Building Automation: Expansion of a house control with LOGO! 0BA7 and weather sensors via Client/Server-Communication (Master-Master)

LOGO! Set 11

Compact Documentation • June 2013

Applications & Tools

Answers for industry.

SIEMENS

Warranty and Liability

Note

The Application Examples are not binding and do not claim to be complete regarding the circuits shown, equipping and any eventuality. The Application Examples do not represent customer-specific solutions. They are only intended to provide support for typical applications. You are responsible for ensuring that the described products are used correctly. These application examples do not relieve you of the responsibility to use safe practices in application, installation, operation and maintenance. When using these Application Examples, you recognize that we cannot be made liable for any damage/claims beyond the liability clause described. We reserve the right to make changes to these Application Examples at any time without prior notice.

If there are any deviations between the recommendations provided in these application examples and other Siemens publications – e.g. Catalogs – the contents of the other documents have priority.

We do not accept any liability for the information contained in this document.

Any claims against us – based on whatever legal reason – resulting from the use of the examples, information, programs, engineering and performance data etc., described in this Application Example shall be excluded. Such an exclusion shall not apply in the case of mandatory liability, e.g. under the German Product Liability Act (“Produkthaftungsgesetz”), in case of intent, gross negligence, or injury of life, body or health, guarantee for the quality of a product, fraudulent concealment of a deficiency or breach of a condition which goes to the root of the contract (“wesentliche Vertragspflichten”). The damages for a breach of a substantial contractual obligation are, however, limited to the foreseeable damage, typical for the type of contract, except in the event of intent or gross negligence or injury to life, body or health. The above provisions do not imply a change of the burden of proof to your detriment.

Copyright © Siemens AG 2013 All rights reserved

Any form of duplication or distribution of these Application Examples or excerpts hereof is prohibited without the expressed consent of Siemens Industry Sector.

Table of Contents

Warranty and Liability **2**

1 Task **4**

1.1 Overview ..... **Fehler! Textmarke nicht definiert.**

2 Solution **4**

2.1 Solution overview 4
2.2 Hardware and software components used 5

3 Function Mechanisms of this Application **7**

3.1 Weather sensors 7
3.1.1 Wind sensor 7
3.1.2 Light sensor 7
3.1.3 Dusk sensor 7
3.1.4 Rain sensor 8
3.1.5 Temperature sensor 8
3.2 Client-server communication 8

4 Installation **10**

4.1 Software installation 10
4.2 Configuration of the client-server communication 11
4.3 Configuration of the project for controlling the application via PC (simulation of the panel at the PC) 12
4.3.1 Settings in the operating system 12
4.3.2 Settings in WinCC Basic V11 13
4.4 Configuration of the project for controlling the application via HMI KTP600 16
4.4.1 Settings on the HMI panel 16
4.4.2 Settings in WinCC Basic V11 18

5 Operating the Application **20**

5.1 Overview of functions 20
5.1.1 Overview screen: display of measuring signals of the weather sensors 20
5.1.2 System functions screen 20
5.2 Operation 21

6 Related Literature **23**

6.1 Bibliography 23
6.2 Internet links 23

7 History **23**

Copyright © Siemens AG 2013 All rights reserved

1 Task

Note

This LOGO! set expands the house control of LOGO! Set 10 by a weather station with HMI panel. The example on hand can also be operated without hardware using the HMI panel simulation of WinCC. In this LOGO! Set the software projects from LOGO! Set 10 are replaced with projects related to LOGO! Set 11.

Further information on the functionalities of LOGO! Set 9 and LOGO! Set 10 and the respective documentation for the download is available in entry ID 64143308 and 68585344.

Introduction

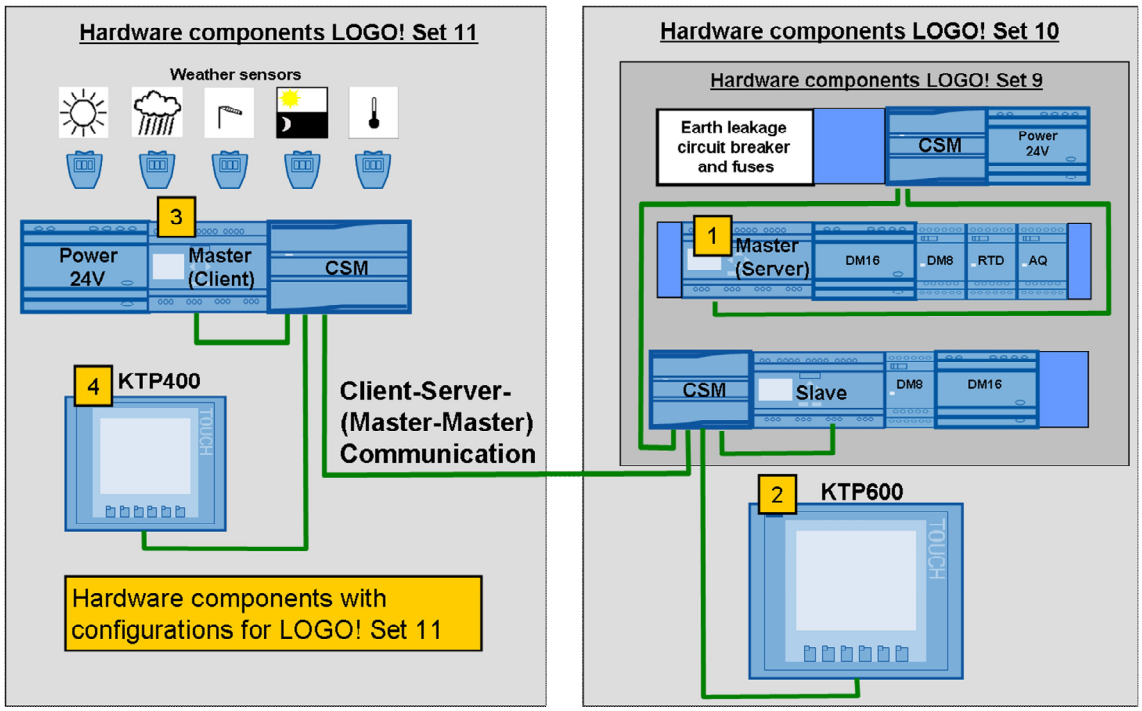
In a residential home, the following functions shall be controlled automatically using weather sensors and the measuring values displayed on an HMI panel:

- Blinds
- Roof windows
- Interior and exterior lighting
- Heating
- Garden watering

2 Solution

2.1 Solution overview

Figure 2-1



Copyright © Siemens AG 2013 All rights reserved

Note The following applies in the overall documentation: the term client-server communication always refers to the master-master communication of the LOGO! controllers in LOGO! Set 11 and LOGO! Set10.

Advantages/benefits

- Weather dependent controlling and monitoring of a house control with LOGO! 0BA7, weather sensors and Touch Panel
- Individually setting each of the blinds also possible in automatic mode
- Minimizing storm damage at the blinds
- Cost reduction through efficient room temperature with internal and external temperature comparison
- Additional option to control the functionalities of the application on the PC via the HMI panel

2.2 Hardware and software components used

Note This LOGO! Set comprises a hardware expansion (autonomous usage also possible) of LOGO! Set 10 and LOGO! Set 9. A connection to the house control requires the hardware components from the documentations of LOGO! Set 10 and LOGO! Set 9 (see entry ID 68585344 and 64143308).

This application was set up with the following components:

Hardware components

Table 2-1

No.	Component	No.	Order number	Note
1.	LOGO! 12/24RCE	1	6ED1052-1MD00-0BA7	
2.	LOGO! CSM 12/24 COMPACT SWITCH MODUL	1	6GK7177-1MA10-0AA0	
3.	LOGO! POWER 24 V/4 A	1	6EP1332-1SH52	
4.	SIMATIC HMI KTP400 BASIC COLOR**	1	6AV6647-0AK11-3AX0	
5.	RAIN SENSOR HEATED AP 258/41	1	5WG1258-3AB41	Optionally, another rain sensor can also be used: for example: Stengler Regensensor (rain sensor) RS-600
6.	TEMPERATURE SENSOR AP 258/21	1	5WG1258-3AB21	Optionally, another temperature sensor can also be used: for example: Stengler Temperatursensor (temperature sensor) TS-S

Copyright © Siemens AG 2013 All rights reserved

No.	Component	No.	Order number	Note
7.	DUSK SENSOR AP 258/11	1	5WG1258-3AB11	Optionally, another dusk sensor can also be used: for example: Stengler Dämmerungssensor (dusk sensor) DS-S
8.	LIGHT SENSOR AP 258/31	1	5WG1258-3AB31	Optionally, another light sensor can also be used: for example: Stengler Sonnen-Lichtsensor (sun light sensor) LE-S
9.	Small wind sensor	1	Ventus art.no.: 200 430	

Configuration software/tools

Table 2-2

No.	Component	No.	Order number	Note
1.	LOGO!Soft Comfort V7	1	6ED1058-0BA02-0YA1	
2.	WinCC Basic V11**	1	6AV2100-0AA01-0AA0	

Note

**For the device support of KTP400 Basic color PN the Hardware Support package for WinCC Basic V11 SP2 must be installed. The update is available at entry ID 58112582.

The HMI project is also compatible with and can be migrated to WinCC Basic V12.

Sample files and projects

Table 2-3

No.	Component	Note	Hardware component (see numbering in Figure 2-1)
1.	68585346_LOGO!_Set11_Wetter station_en.lsc	LOGO!Soft Comfort configuration for LOGO! 0BA7 (Client LOGO! Set 11)	3
2.	68585346_LOGO!_Set11_Master_Master_en.lsc	LOGO!Soft Comfort configuration for LOGO! 0BA7 (Server LOGO! Set 10) • Here, it replaces the configuration from LOGO! Set 10	1
3.	68585346_LOGO!_Set11_HMI_KTP400.ap11	WinCC Basic V11 configuration for weather station with HMI KTP400 (LOGO! Set 11)	4
4.	68585346_LOGO!_Set11_HMI_KTP600.ap11	WinCC Basic V11 configuration for house control with HMI KTP600 (LOGO! Set 10) • Here, it replaces the configuration from LOGO! Set 10	2

Copyright © Siemens AG 2013 All rights reserved

3 Function Mechanisms of this Application

3.1 Weather sensors

3.1.1 Wind sensor

The weather sensor is connected to the configuration part “Manual and automatic control of blinds” (Server LOGO! Set 10).

In automatic mode, all blinds are raised in the event of strong wind via function block “wind” (analog threshold value switch).

For protecting the blinds, strong wind (here, 20 km/h) is given functional priority over high solar irradiation (here, 20 kLux) and lowering via one-week time switches.

In configuration mode, the limit values of the “wind” function block can be changed on the LOGO! display and the LOGO! TD.

Note For wind velocities below the limit value (here, 18 km/h), the blinds are raised in the morning and lowered in the evening automatically according to the set times of the one-week time switches.

Copyright © Siemens AG 2013 All rights reserved

3.1.2 Light sensor

The light sensor is connected to the configuration part “Manual and automatic control of blinds” (Server LOGO! Set 10).

In automatic mode, all blinds are lowered in the event of high solar irradiation (here, 20 kLux) via function block “sun” (analog threshold value switch).

High solar irradiation takes priority over raising via one-week time switches.

Manual switching of blinds takes highest priority, even if the automatic mode is activated and high solar irradiation occurs.

In configuration mode, the limit values of the “sun” function block can be changed on the LOGO! display and the LOGO! TD.

3.1.3 Dusk sensor

The dusk sensor is connected to the configuration part “Interior and exterior lighting” (Server LOGO! Set 10).

In automatic mode, all exterior lights are automatically switched off at sunrise (> 10 lux) and switched on at dusk (< 10 lux) via function block “twilight” (analog threshold value switch).

Manual switching of lights takes highest priority, even if the automatic mode is activated.

In configuration mode, the limit values of the “twilight” function block can be changed on the LOGO! display and the LOGO! TD.

3.1.4 Rain sensor

The rain sensor is connected to the configuration part “Manual and automatic garden watering” as well as “Manual and automatic control of the roof hatch” (Server LOGO! Set 10).

In automatic mode, if it does not rain, the garden watering is switched on automatically in the morning at 09:00 h and in the evening at 20:00 h for 10 minutes via one-week time switches.

In automatic mode, the roof hatch closes via function block “aut.roo” in the event of rain or opens when there is no rain and the temperature is high.

In configuration mode, the days and times of the week time switch (function block “watering”) for the garden watering and function block “aut.roo” for the roof hatch can be changed on the LOGO! display and the LOGO! TD.

3.1.5 Temperature sensor

The temperature sensor is connected to the configuration part “Manual and automatic control of the roof hatch” (Server LOGO! Set 10).

In automatic mode, the roof hatch is opened via function block “aut.roo” at high temperature (here, >28 °C) and closed at low temperature (here, <25°C).

In automatic mode, all heating is switched off via function block “temp out” (analog threshold value switch) as of 22 °C outside temperature.

In configuration mode, the limit values of the function blocks (“temp.out”, “aut.roo”) can be changed on the LOGO! display and the LOGO! TD.

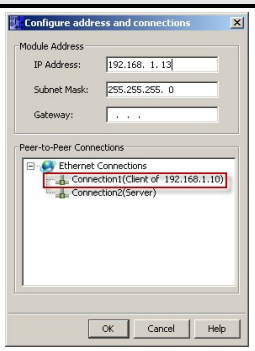
3.2 Client-server communication

During client-server communication, the server provides its data areas for the client to write to or read from.

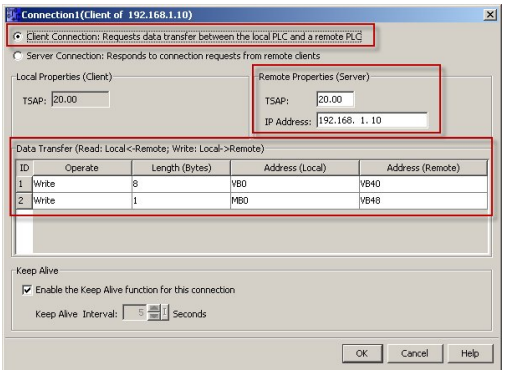
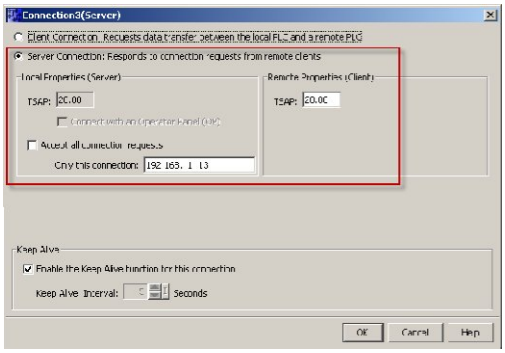
A LOGO! 0BA7 can be client and server at the same time.

In the example on hand, the master LOGO! from the weather station (LOGO! Set 11) is the client which writes the measuring signals of the weather sensors, and the master LOGO! of the house control (LOGO! Set 10) is the server which supplies its data areas and reads the measuring signals.

Table 3-1

	Description	LOGO! Soft Comfort V7
1.	Go to Options->Ethernet Connections and double-click on Connection to open the address configuration.	

Copyright © Siemens AG 2013 All rights reserved

	Description	LOGO! Soft Comfort V7
2.	In the “68585346_LOGO!_Set11_ Wetterstation_en.lsc” configuration of the weather station, the connection is defined as Client Connection. Additionally, the IP address and the TSAP of the communication partner (server) is specified. • here, IP address: 192.168.1.10 • here, TSAP: 20.00 For the measuring signals of the weather sensors, two local data transmissions in “write” direction and the local start addresses VB0 and MB0 are defined. For the distributed addresses from the server of LOGO! Set 10 which reads the measuring signals, the distributed start addresses VB40 and VB48 are defined.	
3.	In the “68585346_LOGO!_Set11_Master_ Master_en.lsc” configuration of the house control (LOGO! Set10) the connection is defined as server connection. Additionally, the IP address and the TSAP of the communication partner (client) is specified. • here, IP address: 192.168.1.13 • here, TSAP: 20.00	

The parameter VM assignment is defined as follows in both configurations of the client-server communication within the assigned data transmission (see Table 3-1, step 2 and step 3):

Table 3-2

	Weather sensor	Client (LOGO! Set 11)	Server (LOGO! Set 10)
1.	Rain sensor	M1	V48.0
2.	Dusk sensor	VW0	VW40
3.	Temperature sensor	VW2	VW42
4.	Light sensor	VW4	VW44
5.	Wind sensor	VW6	VW46

Copyright © Siemens AG 2013 All rights reserved

4 Installation

4.1 Software installation

Note

It is assumed that the necessary LOGO!Soft Comfort V7 software has been installed on your PC and that you are familiar with the basic handling of this software.

IP addresses and subnet masks

Table 4-1

	Device	IP address	Subnet mask	Gateway	Hardware component (see numbering in Figure 2-1)
1.	Client (LOGO! Set11)	192.168.1.13	255.255.255.0	0.0.0.0	3
2.	Server (LOGO! Set10)	192.168.1.10	255.255.255.0	0.0.0.0	1
3.	**Network card or USB Ethernet Adapter** for network connection to PC	192.168.1.12	255.255.255.0	0.0.0.0	
4.	HMI KTP400 (LOGO! Set 11)	192.168.1.80	255.255.255.0	0.0.0.0	4
5.	HMI KTP600 (LOGO! Set 10)	192.168.1.20	255.255.255.0	0.0.0.0	2

Note

The IP addresses and subnet masks of the client and server LOGO!, of HMI panel and network card or the USB Ethernet Adapter for the network connection to the PC, must always be set so all devices are located in the same subnet (see Table 4-1).

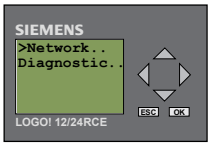
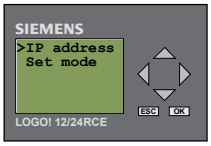
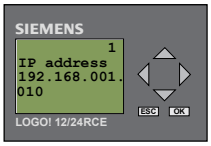
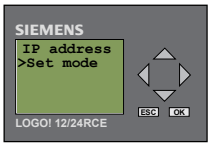
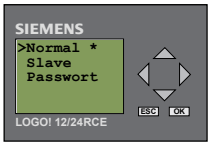
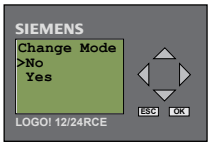
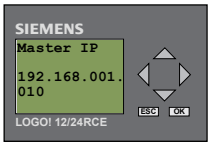
When navigating in the operating system to “Start>Settings>Network connections” and double clicking on the Network card or USB Ethernet Adapter, the menu item “properties” is opened. At “Internet Protocol (TCP/IP)” the IP address for the network connection to the PC can be changed.

Copyright © Siemens AG 2013 All rights reserved

4.2 Configuration of the client-server communication

Note Changes of the IP address are only possible in “STOP” mode.

Table 4-2

1.	First, you configure the server LOGO! from LOGO! Set 10. Navigate to the “Network..” menu item via the LOGO! display and select it.	
2.	Select “IP address” item.	
3.	Press on the OK button of LOGO! and use the arrow keys to enter your IP address of the server LOGO! (here: 192.168.1.10). Confirm with the OK button.	
4.	Press the ESC key to get to the previous menu item and select “Set mode”.	
5.	For configuring the server (master) LOGO! you select the “Normal” mode.	
6.	Acknowledge the “Change Mode” query with “Yes!”, if LOGO! is not yet in normal mode (master).	
7.	Repeat steps 1-6 for the configuration of the client LOGO! of the weather station, with the following differences: • IP address, here: 192.168.1.13	
8.	After a restart both controllers are ready for operation.	

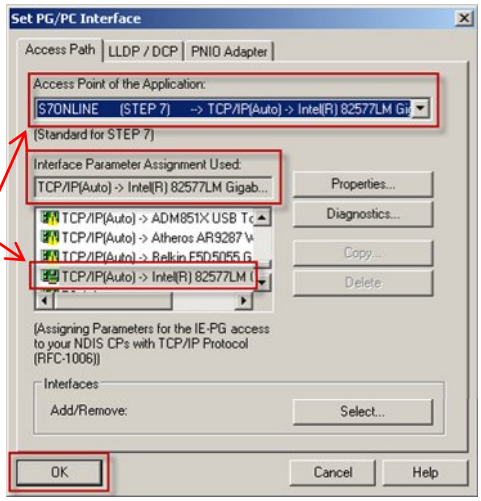
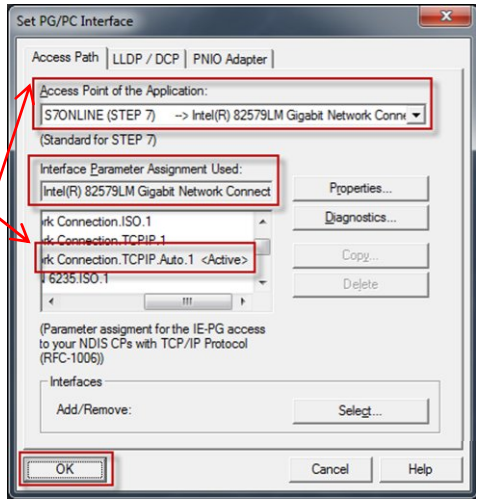
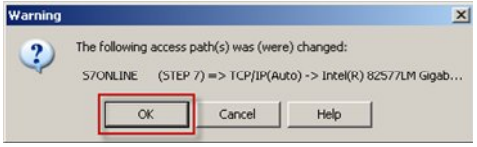
Copyright © Siemens AG 2013 All rights reserved

4.3 Configuration of the project for controlling the application via PC (simulation of the panel at the PC)

4.3.1 Settings in the operating system

Note When controlling the application via PC, please ensure that HMI panel KTP400 is not connected with the subnet, since the PC is already used as HMI panel via the simulation of WinCC, and a basic LOGO! device can communicate with a maximum of one HMI panel.

Table 4-3

	Action	PC screen
1.	In the operating system you navigate to “Start > Settings > Control Panel > Set PG/PC Interface”.	
2.	In “Interface Parameter Assignment Used” you select TCP/IP(Auto) -> Name of your network card or your USB Ethernet adapter (without the yellow warning sign) for the Ethernet communication with LOGO!. • here the example: TCP/IP(Auto)-> Intel(R) 82577LM Gigab…network card) Make sure that in the dropdown menu “Access Point of the Application:” S7ONLINE (STEP7) -> TCP/IP(Auto) -> Name of your network card or your USB Ethernet adapter has been selected. Click on OK to acknowledge the selection.	
3.	Alternatively, at “Control Panel -> Set PG/PC Interface” the “Interface Parameter Assignment Used” is displayed in the following order for certain operating systems: • Name of your network card or your USB Ethernet adapter.TCPIP.Auto.1 (without the yellow warning sign). As in the previous step 2, you also select this point here and make sure that the following has been selected in the “Access Point of the Application”: S7ONLINE (STEP7) -> Name of your network card or your USB Ethernet adapter.TCPIP... . Click on OK to acknowledge the selection.	
4.	Acknowledge the warning prompt that appears in certain operating systems with OK to complete the selection.	

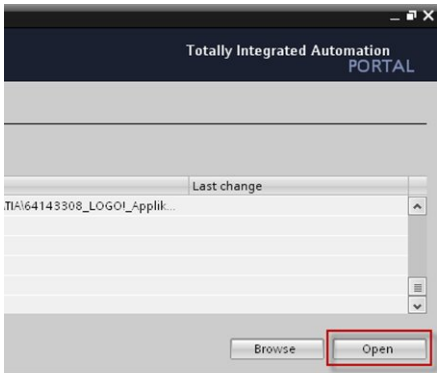
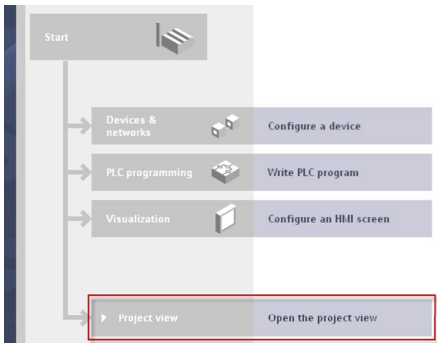
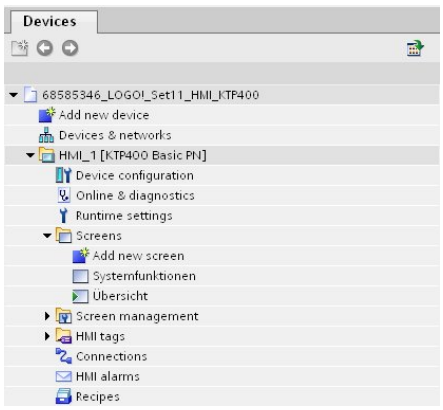
Copyright © Siemens AG 2013 All rights reserved

	Action	PC screen
5.	Now navigate to the WinCC Basic V11 program to make the required settings as described in the next Table 4-4.	

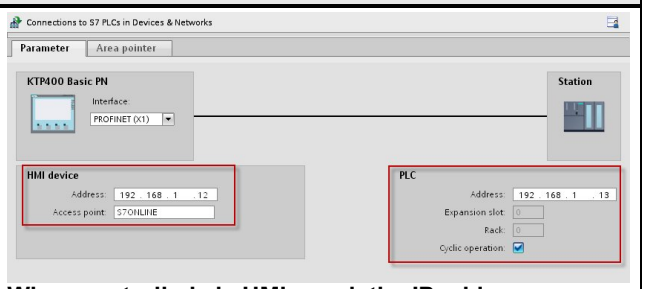
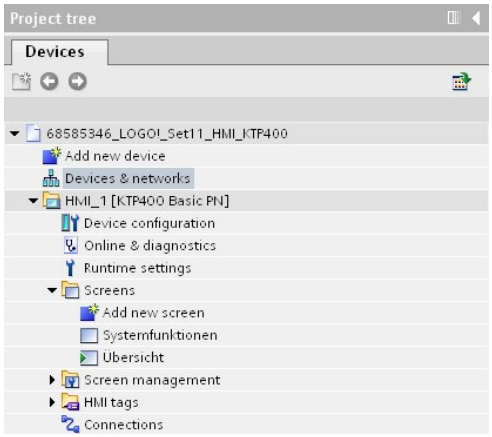
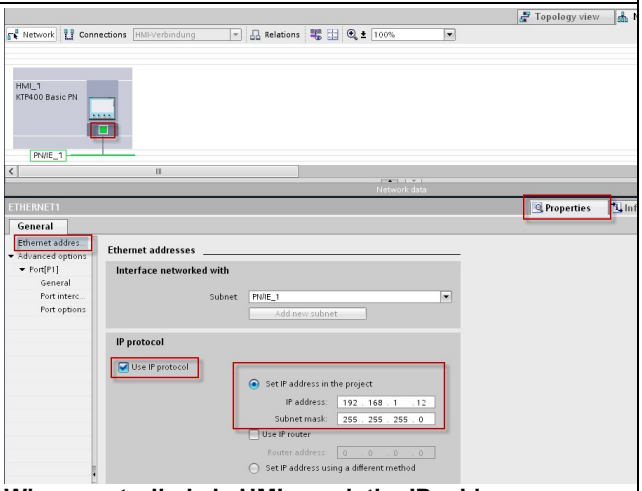
4.3.2 Settings in WinCC Basic V11

Note It is assumed that the WinCC Basic V11 project has been opened and that you are in the project view.

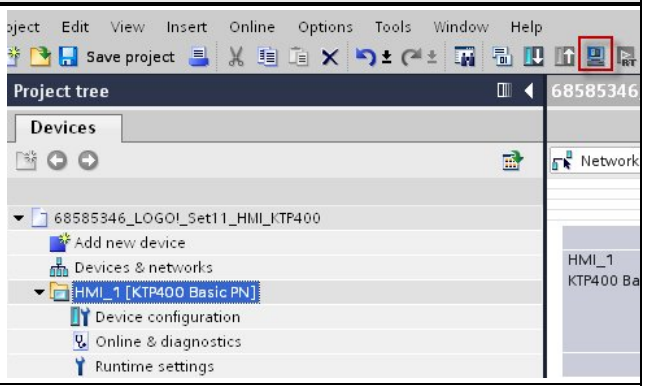
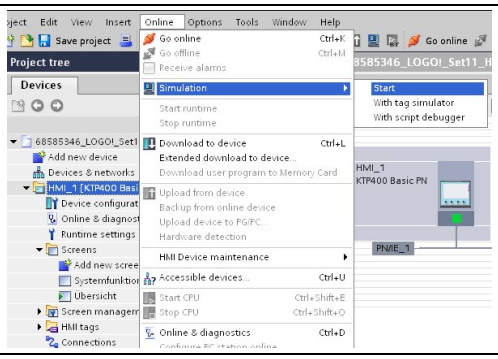
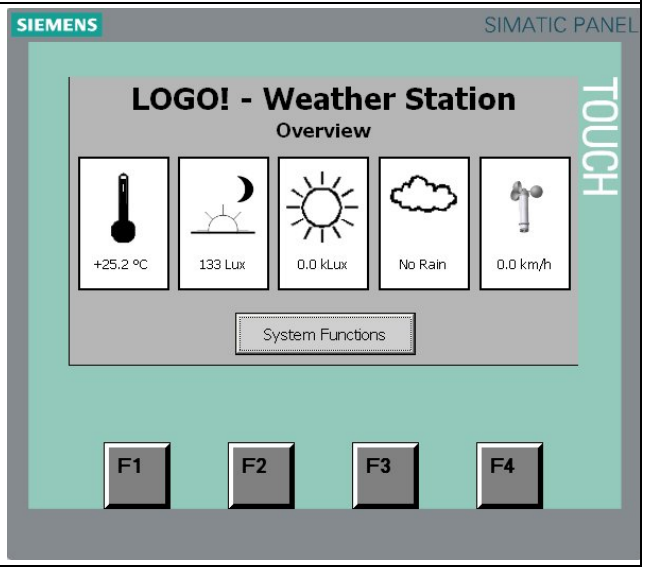
Table 4-4

	Action	WinCC Basic project view
1.	Start WinCC Basic V11, select your project via “Browse” and click on “Open”.	
2.	Click on “Project view”, to open the project view.	
3.	In the project tree in “HMI_1[KTP400 Basic PN]” you navigate to “Connections” and select it with a double-click.	

Copyright © Siemens AG 2013 All rights reserved

	Action	WinCC Basic project view
4.	In “HMI device” you enter the IP address of your PC (here: 192.168.1.12) and press the Enter key for acknowledgement. Make sure that “S7ONLINE” is set as the “Access point:”, your IP address of the client LOGO! (here: 192.168.1.13) has been entered in “PLC”, and the “Cyclic operation” checkbox is activated.	 **When controlled via HMI panel, the IP address 192.168.1.80 of the KTP400 must be entered here at “HMI device”.**
5.	In the project navigation you navigate to “Devices & networks” and select it with a double-click.	
6.	Click on the Ethernet interface, navigate to the “Properties” tab, ensure that “Use IP protocol” has been check-marked, and enter the IP address and subnet mask of your PC, here: • IP address (PC):192.168.1.12. • Subnet mask: 255.255.255.0	 **When controlled via HMI panel, the IP address 192.168.1.80 of the KTP400 should be entered here.**

Copyright © Siemens AG 2013 All rights reserved

	Action	WinCC Basic project view
7.	In the project tree, select the “HMI_1[KTP400 Basic PN]” folder and in the toolbar you click on the “Start simulation” button.	
8.	Alternatively, you can select the “Online > Simulation > Start” command from the menu.	
9.	As soon as the automatic compilation is terminated, the Runtime simulator starts the project. You can now operate the application via your PC.	

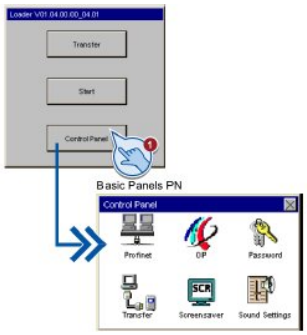
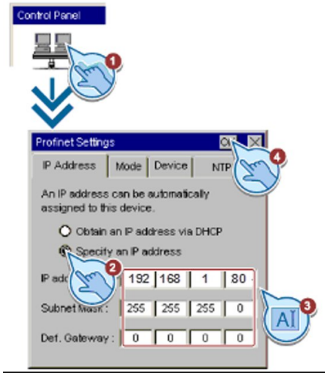
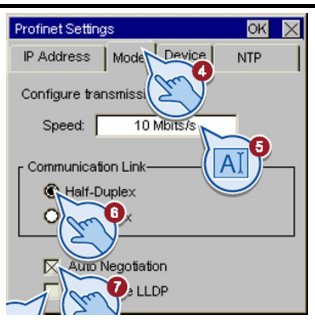
Copyright © Siemens AG 2013 All rights reserved

4.4 Configuration of the project for controlling the application via HMI KTP400

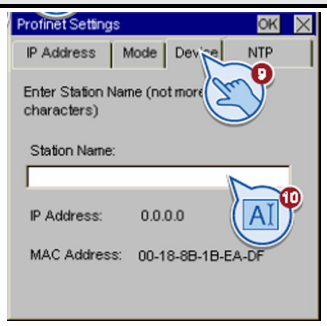
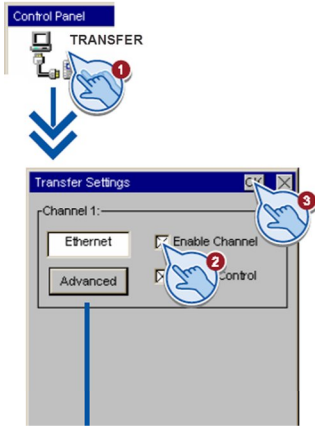
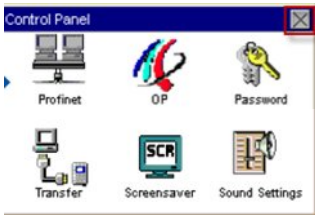
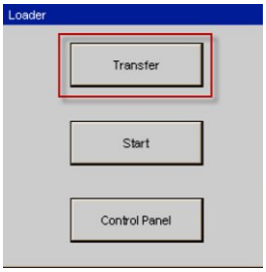
4.4.1 Settings on the HMI panel

Note The respective setup guidelines for HMI KTP400 must generally be followed. The IP address of the HMI panel can only be changed if Runtime has “stopped”.

Table 4-5

No.	Action	KTP400 Display
1.	Open the properties of the HMI panel via the “Control Panel” button of the loader.	
2.	Double-click on the "Profinet" button to open the "Profinet Settings" (1) dialog and select “Specify an IP address” (2) for the assignment of an IP address. Touch the respective input fields and enter the IP address, the subnet mask and the gateway **via screen keyboard**, here: • IP address: 192.168.1.80 • Subnet mask: 255.255.255.0 • Gateway: 0.0.0.0	
3.	Go to the “Mode” tab. Set the checkmark at "Auto Negotiation"; this automatically detects and sets the connection type and the transmission rate in the PROFINET network. Ensure that the "Deactivate LLDP" checkbox (information exchange with other operator panels) **is deactivated**.	

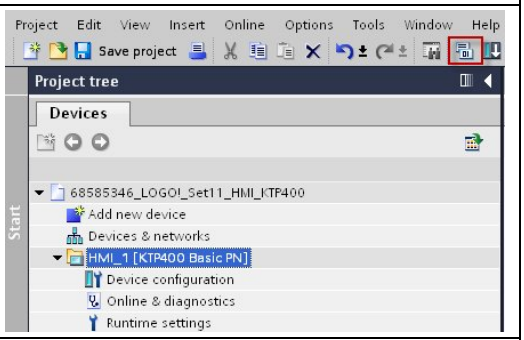
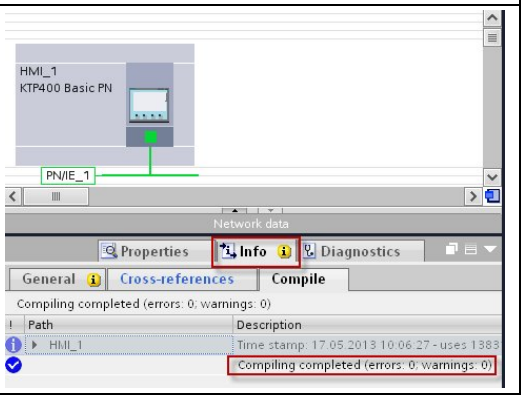
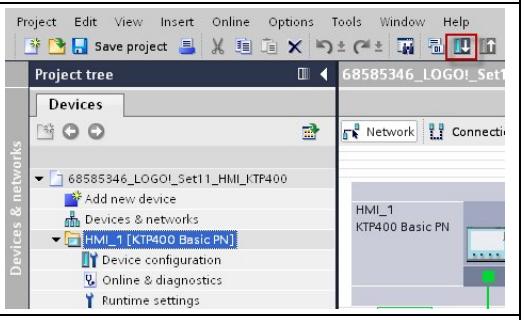
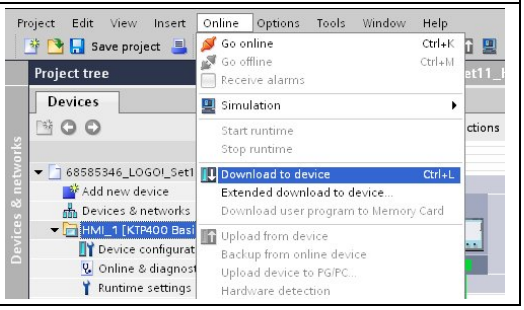
Copyright © Siemens AG 2013 All rights reserved

No.	Action	KTP400 Display
4.	Go to the “Device” tab. Enter a network name for your HMI panel. The name must meet the following requirements: • • Maximum length: 240 characters • • Character "a" to "z", numbers "0" to "9" • • permitted special characters: "-" and"." • • Forbidden syntax: "n.n.n.n" (n=0 to 999) and "port-yxz" (x, y, z =0 to 9) • Press "OK" to accept all entries.	
5.	Select the “Transfer” button to open the “Transfer Settings” dialog box. To load a project onto the HMI panel, at least one data channel must be enabled. Activate the "Enable Channel" checkbox. Check the "Remote Control" checkbox to activate the automatic transfer. Press "OK" to accept the entries.	
6.	Close the window to get back to the start screen of the loader.	
7.	Press on the “Transfer” button of the Loader, to enable loading the project into the HMI panel. In the dialog window which opens, the **"Connecting to host ..."** message is displayed.	
8.	Navigate to the WinCC Basic V11 program to open the project and follow the steps in Table 4-6 to load the project into the HMI Panel.	

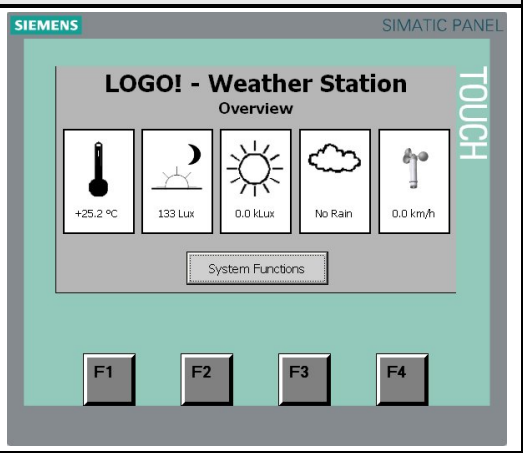
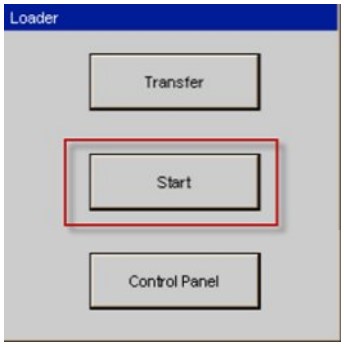
Copyright © Siemens AG 2013 All rights reserved

4.4.2 Settings in WinCC Basic V11

Table 4-6

	Action	WinCC Basic V11 project view
1.	Repeat step 1-6 in Table 4-4 with the following difference: in step 4 and step 6 you enter the IP address 192.168.1.80 from HMI Panel KTP400.	
2.	In the project tree, select the “HMI_1[KTP400 Basic PN]” folder and in the toolbar you click on the “Compile” button.	
3.	Wait until the compilation has finished and the “Info” tab displays the message “Compiling completed (errors: 0 ; warnings: 0)”.	
4.	In the project tree, select the “HMI_1[KTP400 Basic PN]” folder and in the toolbar you click on the “Download to device” button.	
5.	Alternatively, you can also select the “Online > Download to device” command from the menu.	

Copyright © Siemens AG 2013 All rights reserved

	Action	WinCC Basic V11 project view
6.	As soon as the project download has been completed, the configuration automatically starts on the KTP600 and you can now operate the application.	
7.	If the project does not start automatically after loading, click the “Start” button of the loader.	

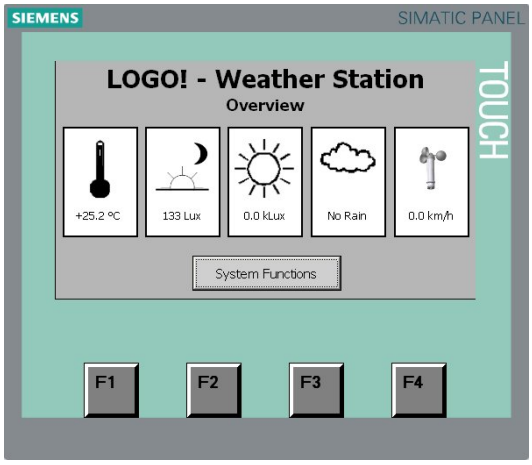
Copyright © Siemens AG 2013 All rights reserved

5 Operating the Application

5.1 Overview of functions

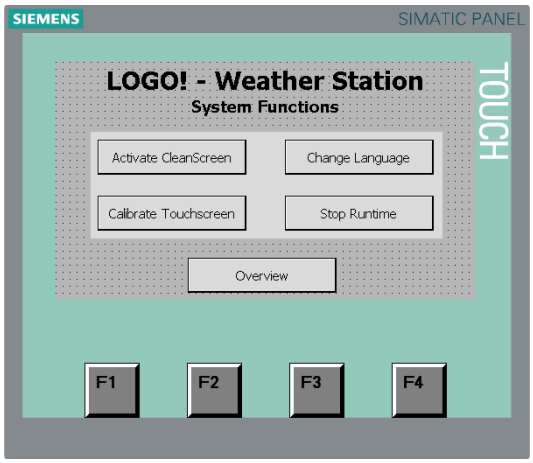
5.1.1 Overview screen: display of measuring signals of the weather sensors

Figure 5-1



5.1.2 System functions screen

Figure 5-2



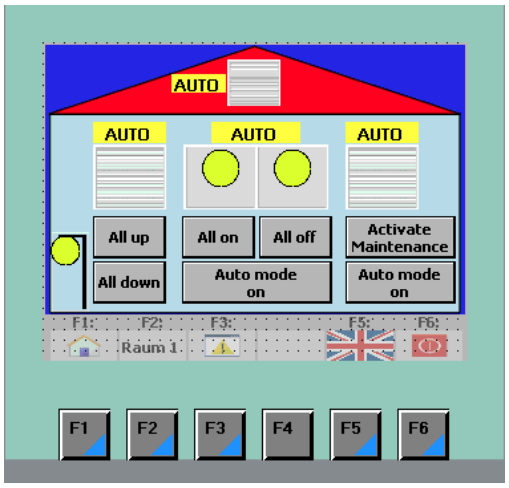
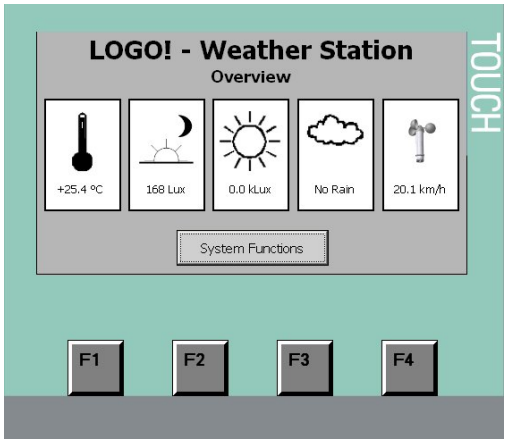
Copyright © Siemens AG 2013 All rights reserved

5.2 Operation

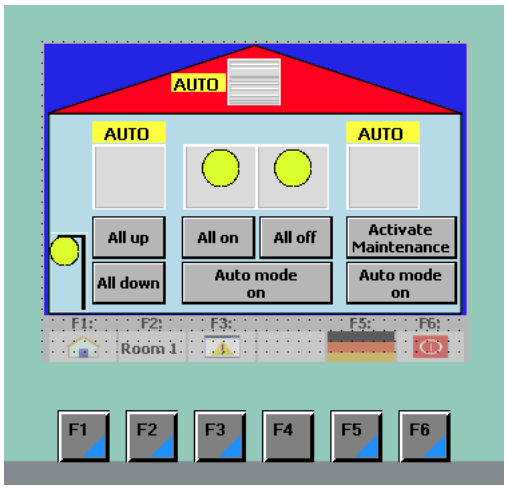
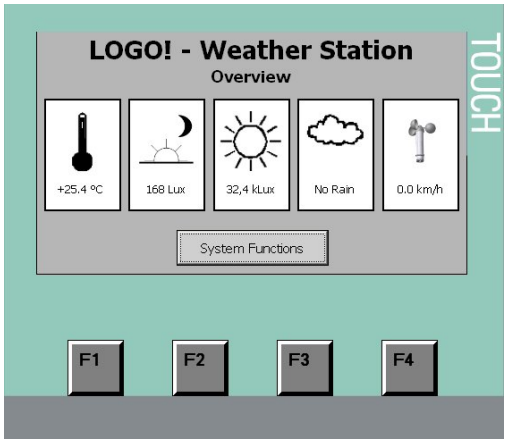
The operation of the application is explained to you using the example of the blinds function with the wind and light sensor.

Note It is assumed you are not using LOGO! Set 11 as an autonomous weather station, but in combination with the house control of LOGO! Set 10.

Table 5-1

No.	Description / activity	KTP600 and KTP400 Display
1.	Check on HMI KTP600 (LOGO! Set 10) that the “Auto mode” for the blinds is active.	**KTP600 (LOGO! Set 10)** 
2.	The wind speed exceeds 20 km/h.	**KTP400 (LOGO! Set 11)** 

Copyright © Siemens AG 2013 All rights reserved

No.	Description / activity	KTP600 and KTP400 Display
3.	All blinds move up and stay in this final position for as long as the wind is strong (>20 km/h).	**KTP600 (LOGO! Set 10)** 
4.	There is high solar irradiation (>20kLUX). All blinds automatically move down, only if the wind speed is also below 18km/h.	**KTP400 (LOGO! Set 11)** 

Copyright © Siemens AG 2013 All rights reserved

6 Related Literature

6.1 Bibliography

This list is not complete and only represents a selection of relevant literature.

Table 6-1

	Topic	Title
1.	LOGO!	LOGO! Practical Training Authors: Uwe Graune; Mike Thielert; Ludwig Wenzl Publisher: Publicis Publishing ISBN: 978-3-89578-338-8

6.2 Internet links

This list is not complete and only represents a selection of relevant information

Table 6-2

	Topic	Title
1.	LOGO! Information	http://ww.automation.siemens.com/mcms/programmable-logic-controller/en/logic-module-logo/Pages/Default.aspx
2.	LOGO! Starter Kit	http://www.automation.siemens.com/mcms/programmable-logic-controller/en/logic-module-logo/logo-starter-kit/Pages/Default.aspx
3.	Link to this document	http://support.automation.siemens.com/WW/view/en/68585346
4.	Siemens Industry Online Support	http://support.automation.siemens.com
5.	LOGO! Manuals	http://support.automation.siemens.com/WW/view/en/10805245/133300
6.	LOGO! Forum	http://www.automation.siemens.com/WW/forum/guests/Conference.aspx?SortField=LastPostDate&SortOrder=Descending&ForumID=40&Language=en&onlyInternet=False
7.	LOGO! Software Updates	http://www.automation.siemens.com/mcms/programmable-logic-controller/en/logic-module-logo/demo-software/Pages/Default.aspx
8.	LOGO! Application Examples	http://www.automation.siemens.com/mcms/programmable-logic-controller/en/logic-module-logo/application-examples/Pages/Default.aspx
9.	KTP400/KTP600 Manual	http://support.automation.siemens.com/WW/view/en/31032678
10.	KTP400 Hardware Support Package for WinCC Basic V11 SP2	http://support.automation.siemens.com/WW/view/de/58112582

7 History

Table 7-1:

Version	Date	Modifications
V1.0	05/2013	First version

Copyright © Siemens AG 2013 All rights reserved