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LOGO! 8
Logic Function
"Window Contacts"
for KNX

LOGO! 8, LOGO! CMK2000

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Table of Contents

1 Introduction

This application example offers you a complete function for monitoring the window contacts with LOGO! 8. An expanded application of the application example (see chapter 4) contains suggestions for useful and efficient expansion of the logic function.

The integrated functions of a LOGO! 8 offer many options for quick and easy solutions for automation tasks. Pre-programmed function blocks support you when creating a project, e.g. week timer, pulse generator, astro timer, yearly timer, stopwatch and simple logic gates.

The LOGO! text display unit (TDE) and the integrated LOGO! 8 web server offer additional options for control and monitoring with function keys and message texts.

The communication module CMK2000 from Siemens provides a solution for communication in building automation with LOGO! 8. The communication module enables communication between a LOGO! 8 and any KNX device via the KNX building system bus.

Figure 1-1: Hardware setup for the application example
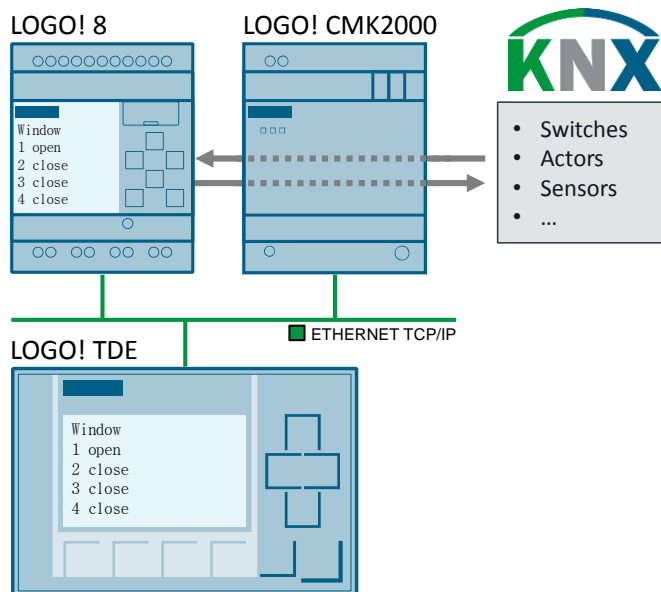
Advantages

The combination of the logic function in LOGO! 8 and the CMK2000 module offers you the following advantages:

- Logic function can be expanded, e.g. with additional window contacts
- Software program can be expanded by further tasks (room lighting, staircase lighting, partition wall control, etc.)
- Integration of LOGO! inputs and output into a KNX system

Target group

This application example is aimed at experienced KNX users who seek to expand their KNX system with the functionalities of a LOGO! 8.

1.1 Task Description

This application example shows how to monitor electric window contacts and KNX signals with LOGO! 8 and evaluate them as the result of a logic operation.

Figure 1-2 shows a simple sample application of the monitoring of window contacts in a house.

When a window is opened, this is to be displayed at a central station and an optional alarm function is to be offered.

Figure 1-2: Task (Monitoring of window contacts)
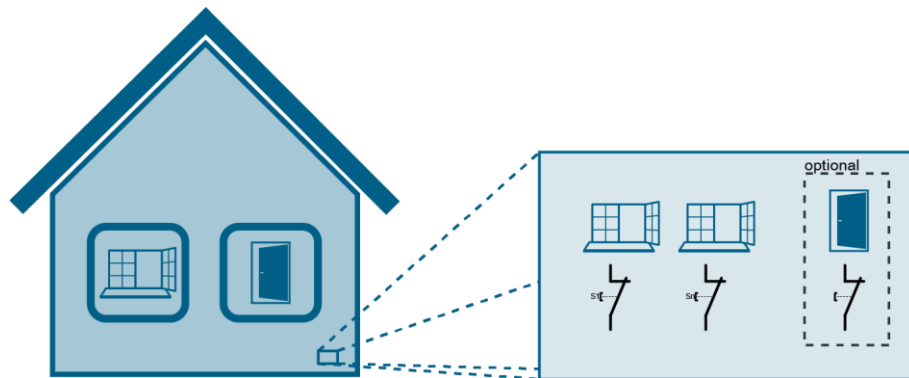
You can flexibly expand the function with LOGO! 8, e.g. by the additional monitoring of doors and by several alarm functions like motion alarms, pressure sensors in the door mat, etc.

You can expand your application by functions like a week timer or automate individual processes in the house. Chapter 4 shows a few possible expansions.

1.2 Mode of operation

The window contacts are interconnected with the digital inputs [I1] to [I4] of the LOGO! in the LOGO! switching program.

Window contacts are generally delivered as break contact ("normally opened") or make contact ("normally closed"). The break contact version has the practical advantage that the signal is interrupted in case of a wire break and a warning or alarm signal is triggered.

The switching states of the window contacts are displayed as message texts on the LOGO! display and the LOGO! TDE.

Note	A functional description of the logic function can be found as a comment of the switching program under LOGO! Soft Comfort: > "Tools" > "Select Hardware" > "Offline settings" > "Comment". **Tip:** Activate the "Comment" option box under "Tools" > "Options" > "Print" for the function description to be printed together with the program.

2 Setup and description

2.1 Components used

This application example was created with the following components:

Table 2-1: Hardware and software components for the application example

Component	Number	Article number	Note
LOGO! Soft Comfort V8.1	1	6ED1058-0BA08-0YA1	Upgrade to V8.1 can be found at http://www.siemens.com/logo
ETS5 Demo A maximum of 5 KNX devices per project	1	Download	https://www.knx.org/knx-en/software/ets/download/index.php
LOGO! Power	1	6EP3332-6SB00-0AY0	-
LOGO! 8 12/24 RCE	1	6ED1052-1MD00-0BA8	-
LOGO! DM8 24, Transistor DA	1	6ED1055-1CB00-0BA2	-
LOGO! CMK2000	1	6BK1700-0BA20-0AA0	Product data base ETS5: http://www.siemens.com/gamma-td
LOGO! TDE	1	6ED1055-4MH00-0BA1	Optional components
Siemens GAMMA KNX Power Supply	1	5WG1 125-1AB12	320 mA
Siemens GAMMA KNX bus coupler	1	5WG1 117-2AB12	-
Siemens GAMMA KNX 3-Gang Button	1	5WG1 223-2DB13	Product data base ETS5: http://www.siemens.com/gamma-td
Siemens GAMMA KNX/IP interface	1	5WG1 148-1AB12	Required for programming the KNX devices. Alternatively: USB interface

This application example consists of the LOGO! and ETS programs.

Table 2-2: Components for the application example

Component	File name	Note
Documentation	109745699_LOGO8_LogicFunction_DOC_en.pdf	-
LOGO! 8 programs	109745699_LOGO8_LogicFunktion_basic_en.lsc 109745699_LOGO8_LogicFunktion_extended_en.lsc	Requirement: LOGO! Soft Comfort V8.1
ETS5 projects	109745699_LOGO8_LogicFunktion_en.knxproj	Project for "basic" and "extended" Requirement ETS5 software

2.2 Hardware setup

Figure 2-1 shows the hardware setup for this application example.

The assignment of the digital input and output signals of LOGO! 8 for the basic sample project can be found in Table 2-3 and for the expansion in Table 4-1.

The assignment of the KNX communication objects and the group addresses can be found in Table 2-4.

Figure 2-1: Hardware setup
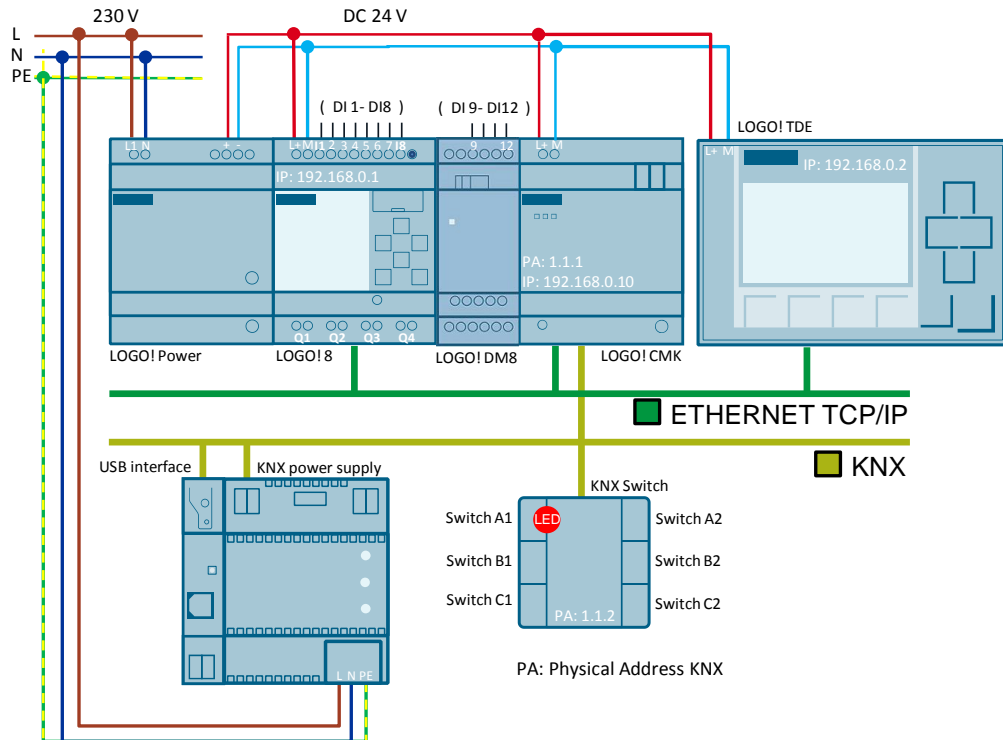
Note	LOGO! TDE is an optional component. You can also use its functions (message texts and function buttons) via the integrated LOGO! web server.

2.3   LOGO! program

The basic switching program consists of four window contacts that are linked via two basic logic functions (AND or OR blocks).

Use the LOGO! Soft Comfort simulation function for a graphic display of the dependencies in the switching program. Active connections (signals) are displayed in red, passive connections in blue.

Figure 2-2 shows three closed window contacts [I2] to [I4] and an open window contact at [I1]. The logic blocks therefore create a positive result of the operation and trigger the output [Q1] as a general warning message for at least one open window.

The button at [I5] activates an alarm system that triggers an alarm signal (e.g. acoustic warning, lighting, etc.) via [Q2] when a window is open.

In addition, the messages on the LOGO! display turn red.

You can see in the switching program how the same result of the operation of a NAND block is achieved with [B002] and [B004]. Invert the inputs of an OR function or the output of an AND function to achieve a NAND behavior.

Note   Two logic blocks of a KNX device (logic block N 301) are designed as hardware. The inputs and outputs could be inverted to achieve the desired behavior. LOGO! offers you the same flexibility, but already includes all logic blocks.

Figure 2-2: LOGO! switching program for the application example (basic switching program)
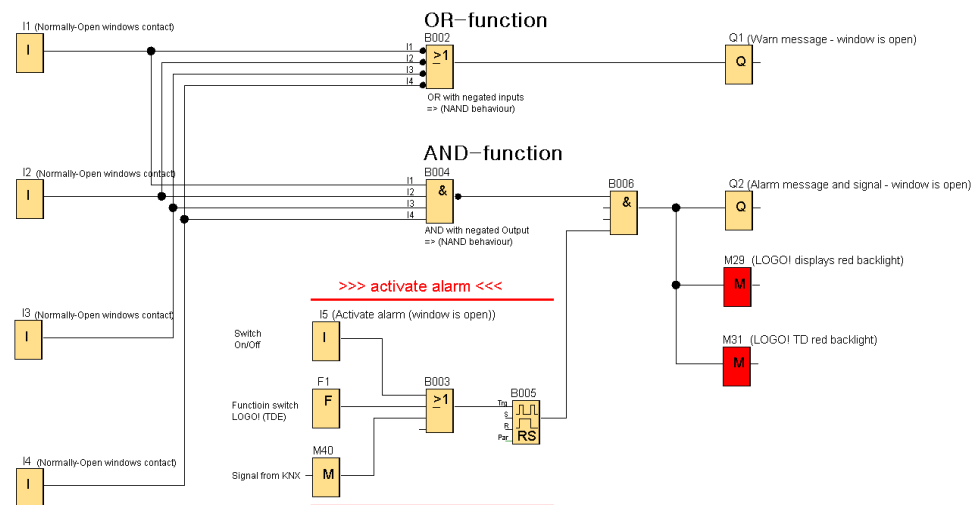
Table 2-3: Input and output signals in the LOGO! (Basic switching program)

Signals	Description
[I1] to [I4]	Digital LOGO! inputs, interconnected with window contacts
[I5] [F1] [M40]	The signals activate or deactivate the "Alarm message" function for at least one open window. [F1]: Function button at the LOGO! TDE or the web server. [M40]: Signal from KNX => LOGO! (Table 2-4)
[Q1]	Output signal as result of the operation of an OR block with inverted inputs equals (NAND behavior).
[Q2]	Output signal as result of the operation of an AND block with inverted output equals (NAND behavior).

A message text block has been included in the switching program to show the switching states of the window contacts. The content of the message text is displayed on the LOGO! display, the LOGO! TDE and the web server (LOGO! TD).

Figure 2-3: Message texts (switching states of the window contacts)
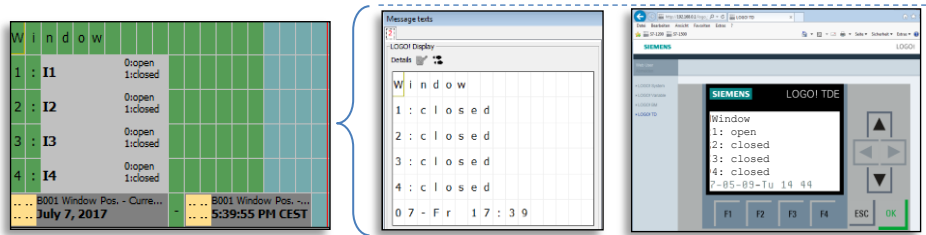
2.4 Mounting the LOGO! into KNX

LOGO! 8 is integrated into a KNX system via the LOGO! communication module CMK2000.

The bi-directional data exchange between LOGO! and the KNX devices is made via configurable communication channels of the LOGO! CMK2000. For the channels, you parameterize inputs and outputs, flags or variable memories as signal in the LOGO!.

The following Table 2-4 shows the signals of the LOGO! for this application example and the communication direction between LOGO! and KNX for the two switching programs in this application example. The ETS5 project included in the delivery contains the LOGO! CMK2000 configured for use with a specific KNX button.

Table 2-4: KNX group addresses and LOGO! channels for communication

Signals in the LOGO!	KNX Group address	Channel Communication between LOGO! and KNX	Description
Flags [M40]	1/1/1	KNX to LOGO! (Channel 1)	Activate warning KNX button A1 (upper left)
Output [Q2]	1/1/12	LOGO! to KNX (channel 12)	Warning signal function is active! (Warning is output that a window is open)
The following signals are additional signals in the expanded switching program:			
Flags [M41]	1/1/2	KNX to LOGO! (Channel 2)	Activating the night alarm KNX button A2 (upper right)
Output [Q1]	1/1/11	LOGO! to KNX (channel 11)	General warning message to Q1 (A window is open)
Output [Q3]	1/1/13	LOGO! to KNX (channel 13)	Night alarm function is active! - Open window - Panic function
Flag [M50] to output [Q4]	1/1/14	KNX to LOGO! (Channel 3)	KNX button in the living room KNX button C1 (bottom left) (Output Q4 does not send a signal back to KNX via LOGO! in this case)

Note In this application example, a 3-gang button with status LEDs is used as KNX device for switching KNX signals.

2.4.1   Configuration of LOGO! CMK2000

Note   In this application example, the KNX devices and the LOGO! communication module CMK2000 have been integrated into the ETS software as "devices".

The basic prerequisites for the signal exchange between LOGO! 8 and the KNX system bus are shown below.

The LOGO! CMK2000 communication module is configured via the ETS software.

Configuration of LOGO! CMK2000:

• General settings for LOGO! CMK2000 and the settings for the channels for the communication between LOGO! 8 and KNX are made in the "Parameters" window.

• Select the LOGO! basic module with which the signal and data exchange is to be performed in the general parameters.

• You have to assign valid IP addresses for the LOGO! base module and the LOGO! CMK2000.

• Enter a password for the web interface.

• One channel of the CMK2000 is configured in the ETS software for the direction "from LOGO! to KNX" and one for the direction "from KNX to LOGO!".

• The LOGO! CMK2000 communication channels are connected with the group addresses of the KNX devices in the "Communication objects" window.

3 Commissioning

Proceed as follows to commission the application example:

LOGO!

1. Start LOGO! Soft Comfort V8.1
2. Open the LOGO! example program included in the delivery: "109748586_LOGO8_Logicfunctions_basic_en.lsc"
3. Load the program to the LOGO!

Note	In this application example, the LOGO! IP address has been preconfigured as 192.168.0.1. How to set the IP address of a LOGO! 8 can be found in the manual in chapter: 3.8.1 "Configuring network settings".

KNX

The following requirements apply to the KNX application:

- The physical addresses "1.1.1" and "1.1.2" are freely available in your KNX system.
- The communication interface has been defined in the ETS software. (Menu bar: "ETS > Bus")
- The bus connection with KNX participants has been established. (e.g.: via the USB interface or the IP interface).

1. Start the ETS software.
2. Click "ETS" in the ETS menu bar.
3. Select the "Overview" tab.
4. Click on the "Import project" symbol.
5. Navigate to the path of the KNX project: "109748586_LOGO-KNX_LogicFunction_en.knxproj"
6. In the "Devices" window, select the button and the LOGO! CMK2000.
7. Click the "Download" button and select "Download all".
8. Follow the instructions in the container "Pending Operations" and press the programming button of the respective device.

Note	Further information on the programming button can be found in the "LOGO! CMK2000" manual: https://support.industry.siemens.com/cs/ww/en/view/109481657 Technical product information GAMMA KNX 3-Gang Button: https://support.industry.siemens.com/cs/ww/en/view/87668166 (in the manual called Commissioning key "F9")

You can check the actual switching states of the window contacts using the message texts from the switching program Figure 2-3.

4 Adjustments and expansions

Starting with a switching program with four window contacts (NC) and the general warning message "Open window" at [Q1], you can freely and effectively expand the program using LOGO!.

Figure 4-1 shows a functional expansion of the application example.

The application example is additionally expanded by a lighting control with integrated panic function Figure 4-2.

The signal assignment can be found in Table 4-1.

4.1 Functional expansions in the application example

Warning signal function

The warning signal is activated and deactivated with a button at input [I5], the function button [F1] at the LOGO! TDE or at the web server.

If the "Warning signal" function is activated and at least one window is open, output [Q2] is set and the LOGO! display turns yellow.

The night alarm function replaces the warning signal, as described below.

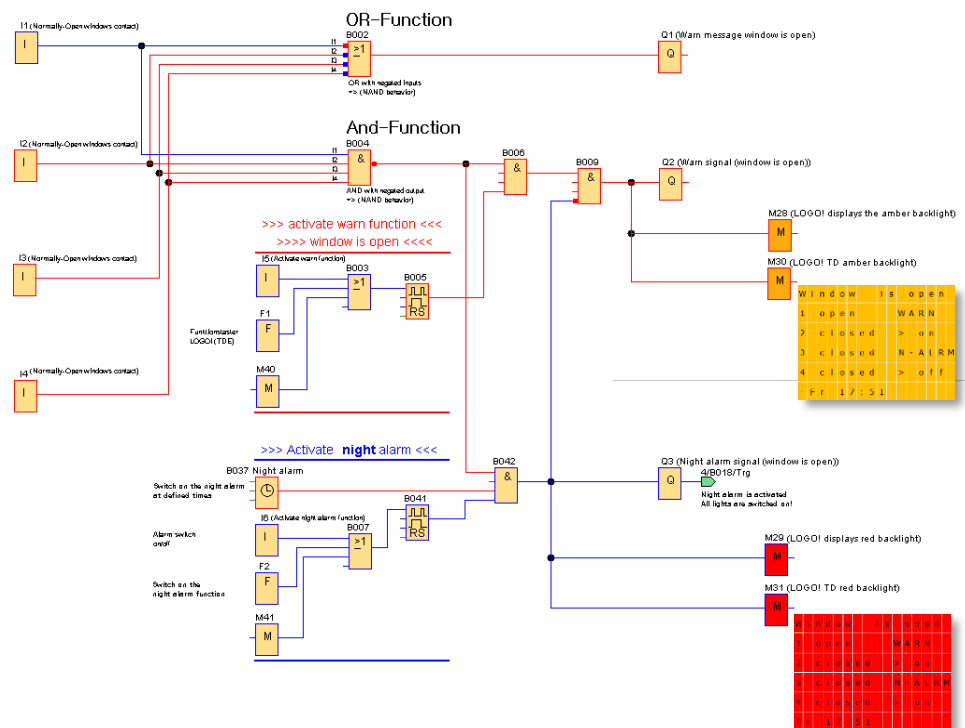**Night alarm function**

The switching program is expanded by the "Night alarm" function.

The button at input [I6] and function button [F2] are used to activate the "Night alarm" function at specific times of the week.

If the "Night alarm" is activated and at least one window is open, output [Q3] is set and the LOGO! display turns red.

Figure 4-1: Application example (expanded LOGO! switching program)

Lighting control

The monitoring of the window contacts is linked with the lighting control, which triggers the panic function when a window is open while the night alarm is activated.

The room sensors are interconnected with the digital inputs of the LOGO!. As an example, a button is connected via KNX to [M50].

| Note | KNX buttons can increasingly be found in the high-priced range and with individual design, particularly for living areas. Therefore, the KNX buttons and the buttons connected with the digital LOGO! inputs are differentiated in this application example. |

Panic function for lighting

If a room button is pressed for more than 3 seconds, the panic function is activated and all lighting in the house is switched on for one minute (length can be configured).

When the "Night alarm" function is activated and a window is open, the panic function is also activated and all the lighting in the house is switched on.

If the window was opened intentionally despite the "night alarm", the house lighting can be switched off by pressing a room button.

The lights will remain on in rooms where the lights were on before the panic function was activated and in the room where the acknowledgment button was pressed.

You can switch off the lights in a room by pressing the room button of the specific room again.

Exterior lighting

The button at input [I11] is used to switch on the exterior lighting for one minute. Pressing the button again will immediately switch off the lighting.

You can activate the automatic switching on and off of the exterior lighting by the astronomical clock via the button at input [I10] for the night operation, for example if the house is empty.

The time zone of the astronomical clock is set via a message text.

below shows the lighting control with the panic function and the exterior lighting.

Figure 4-2: Lighting control for a house (expanded LOGO! switching program)
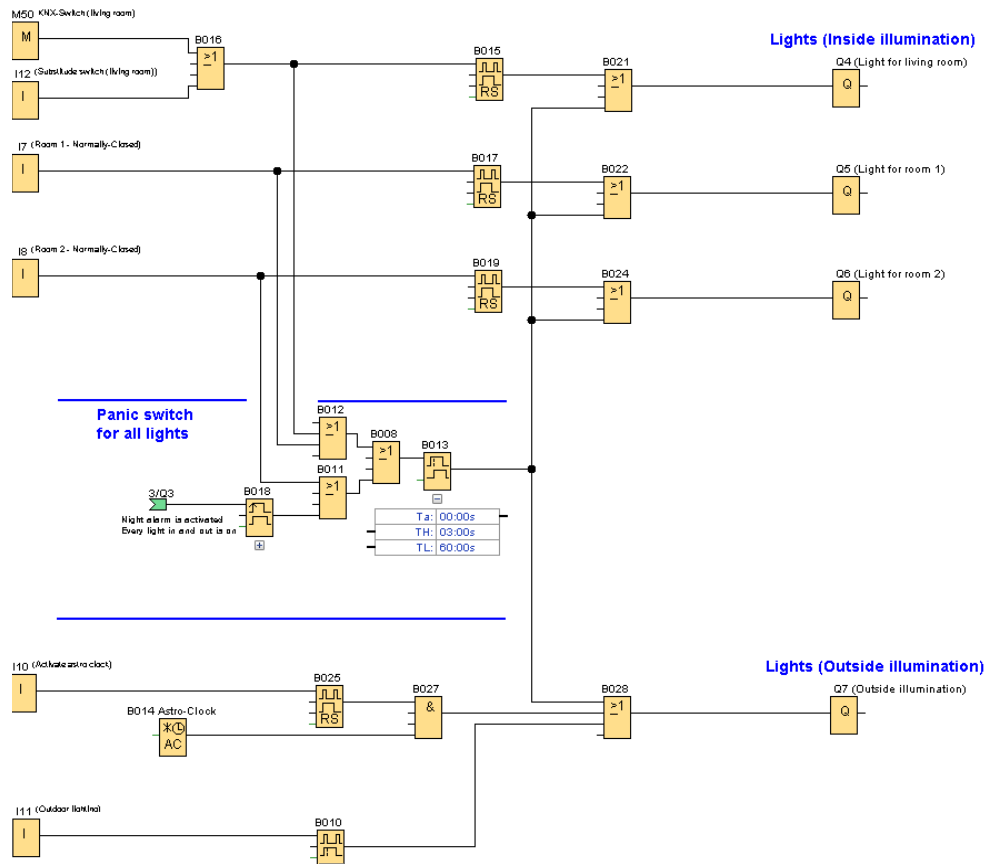
Table 4-1 shows the input and output signals of the logic function.

Table 4-1: Input and output signals in the LOGO! (expanded LOGO! switching program)

Input signals	Description
Inputs [I1] to [I4]	The window contacts are interconnected with the digital inputs of the LOGO!.
Input [I5]; [F1]; [M40]	Activates/deactivates the "Warning signal" function. [F1]: Function button at the LOGO! TDE or the web server. [M40]: Signal from KNX button A1 to LOGO! (Table 2-4)
Input [I6]; [F2]; [M41]	Activates/deactivates the "Night alarm" function. [F2]: Function button at the LOGO! TDE or the web server. [M41]: Signal from KNX button A2 to LOGO! (Table 2-4)
Inputs [I7] and [I8]	Lightings (room 1 and room 2) Additional digital inputs must be implemented for additional rooms.
Input [I10]	Switches on the astronomical clock for the exterior lighting.
Input [I11]	Switches on the exterior lighting.
[I12] and [M50]	Backup switch, in case one KNX button (possibly KNX design button) is non-existent. KNX button C1 is connected via flag [M50]. (Table 2-4)
Output signals	**Description**
Output [Q1]	Warning message (open window). Output signal as result of the operation of an OR block with inverted inputs = (NAND behavior).
Output [Q2]	Activating/deactivating the "Warning signal" function Output signal as result of the operation of an AND block with inverted output = (NAND behavior).
Output [Q3]	Activating/deactivating the "Night alarm" function.
Output [Q4]	Living room lighting
Outputs [Q5], [Q6]	Lighting for room 1 and room 2
Output [Q7]	Exterior lighting

4.2 Adapting the message texts

In the message texts, you can place parameters of individual function blocks to later configure them via the display of the LOGO! basic module, the LOGO! TD or, as an option, via the web server.

Use the arrow keys of the LOGO! and the LOGO TD to browse the message texts in Figure 4-3:

- The first message text (1) of the application example shows you the position of the windows.
- The second message text (2) is used to set the active times for the "Night alarm" function.
- The third message text (3) is used to set the time zone of the astronomic clock for automatic switching of the exterior lighting.

Figure 4-3: Display of a defined alarm message

Note	A configuration mode for individual block parameters is offered for specific function blocks.
	A detailed description can be found in the LOGO! 8 manual in chapter: 8.1 "Switching to parameterization mode".
	Manual: https://support.industry.siemens.com/cs/ww/en/view/100761780

5 Appendix

5.1 Service and Support

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5.2   Links and literature

Table 5-1: Links and literature

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	This entry https://support.industry.siemens.com/cs/ww/en/view/109748586
\3\	LOGO! 8 Manual https://support.industry.siemens.com/cs/ww/en/view/109741041
\4\	LOGO! CMK2000 Manual https://support.industry.siemens.com/cs/ww/en/view/109481657
\5\	Technical product information GAMMA KNX 3-Gang Button https://support.industry.siemens.com/cs/ww/en/view/87668166

5.3   Change documentation

Table 5-2: Document version and change history

Version	Date	Modifications
V1.0	07/2017	First version