



SIEMENS



SCE Training Curriculum

Siemens Automation Cooperates with Education | 06/2015

Additional Modules 900-010
LOGO! Startup

Cooperates
with Education

Automation

SIEMENS

Suitable SCE Trainer Packages for this Training Curriculum

LOGO! Controllers

- **LOGO! 8 12/24V ETHERNET – set of 6**
Order no: 6ED1057-3SA20-0YA1
- **LOGO! 8 230V ETHERNET – set of 6**
Order no: 6ED1057-3SA20-0YB1
- **LOGO! 0AB6 12/24V – set of 5**
Order no: 6ED1057-3SA00-0YA1
- **LOGO! 0AB6 230V – set of 5**
Order no: 6ED1057-3SA00-0YB1
- **LOGO! 0AB6 PC cable – set of 4**
Order no: 6ED1057-3SA00-0YC0

LOGO! HMI

- **SIMATIC Basic Panel KTP 400 for LOGO! Ethernet (-0AB7) – set of 6**
Order no: 6AV2123-2DB03-0AA0
- **SIMATIC Basic Panel KTP 400 for LOGO! Ethernet (-0AB7) – set of 1**
Order no: 6AV2123-2DB03-0AA1

Please note that these training packages are replaced with successor packages when necessary.
An overview of the currently available SCE trainer packages is provided under: [siemens.com/sce/tp](https://www.siemens.com/sce/tp)

Supplementary information for LOGO!

Such as Web-based Training, Getting started, videos, tutorials, manuals and programming guidelines.
[siemens.com/sce/logo](https://www.siemens.com/sce/logo)

Advanced Training

For regional Siemens SCE advanced training courses, please get in touch with your regional SCE contact person. [siemens.com/sce/contact](https://www.siemens.com/sce/contact)

Additional information regarding SCE

[siemens.com/sce](https://www.siemens.com/sce)

Information regarding usage

This SCE training curriculum for the end-to-end automation solution was prepared for the program "Siemens Automation Cooperates with Education (SCE)" specifically for training purposes for public educational facilities and R&D facilities. Siemens AG does not guarantee the contents.

This document is to be used only for initial training on Siemens products/systems, which means it can be copied entirely or partially and given to those being trained to use within the scope of their training. Distributing or copying this training curriculum and sharing its contents is permitted within public training and advanced training facilities for training purposes.

Exceptions require written permission from the Siemens AG contact person: Roland Scheuerer
roland.scheuerer@siemens.com.

Infringements will require compensation for damages. All rights, including to the translation, are reserved, particularly if a patent is granted or a utility model or design is registered.

Use for industrial customer courses is expressly prohibited. We do not consent to the training curriculums being used commercially.

We wish to thank the Michael Dziallas Engineering Corporation and all other involved persons for their support during the preparation of this training curriculum.

Content

	Page:
1. Preface	4
2. Notes on use of LOGO! logic modules	6
3. First steps with LOGO! 0BA0 – 0BA6	7
3.1 Connectors	7
3.2 LOGO! connectors	7
3.3 LOGO! knows the following connectors	8
3.4 Blocks and block numbers	8
3.5 Blocks	8
3.6 Logical operations	8
3.7 Display of blocks in LOGO! display	9
3.8 Assignment of a block number	9
3.9 The 4 golden rules of LOGO! operation	10
3.10 Overview of LOGO! menus	11
4. Example task: Plant gate control with LOGO! 0BA0 – 0BA6	12
4.1 Requirements on the gate control	12
4.2 Wiring the gate control with LOGO! 12/24RC	13
4.3 Used LOGO! components and connectors	13
4.4 Function block diagram of LOGO! solution	14
5. Program input into LOGO! 0BA0 – 0BA6	15
5.1 Changing to "Programming" mode	15
5.2 LOGO! changes to the programming menu	15
5.3 Entering the program	16
5.4 Parameter assignment of a block	17
5.5 Switch LOGO! to RUN	20
6. LOGO! software for LOGO! 0BA0 – 0BA8	22
6.1 LOGO!Soft Comfort	22
6.2 Connecting LOGO! with a PC	23
7. Commissioning a LOGO! 0BA7 with LOGO!Soft Comfort V7.1	27
7.1 Setting the IP address of LOGO! 0BA7	27
7.2 Creating the circuit program	31
7.3 Simulation of the circuit	39
7.4 Online test	41
8. Commissioning a LOGO! 0BA8 with LOGO!Soft Comfort V8.0	42
8.1 Setting the IP address on LOGO! 0BA8	42
8.2 LOGO!Soft Comfort V8.0	42
8.3 User interface of LOGO!Soft Comfort V8.0	43
9. PROJECT PLANT GATE CONTROL WITH LOGO!SOFT COMFORT V8.0 AND LOGO! 0BA8	45
9.1 Starting LOGO!Soft Comfort V8.0 and adding LOGO! 0BA8	45
9.2 LOGO! 0BA8 settings	47
9.3 Entering input/output names	49
9.4 Entering a program in the Diagram Editor	50
9.5 Simulation of the circuit	57
9.6 Transferring the tested program to LOGO!	59
9.7 Online test	60
10. Additional information	60

1. PREFACE

The contents of the module SCE_EN_900-010 are associated with the training unit basics of LOGO! programming and represent a **Quick Start** to the handling of LOGO! logic modules 0BA3 to 0BA7 and programming with the LOGO!Soft Comfort software.

Basics of LOGO Programming Module 900

Training Objective:

The reader is to learn about the main functions of the LOGO! logic module in this module.

Typical tasks are explained by using a sample task and processed in a project in the following steps:

- Creating a program for the LOGO! logic module
- Testing the task in LOGO! RUN mode
- Setting the IP address
- Setting the interface with the LOGO! software
- Programming the task with the LOGO! software
- Simulating the task with the LOGO! software
- Online test of the task with the LOGO! software

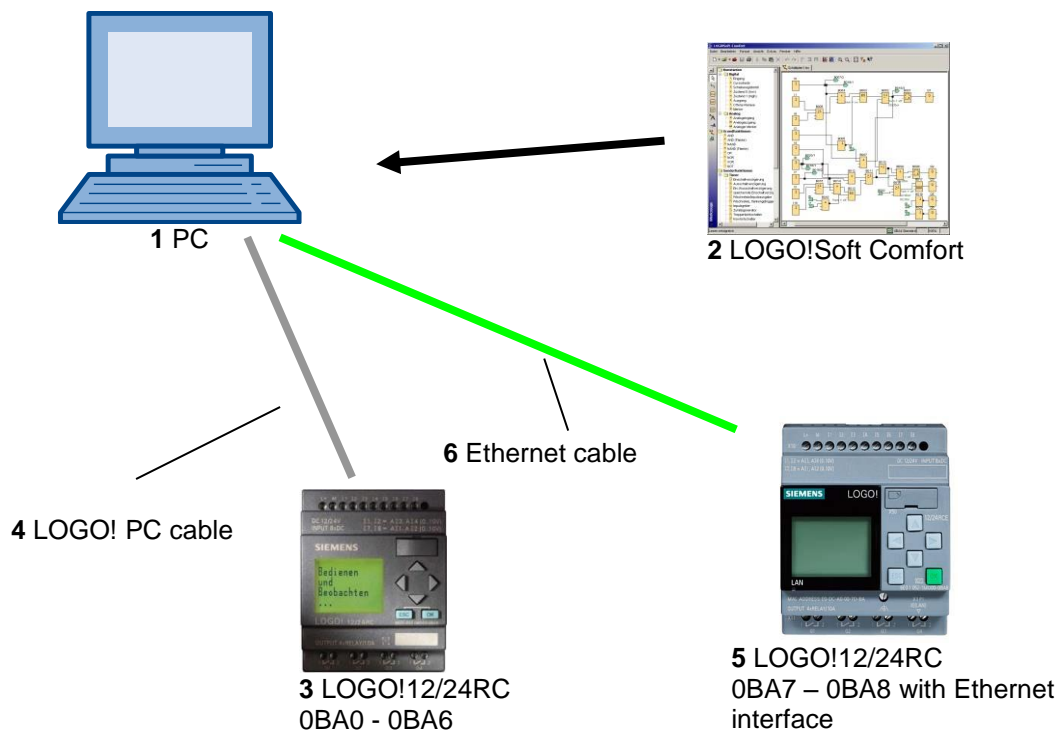
Requirements:

To successfully work through this module, the following knowledge is assumed:

- Proficiency in working with Windows

Hardware and software needed

- 1 PC as of Pentium III, operating system as of Windows 7 Home, network card
- 2 LOGO!Soft Comfort Version 7.1 software (LOGO! 0BA8 requires Version 8.0)
- 3 LOGO! logic module 0BA0 – 0BA6 (alternatively)
- 4 LOGO! PC cable (alternatively)
- 5 LOGO! logic module 0BA7 – 0BA8 with Ethernet interface (alternatively)
- 6 Ethernet cable (alternatively)



2. NOTES ON USE OF LOGO! LOGIC MODULES

LOGO! is the universal logic module from Siemens.

LOGO! integrates the controller with operator control and display unit. You can use the LOGO! operator control and display unit to create programs, edit and execute system functions.

You can use an interface or a PC cable from the LOGO! SOFT programming software to read in an external program from a program module. In addition to creating a program, you can use LOGO! SOFT to simulate your circuit on the computer or print out overview diagrams.

Depending on the device type, the LOGO! logic modules already include ready-to-use basic functions, such as delayed ON, delayed OFF and current impulse relay, time switch, binary bit memory, as well as inputs and outputs.

You solve tasks with LOGO!:

- in home and installation technology (e.g. stairway lighting, outside lighting, awnings, shutters, show window lighting and much more),
- in control cabinet installation and machine and apparatus design (e.g. gate controls, ventilation systems, industrial water pumps and much more).

LOGO! can also be used for special controllers for signal pre-processing.

By connecting the LOGO! module to the AS-Interface, it can be used as I/O with its own intelligence to control machines and processes on-site. This means you can execute control tasks in the LOGO! logic module and reduce the load on the master controller by doing so.

There are special versions without operating unit for serial applications in small machine and apparatus engineering, in control cabinet installation and the installation area. These must be downloaded afterwards by means of a program module or with the LOGO! SOFT PC software.

3. FIRST STEPS WITH LOGO! 0BA0 – 0BA6

Programming is defined as entering a circuit. A LOGO! program is actually nothing more than a circuit diagram in a somewhat different layout.

We have adapted the display to match the LOGO! display panel. In this chapter we will show you how to use LOGO! to turn your applications into LOGO! programs.

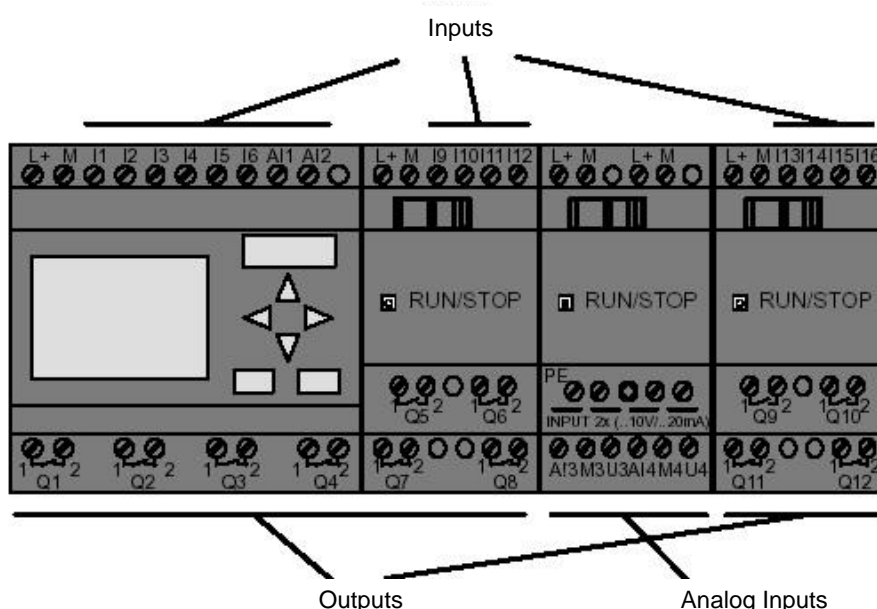
We start out by introducing you to the two basic terms **Connector** and **Block** and show you what they mean.

In a second step we will show you how to develop a program from a simple conventional circuit which you can enter directly into LOGO! in the third step.

After working through only a few pages of the manual, your first program will be saved and ready to run in LOGO!. You will be able to conduct your first tests with the matching hardware (switches...).

3.1 Connectors

LOGO! has inputs and outputs:








The inputs are specified with the letter I and a number. When you look at LOGO! from the front, you can see the connectors for the inputs at the top. Only with analog modules LOGO! AM2 and AM2 PT100 are the analog inputs on the bottom. The outputs are specified with the letter Q and a number. The connectors of the outputs can be seen at the bottom in the figure.

3.2 LOGO! connectors

We refer to all connections and states used in LOGO! as connectors. The inputs and outputs can have the status '0' or the status '1'. Status '0' means that there is no voltage at the input; status '1' means that voltage is present. But you probably already know this. We have introduced the connectors hi, lo and x to make it easier for you to input the program. 'hi' (high) has the fixed status '1'. 'lo' (low) has the fixed status '0'. If you do not want to activate an input of a block, use the connector 'x'. You will find out what a block is on the next page.

3.3 LOGO! knows the following connectors

Connectors	 LOGO! 0BA6  LOGO! 0BA7		 DM	 AM	 AM2AQ
Inputs	LOGO! 230RCE LOGO! 230RC/RCo LOGO! 24RC/RCo	Two groups: I1 to I4 and I5 to I8	I9 to I24	A11 to A18	none
	LOGO! 12/24RCE LOGO! 12/24RC/RCo LOGO! 24/24o LOGO! 24C/24Co	I1, I2, I3-I6, I7, I8 AI3, AI4 ... AI1, AI2	I9 to I24	A15 to A18	
Outputs	Q1 to Q4		Q5 to Q16	none	AQ1, AQ2
lo	Logical '0' signals (off)				
hi	Logical '1' signals (on)				
X	An existing connection that is not used				
Flags	Digital flags: M1 to M27 Analog flags: AM1 to AM6 (0BA6) AM1 to AM 16 (0BA7)				
Shift register bits	S1 to S8 (0BA6) S1.1 to S4.8 (0BA7)				
Network inputs ¹⁾	NI1 to NI64 (0BA7 only)				
Network analog inputs ¹⁾	NAI1 to NAI32 (0BA7 only)				
Network outputs ¹⁾	NQ1 to NQ64 (0BA7 only)				
Network analog outputs ¹⁾	NAQ1 to NAQ16 (0BA7 only)				

DM: Digital module

AM: Analog module

3.4 Blocks and block numbers

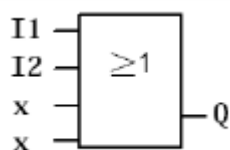
In this chapter we will show you how to use the LOGO! elements to create comprehensive circuits and how you can link the blocks with each other and with the inputs and outputs.

3.5 Blocks

In LOGO! a block is a function that converts the input information into output information. In the past, you had to wire the individual elements in the control cabinet or the terminal box. For programming, you connect the connectors with blocks. You simply select the required connector from the **Co** menu. The **Co** menu is named for the English term "connector".

3.6 Logical operations

The simplest blocks are logical operations (e.g., AND, OR).



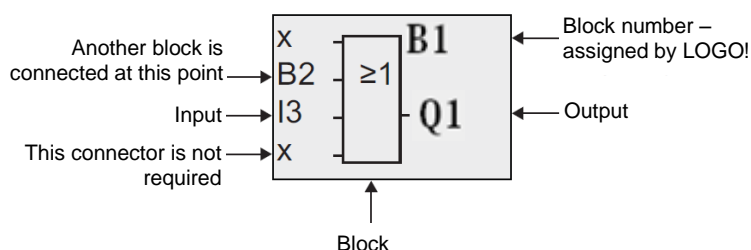
Here the inputs I1 and I2 are connected to the OR block. The last two inputs of the block are not used and therefore occupied with x.

The special functions are much more powerful (e.g., current impulse relay counters timers)

3.7 Display of blocks in LOGO! display

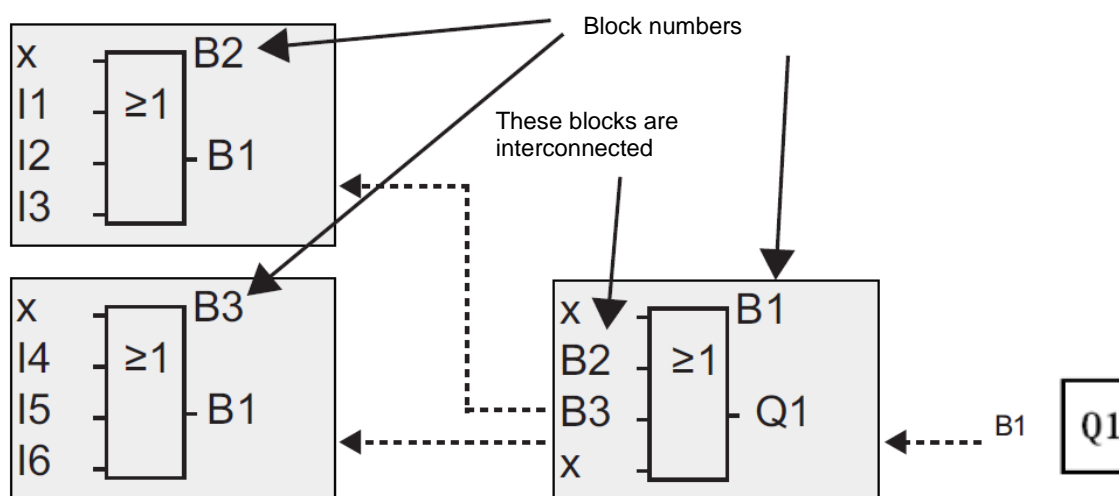
The figure below shows a typical LOGO! display. Only one block can be displayed at the time. This is why we have introduced block numbers to help you control the circuit structure.

View of the LOGO! display



3.8 Assignment of a block number

Every time you insert a block into a program, LOGO! assigns a block number to this block. LOGO! uses the block number to show you the interconnection between blocks. The block numbers are initially only for your orientation in the circuit program.



The overview screen shows you the three LOGO! displays that together make up the circuit program. As you can see, LOGO! interconnects the blocks with each other by using the block numbers.

3.9 The 4 golden rules of LOGO! operation

Rule 1 - Changing the operating mode

You create the circuit program in the **Programming** mode.

After a Power on and "No Program / Press ESC" on the display, you press **ESC** to enter Programming mode.

You can change the time values and parameter values of an existing circuit program in the Parameter assignment and Programming modes.

LOGO! is in **RUN mode** during parameter assignment, which means the circuit program is still being processed. You must stop the processing of the circuit program for programming with the "Stop" command. You get to **RUN mode** with the menu item 'Start' in the main menu. Press **ESC** in **RUN mode** to return to the **Parameter assignment** mode. If you are in **Parameter assignment** mode and want to return to **Programming** mode, run the "Stop" command in the parameter assignment menu and answer with "Yes" for "Stop Prg" by moving the cursor to "Yes" and pressing **OK**.

Rule 2 - Outputs and inputs

You always enter a circuit from the output to the input.

You can connect an output with several inputs but not connect several outputs to one input. You cannot connect an output with a preceding input within a program path. You need to interconnect bit memories or outputs for such internal feedback.

Rule 3 - Cursor and cursor movement

The following applies when entering a circuit:

You can move the cursor when it is shown as underscore.

- you move the cursor in the circuit with the \leftarrow , \rightarrow , \uparrow or \downarrow keys
- you change to "Select connector/block" with **OK**
- you exit entering the circuit with **ESC**

If the cursor is displayed as solid block, you must select a connector/block.

- you select a connector/block with the \uparrow or \downarrow keys
- you apply the selection with **OK**
- you go back one step with **ESC**

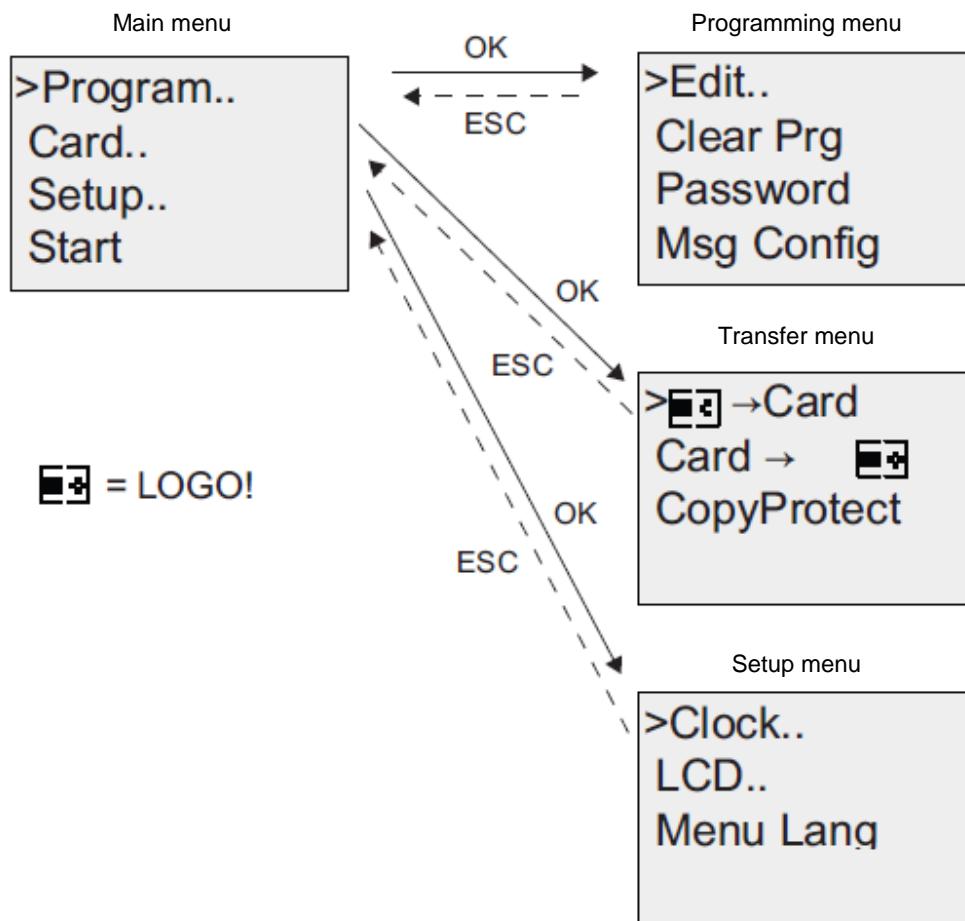
Rule 4 – Planning

Before you enter a circuit, you plan it completely on paper or program LOGO! directly with LOGO!Soft or LOGO!Soft Comfort. LOGO! can only save complete programs.

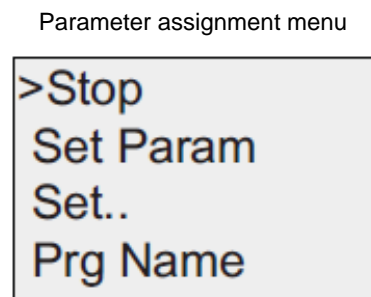
If a circuit has not been entered completely, LOGO! cannot exit the **Programming** mode.

3.10 Overview of LOGO! menus

Programming mode



Parameter assignment mode



Note

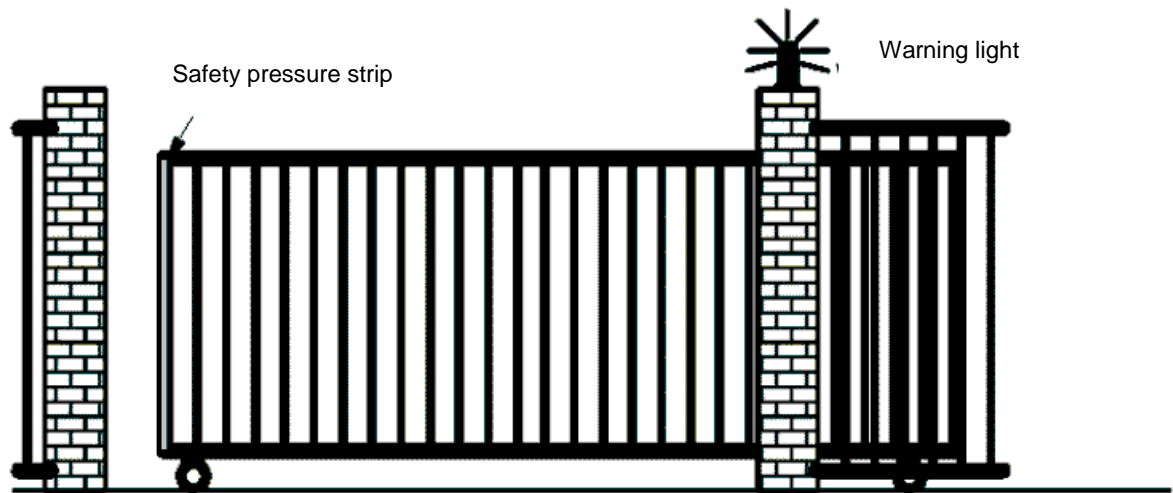
As of logic module 0BA6 you can set the menu language (e.g., to English).

4. EXAMPLE TASK: PLANT GATE CONTROL WITH LOGO! 0BA0 – 0BA6

You can usually enter a plant site through several gates. It must be ensured that the gate can be opened and closed from inside the vehicle by pressing buttons on the gate itself or by using pull cords.

A LOGO!12/24RC is used for each gate.

We describe a gate control for one gate in this section. The other gate controls have the same design.



4.1 Requirements on the gate control

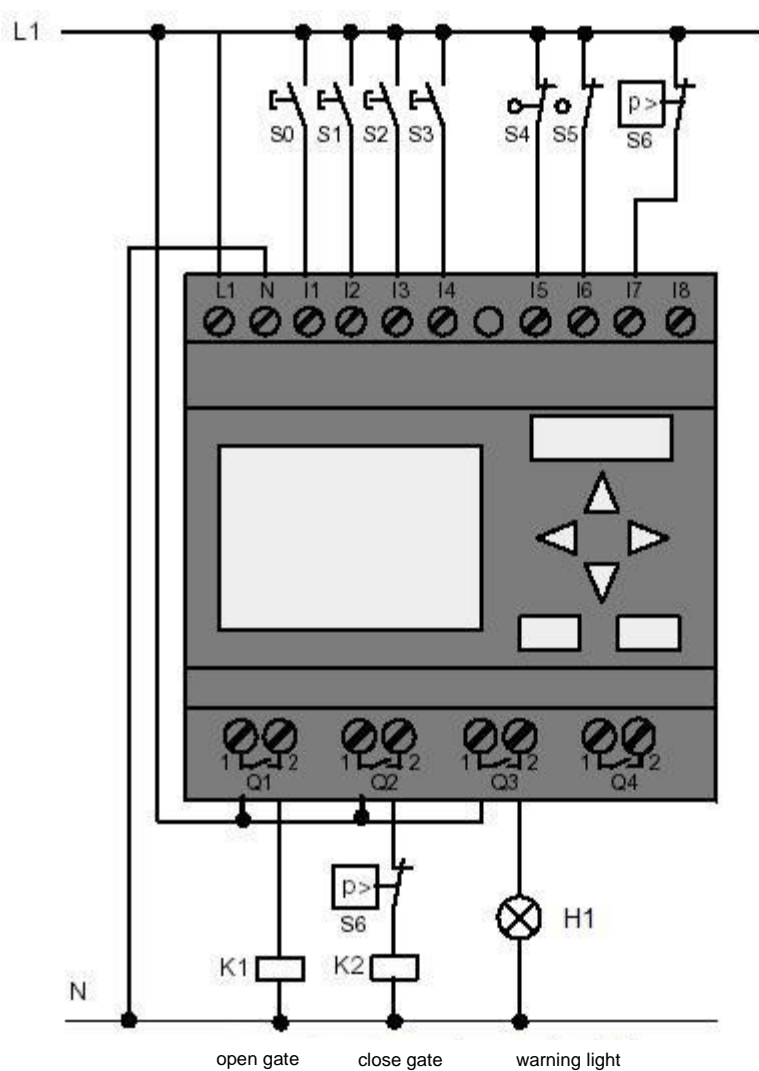
Each gate is opened or closed by means of a cord switch. The gate is opened or closed completely in the process.

Each gate can also be opened or closed locally by a button in jog mode.

A warning light is active 5 seconds before the start and while the gate is moving.

A safety pressure strip ensures that people are not injured and that no objects are trapped and damaged when the gate is closing.

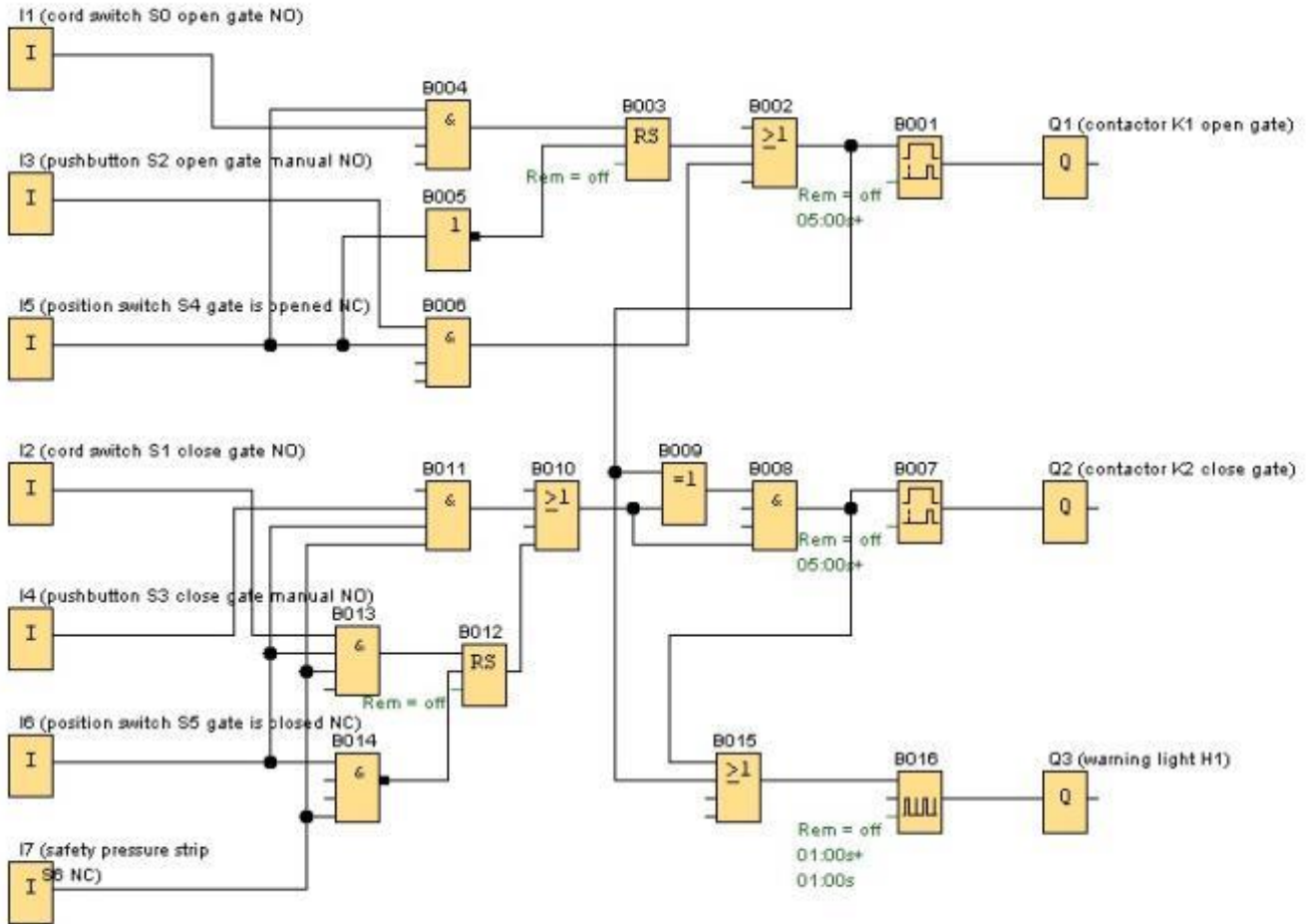
4.2 Wiring the gate control with LOGO! 12/24RC



4.3 Used LOGO! components and connectors

- K1 at Q1 main contactor opening
- K2 at Q2 main contactor closing
- H1 at Q3 warning light
- S0 at I1 cord switch OPEN-GATE NO
- S1 at I2 cord switch CLOSE-GATE NO
- S2 at I3 pushbutton OPEN-GATE-MANUAL NO
- S3 at I4 pushbutton CLOSE-GATE-MANUAL NO
- S4 at I5 position switch GATE IS OPENED NC
- S5 at I6 position switch GATE IS CLOSED NC
- S6 at I7 safety pressure strip NC

4.4 Function block diagram of LOGO! solution



The cord switch **"OPEN GATE"** or **"CLOSE GATE"** initiates the movement of the gate if the opposite direction is not switched on. The travel ends when the respective limit switch is reached. The closing process is also interrupted by the safety pressure strip.

The movement of the gate is controlled in jog mode by the pushbuttons **"OPEN GATE MANUAL"** or **"CLOSE GATE MANUAL"**. The travel ends when the pushbutton is released or when the respective limit switch is reached. The closing process of the gate is also interrupted by the safety pressure strip.

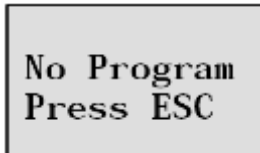
A warning light is active 5 seconds before the start and while the gate is moving.

5. PROGRAM INPUT INTO LOGO! 0BA0 – 0BA6

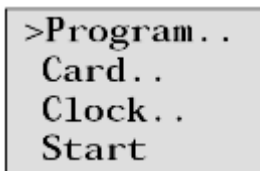
You have designed a circuit and now you would like to enter it in LOGO!. We use a program input to show you to do just that.

5.1 Changing to "Programming" mode

You have connected LOGO! to the power supply and switched on the voltage. The display looks as follows:

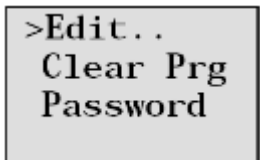


Switch LOGO! to programming mode.
You do this by pressing **ESC**. The LOGO! main menu opens.



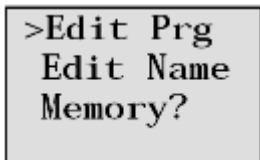
LOGO! main menu:

The first character of the first line is a ">".
Use the cursor keys (↑, ↓) to move the ">" up and down.
Move the ">" to "**Program..**" and press **OK**.



LOGO! programming menu:

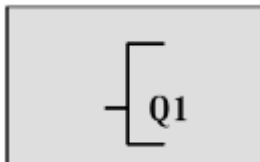
Here you can also use the cursor keys (↑, ↓) to move the ">". Set the ">" to "**Edit..**" (for editing, i.e., entering) and press **OK**.



LOGO! edit menu:

Set the ">" to "**Edit Prg**" (for editing circuit program) and press **OK**.

5.2 LOGO! changes to the programming menu

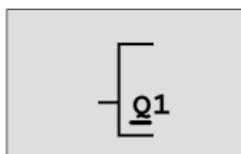


LOGO! programming mode:

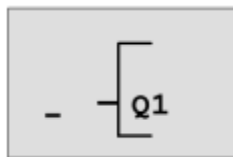
LOGO! only shows you the first output:
Use the cursor keys (↑, ↓) to select the other outputs.
Now you can start entering your circuit.

5.3 Entering the program

Now we enter the program (from output to input). LOGO! starts by displaying output Q1:



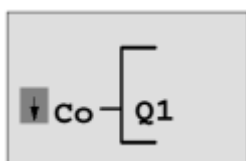
The first LOGO! output



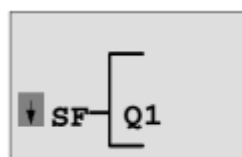
The cursor shows you where you are in the program.

You see an underscore below the Q of Q1. We call the underscore **cursor**. The cursor shows you where you currently are in the program. You can move the cursor with the cursor keys. Press the button **Cursor to the left**.

Here you enter the first block. Change to input mode by pressing **OK**.

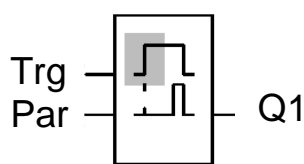


The cursor is displayed as a solid block: You can select a connector or a block.



The SF list includes the blocks for special

The cursor is no longer an underscore but flashes as solid block. LOGO! offers you different selections at the same time. Select SF (press the **Cursor down** button until SF is displayed) and press **OK**. LOGO! now shows you the first block from the list of special functions (SF):



LOGO! shows the block of the function when you select a block for a special or basic function. The cursor is located in the block in form of a solid block. Use the ▼ or ▲ keys to select the required block.

Confirm your selection with **OK**.

The block for the on-delay has two inputs. The input on top is the **trigger input (Trg)**. Use this input to start the on-delay. The on-delay is started by OR block B2 in our example. Use the **parameter input (Par)** to set the time for the on-delay.

Note

Identify the individual logical functions on the function block diagram with the block numbers of your LOGO! program.

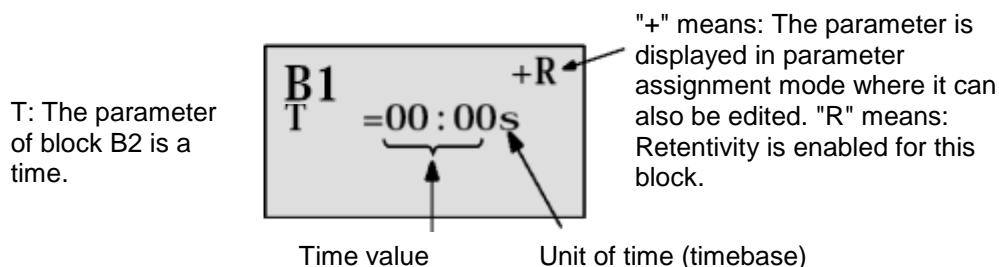
This makes for easier troubleshooting or editing of the program.

5.4 Parameter assignment of a block

Now enter the time T for the on-delay:

1. If the cursor is not yet under the **Par**, use the cursor keys to move it under the **Par**.
2. Change to input mode: Press **OK**.

LOGO! displays the parameter window for parameters:

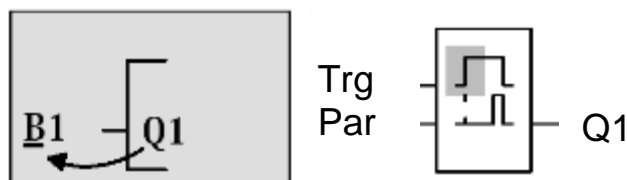


How to change the time value:

- Use the ◀ and ▶ keys to move the cursor back and forth.
- Use the ▲ and ▼ keys to change the value at that point.
- Once you have entered the time value, press **OK**.

Move the cursor under the B of B1 (**B1 is the block number of the time block**).

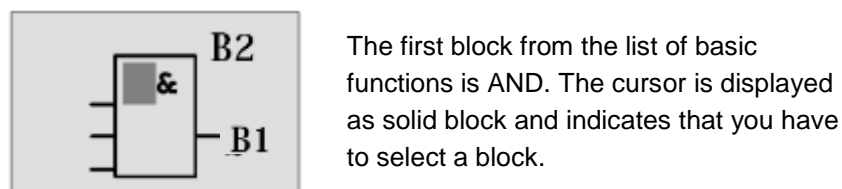
Press the **Cursor to the left** button two more times to position it under **Trg**.



Press **OK**.

Use the **Cursor down** key to select **GF** for basic functions.

Confirm with **OK** (block B2 is displayed).



Use the **Cursor down** key to select an OR (OR function).

Click **OK** to confirm.

Press **OK** at the first input of the OR block (CO is displayed) and then **OK** once again (I1 appears and the I flashes). Now press the **Cursor up** button three times \uparrow until you see an **x**. Confirm your selection with **OK**. This is how you enter an **x** for a position not in use. The cursor jumps to the second input of the OR block.



Press **OK** at the second input and change to **SF** for special functions with **Cursor down**. Confirm your selection with **OK**.

Use the cursor keys (\uparrow , \downarrow) to select an **RS** memory and confirm with **OK**.

You are now in block B3.

Enter an **AND block** (And function) at the set input of the memory with **OK**, **Cursor down** \downarrow to **GF** for basic functions and **OK** again.

Confirm your selection with **OK**.

You are now in block B4.

At the first input of the AND block, enter the input **I5** with **OK** (CO appears) and **OK** once again (I1 appears) and the cursor keys (\uparrow , \downarrow).

Click **OK** to confirm.

At the second input of the AND block, enter the input **I1** with **OK** (CO appears) and **OK** once again (I1 appears).

Click **OK** to confirm.

Enter an **x** at the third and fourth input of the AND block for a position not in use. Block B4 is now complete (the cursor appears at the first input again).

Press the cursor to the right button three times to get to block B3.

Add a **NOT block** (Negation) at the reset input with **OK**, **Cursor down** to **GF** for basic functions and **OK** again and **Cursor down** twice.

Click **OK** to confirm. You are now in block B5.

At the first input of the NOT block, enter the input **I5** with **OK** (CO appears) and **OK** once again (I1 appears) and the cursor keys (\uparrow , \downarrow).

Click **OK** to confirm.

Block B5 is complete and you can now move to the Par input in block B3.

Here you can set a retentivity of the memory with **OK** and the cursor keys (↑, ↓).

Click **OK** to confirm.

Block B3 is complete and you can now move to the third input in block B2.

Enter an **AND block** (And function) at the third input of the OR block with **OK**, **Cursor down** to **GF** for basic functions and **OK** again.

Click **OK** to confirm.

You are now in block B6.

At the first input of the AND block, enter the input **I3** with **OK** (CO appears) and **OK** once again and the cursor keys (↑, ↓).

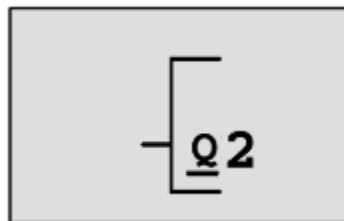
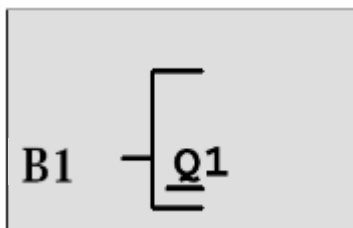
Click **OK** to confirm.

At the second input of the AND block, enter the input **I5** with **OK** (CO appears) and **OK** once again and the cursor keys (↑, ↓).

Click **OK** to confirm.

At the third and fourth inputs of the AND block, enter an **x** with **OK** (CO appears) and **OK** once again (**I1** appears) for a position not in use. Click **OK** to confirm.

The input for output Q1 is now complete.



Note

Chapter 6 includes information on how to complete the current program with the help of the LOGO!Soft Comfort software. The circuit program for output Q1 is transferred from LOGO! to the PC and expanded by the necessary blocks for outputs Q2, Q3.

Use the cursor keys (↑, ↓) to select the output Q2.

Press **Cursor to the left** and enter the program for output Q2.

Note that accesses to outputs of existing blocks are also programmed here.

Existing blocks are available under **BN** for block numbers (in **CO** once with **Cursor up**).

Now enter the program output Q3.

This completes the program input for gate control in LOGO!.

Now it is time for us to exit program input. Proceed as follows:

1. Back to the programming menu: Press **ESC**.

If you this does not return you to the programming menu, you forgot to interconnect a block completely. LOGO! will show you the position in the program where you forgot something (LOGO! only accepts complete programs).

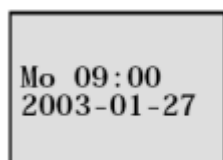
2. Back to the main menu: Press **ESC**.

5.5 Switch LOGO! to RUN

1. Move '>' to 'Start': with the cursor keys (↑, ↓).
2. Apply start: Press **OK**.

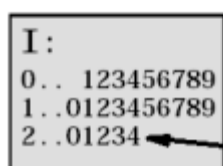
LOGO! goes into RUN. The LOGO! display looks like this in RUN:

LOGO! display in RUN



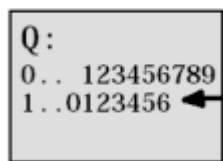
Date and current time (only for versions with clock). This display flashes until date and time have been set.

◀ key ▶



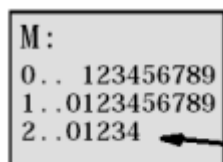
Inputs I1 to I9
Inputs I10 to I19
Inputs I20 to I24

◀ key ▶



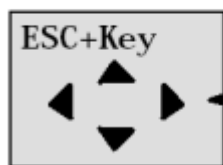
Outputs Q1 to Q9
Outputs Q10 to Q16

◀ key ▶



Bit memory M1 to M9
Bit memory M10 to M19
Bit memory M20 to M24

◀ key ▶



4 cursor keys for manual manipulation of the circuit program (**ESC** + required key)

LOGO! processes the program in RUN. To do so, LOGO! starts by reading the states of the inputs, determines the states of the outputs based on the program you have specified and switches the relays at the outputs on or off.

LOGO! represents the status of an input or output as follows:

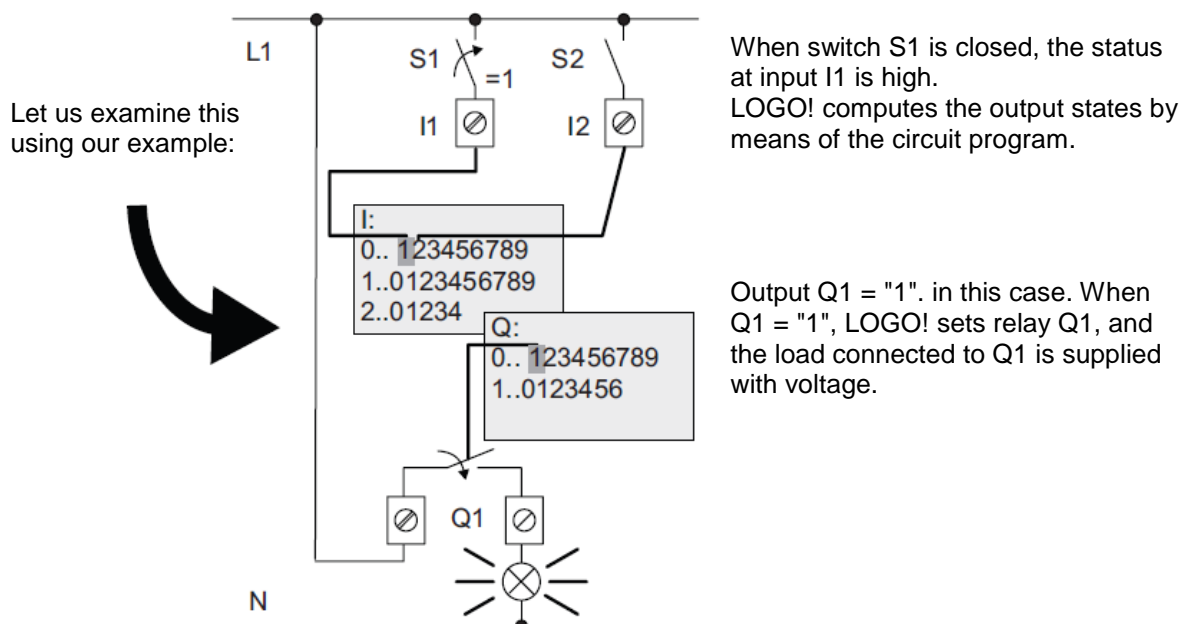
I:
0.. 123456789
1..0123456789
2..01234

■ Input/output status is '1':
inverted
Input/output status is '0': not
inverted

Q:
0.. 123456789
1..0123456

In this example, only the inputs I5, I15, Q8 and Q12 are set "high".

Example of a status display in the display:



You can now test the gate control on LOGO!.

Note that the limit switches for **GATE-OPENED** or **GATE-CLOSED** and the safety pressure strip have an **NC function**.

The gate is only moved with the manual pushbuttons **OPEN** or **CLOSE** as long as the respective pushbutton is activated. The warning light will flash for 5 seconds before the gate is actually moved (which means the manual pushbuttons will have to be pressed for this length of time).

The gate is opened or closed with the cord switches in automatic mode.

6. LOGO! SOFTWARE FOR LOGO! 0BA0 – 0BA8

The LOGO!Soft Comfort program is available as programming package for your PC. The software includes the following services:

- Graphical offline creation of your circuit program as ladder diagram (ladder logic / circuit diagram) or as function block diagram (FBD)
- Simulation of your circuit program on the computer
- Generation and printing of an overview diagram of the circuit program
- Data backup of the circuit program on the hard disk or any other medium
- Comparing circuit programs
- Convenient parameter assignment of blocks
- Transfer of circuit program
 - from LOGO! to the PC
 - from the PC to LOGO!
- Reading the operation-hour counter
- Set clock
- Summer time / Winter time
- Online test: Display of states and actual values of LOGO! in RUN mode:
 - States of all digital inputs, digital outputs, bit memories, shift register bits and cursor keys
 - Values of all analog inputs, analog outputs and bit memories
 - All block results
 - Actual values (including times) of selected blocks
- Stop processing of the circuit program from the PC (STOP).

6.1 LOGO!Soft Comfort

LOGO!Soft Comfort offers an alternative to standard planning:

- You initially develop your circuit program at your desk.
- You simulate the circuit program on the computer and check the functionality even before the circuit program is actually used.
- You can comment and print your circuit program.
- You save your circuit programs in your PC file system.
- This makes a circuit program immediately available for later changes.
- You transfer the circuit program to LOGO! by simply pushing a few buttons.

6.2 Connecting LOGO! with a PC

Standard LOGO! 0BA0 to 0BA6

You need a LOGO! PC cable to connect a standard LOGO! with a PC.

Remove the cover cap or the program module (card) on your LOGO! and connect the cable. The other end of the cable is connected with the serial interface or a USB port of your PC.



LOGO! 0BA7 to 0BA8 with Ethernet interface

You need a network cable to directly connect a LOGO! with Ethernet interface to a PC.

To program a LOGO! 0BA7 or 0BA8 with Ethernet interface from a PC, programming device or laptop, you need a TCP/IP connection.

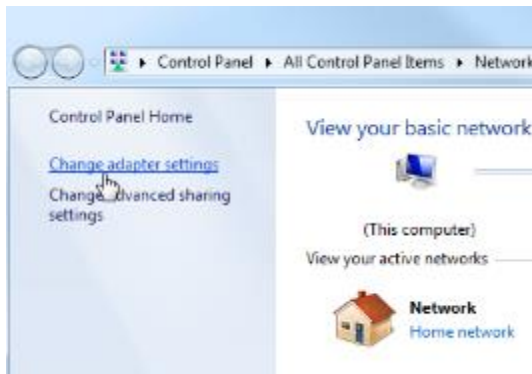
The IP addresses of both devices must match so that the PC and LOGO! 0BA7 can communicate with each other.

First we show you how to set the IP address of the computer in Windows 7.

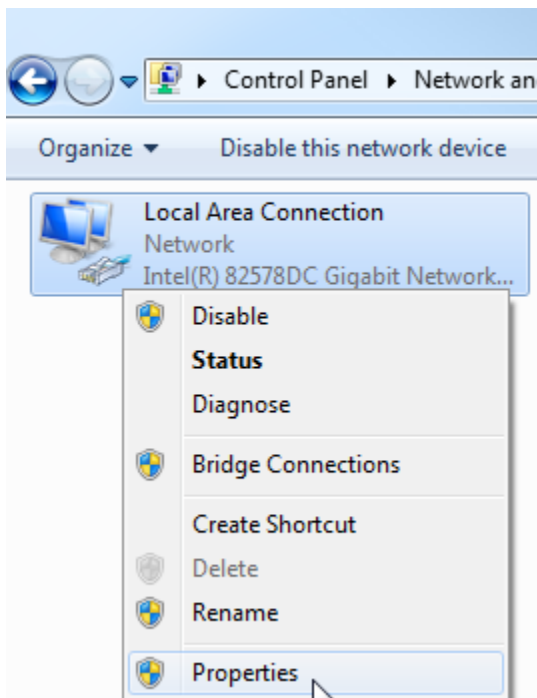
Locate the network icon  and proceed to click 'Open Network and Sharing Center'. (→ 
→ Open Network and Sharing Center)



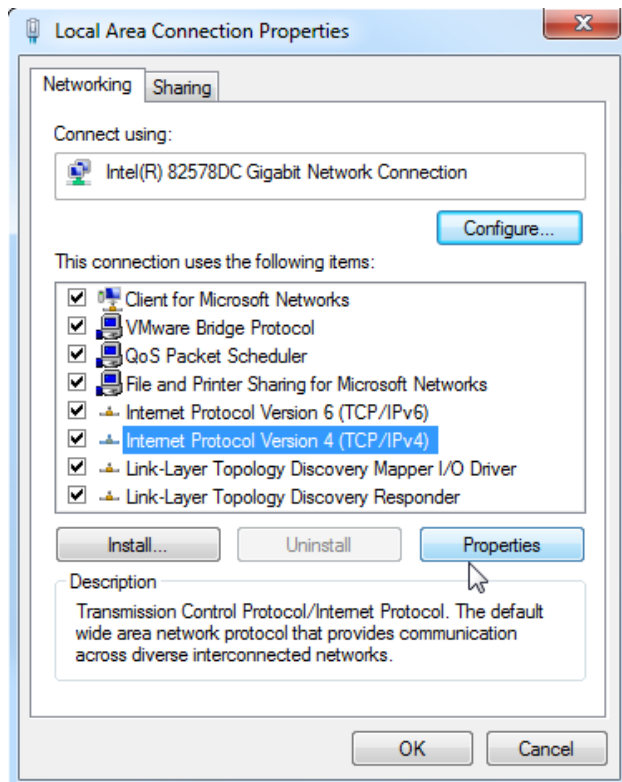
Once the Network and Sharing Center windows is opened in the control panel, click on '**Change adapter settings**'. (→ Change adapter settings)



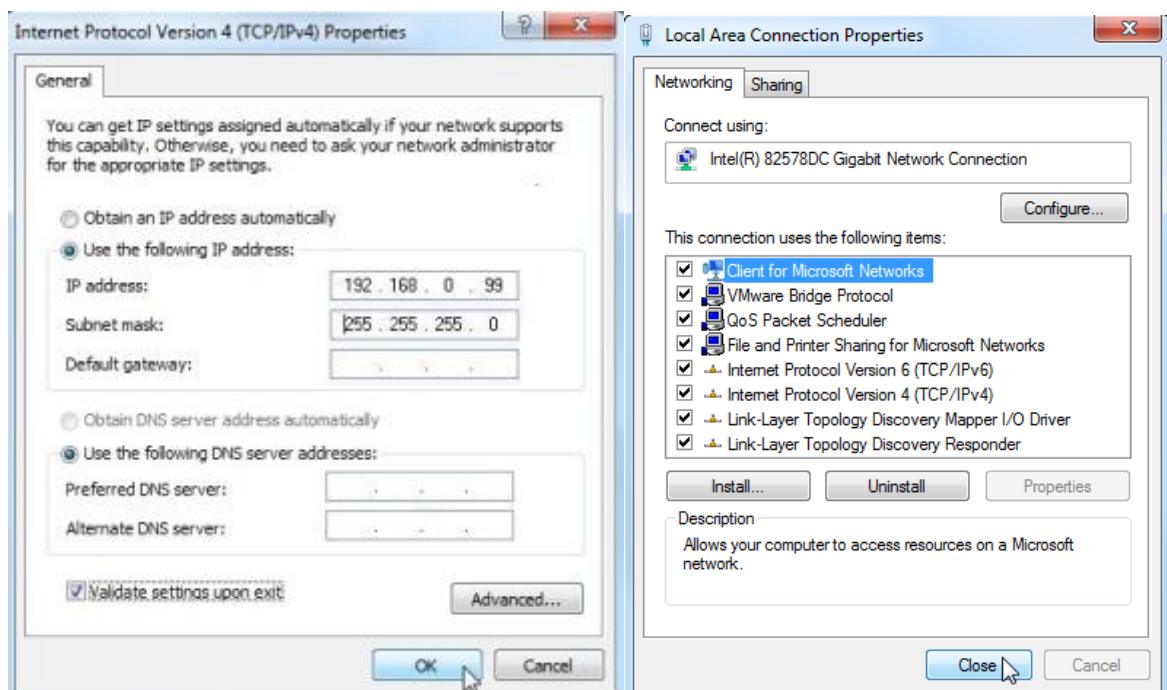
Locate the '**Local Area Connection**' you intend to use for the connection with the LOGO! And select '**Properties**'. (Local Area Connection → Properties)



Select the '**Properties**' of the '**Internet Protocol Version 4 (TCP/IPv4)**'
(→ Internet Protocol (TCP/IP) → Properties)



You can then set the '**IP address**' and the '**Subnet mask**' and apply with '**OK**'.
(→ Use the following IP address → IP address: 192.168.0.99 → Subnet mask 255.255.255.0 → OK
→ Close)



Notes for networking on Ethernet

MAC address:

The MAC address consists of a fixed and a variable part. The fixed part ("base MAC address") identifies the manufacturer (Siemens, 3COM, ...). The variable part of the MAC address differentiates between the various Ethernet devices and should be unique worldwide. A factory-assigned MAC address is imprinted on each module.

Value range for the IP address:

The IP address consists of 4 decimal numbers of the range from 0 to 255, separated by a period; for example, 141.80.0.16.

Value range for the subnet mask:

This mask is used to detect whether a device or its IP address belongs to the local subnet, or can be accessed only by means of a router.

The subnet mask consists of 4 decimal numbers from the value range 0 to 255, separated by a period. For example, 255.255.0.0.

In their binary representation, the 4 decimal numbers of the subnet mask must include a continuous series of "1" values without any gaps from the left and a series of "0" values without any gaps from the right.

The "1" values specify the area of the IP address for the network number. The "0" values specify the area of the IP address for the device address.

Example:

Correct value:	255.255.0.0 decimal	= 1111 1111.1111 1111.0000 0000.0000 0000 binary
	255.255.128.0 decimal	= 1111 1111.1111 1111.1000 0000.0000 0000 binary
	255.254.0.0 decimal	= 1111 1111.1111 1110.0000 0000.0000 0000 binary
Incorrect value:	255.255.1.0 decimal	= 1111 1111.1111 1111.0000 0001.0000 0000 binary

Value range for the address of the gateway (router):

The address consists of 4 decimal numbers from the value range 0 to 255, separated by a period. For example, 141.80.0.1.

Relation of IP addresses, router address, and subnet mask:

The IP address and the address of the gateway may only differ at the positions at which there is a "0" in the subnet mask.

Example:

You have entered the following: for the subnet mask 255.255.255.0, for the IP address 141.30.0.5 and for the router address 141.30.128.1.

The IP address and the address of the gateway may only have a different value in the 4th decimal number. In the example, however, the 3rd position is different.

In the example, you will therefore need to make one of the following changes:

- The subnet mask to: 255.255.0.0 or
- The IP address to: 141.30.128.5 or
- The address of the gateway to: 141.30.0.1

7. COMMISSIONING A LOGO! 0BA7 WITH LOGO!SOFT COMFORT V7.1

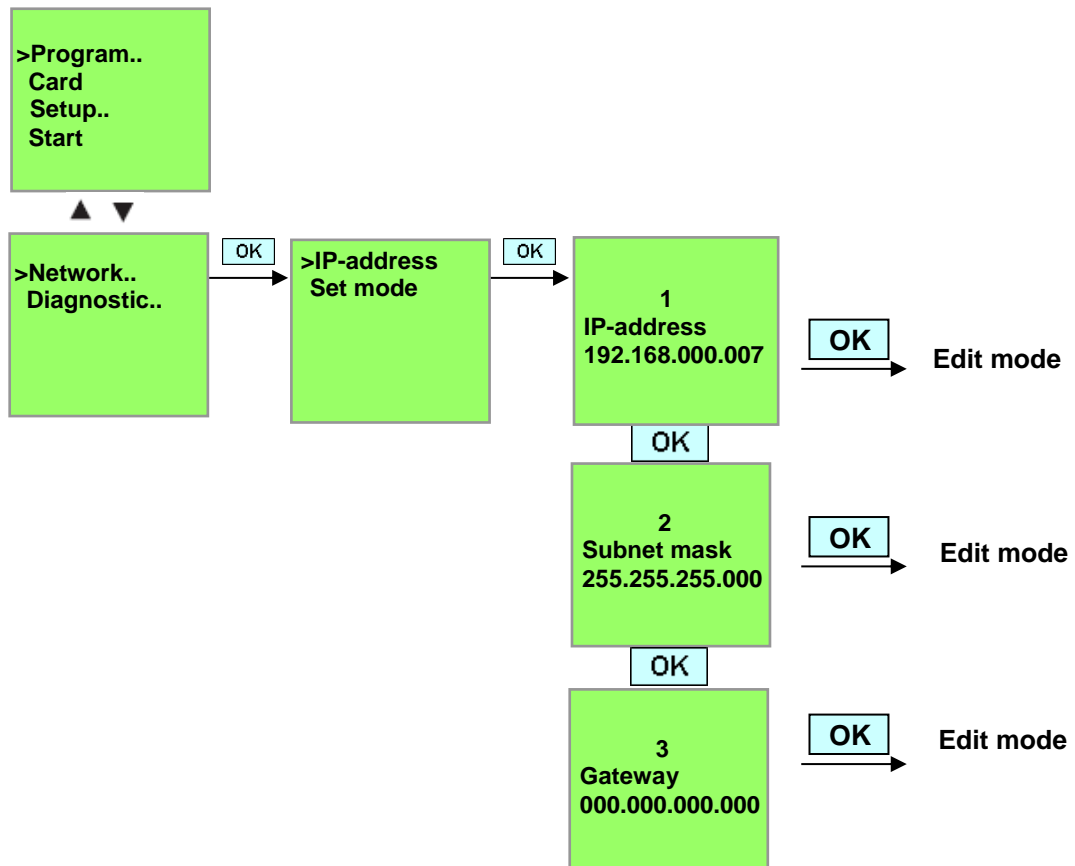
7.1 Setting the IP address of LOGO! 0BA7

In Stop mode of LOGO! 0BA7, navigate to the menu item **Network**.

Here you will find the settings of the IP address, the subnet mask and the gateway.

Press **OK** to enter the Edit mode of the network settings.

Assign the network settings as you see fit.

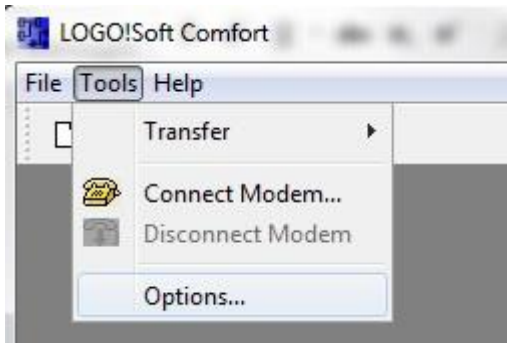


Setting the interface

Start the LOGO! SOFT Comfort V7.1 software.

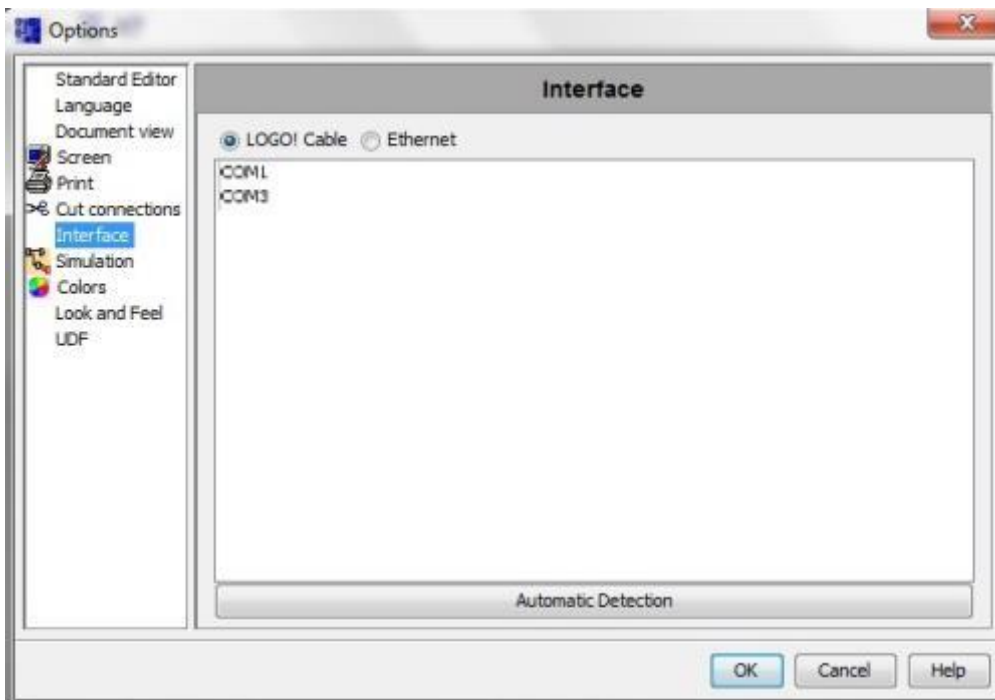


Open the Tools menu and select Options.



LOGO! 0BA0 to 0BA6

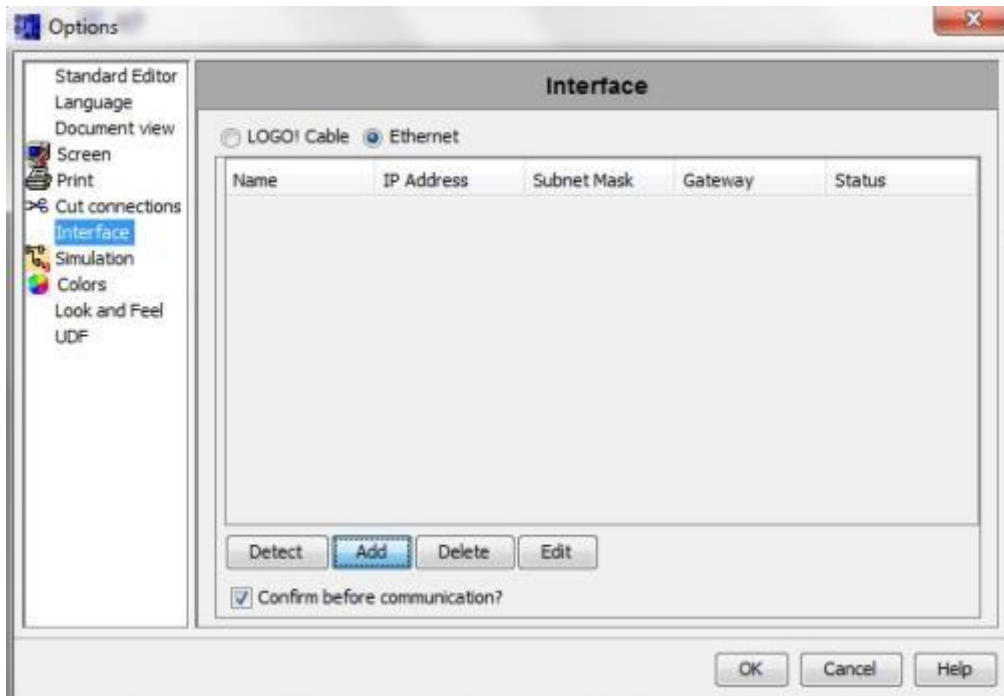
Under interface, select the LOGO! cable with the COM interface



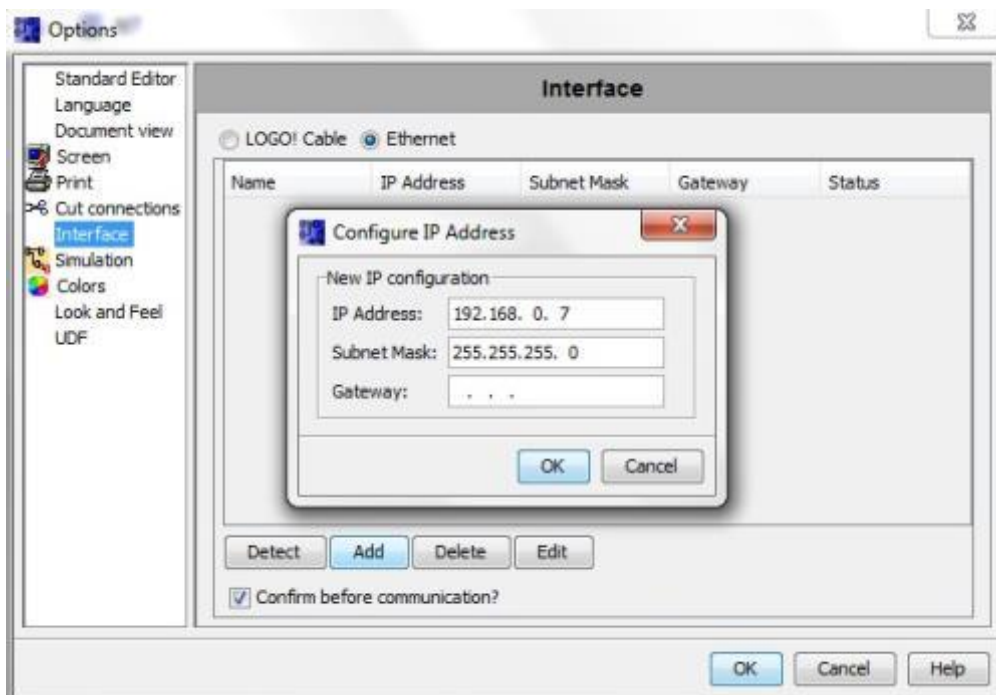
LOGO! 0BA7

Select Ethernet under Interface.

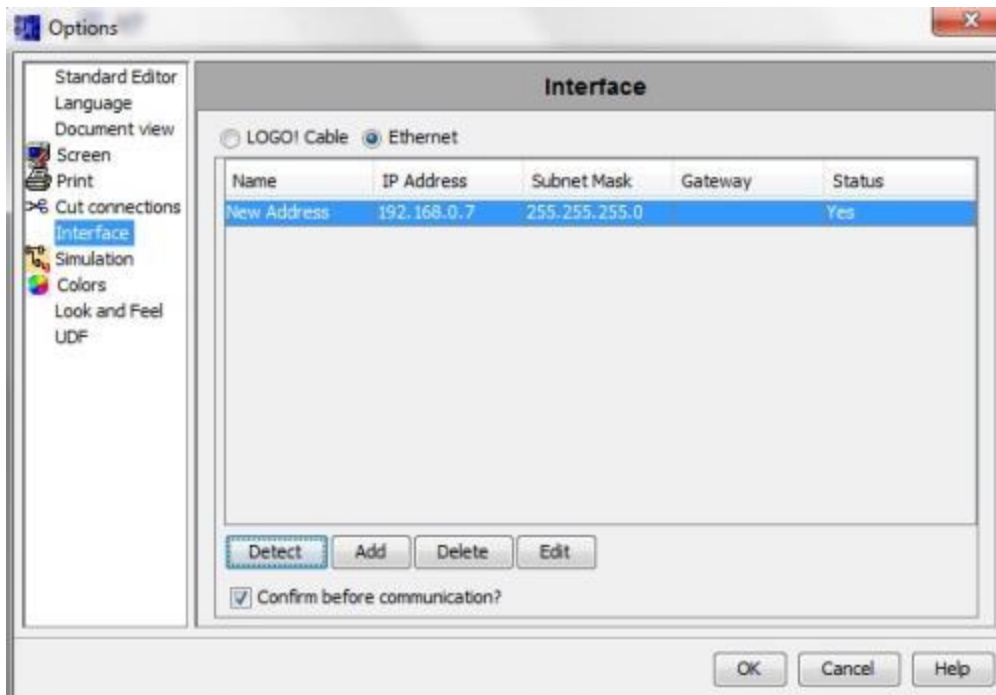
Click **Add**.



Enter the IP address and subnet mask.



To test the settings, connect the LOGO! with the PC using the network cable and click **Detect**.




If the status is **Yes**, the setting is correct.

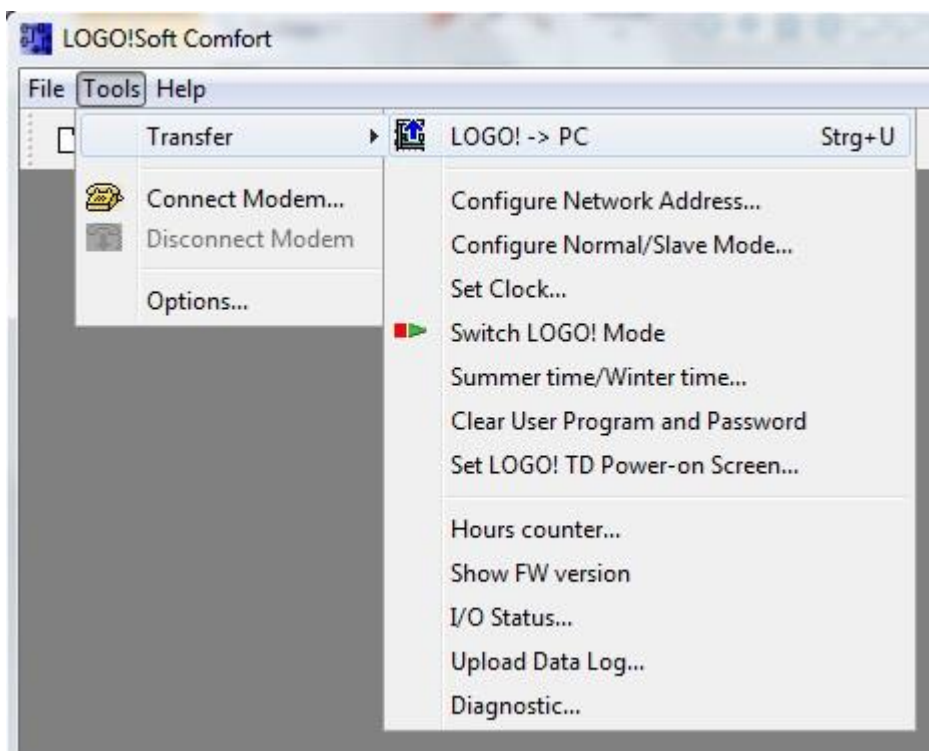
7.2 Creating the circuit program

To become familiar with the basic operation of LOGO!Soft Comfort, we are going to download a circuit program from LOGO! to the PC. You will then create additional functions and simulate the program on your PC. Based on our example task, the operating steps are to be described with LOGO!Soft Comfort.

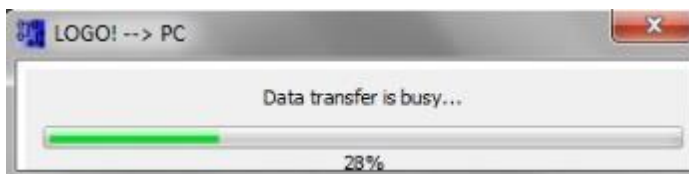
Downloading program from LOGO! to the PC.

Once you have connected the cable and made the interface settings, you can download the program from LOGO! to the PC.

Click the  button for LOGO! -> PC or transfer the program using the Tools menu.



Data transfer starts once you have confirmed the interface.

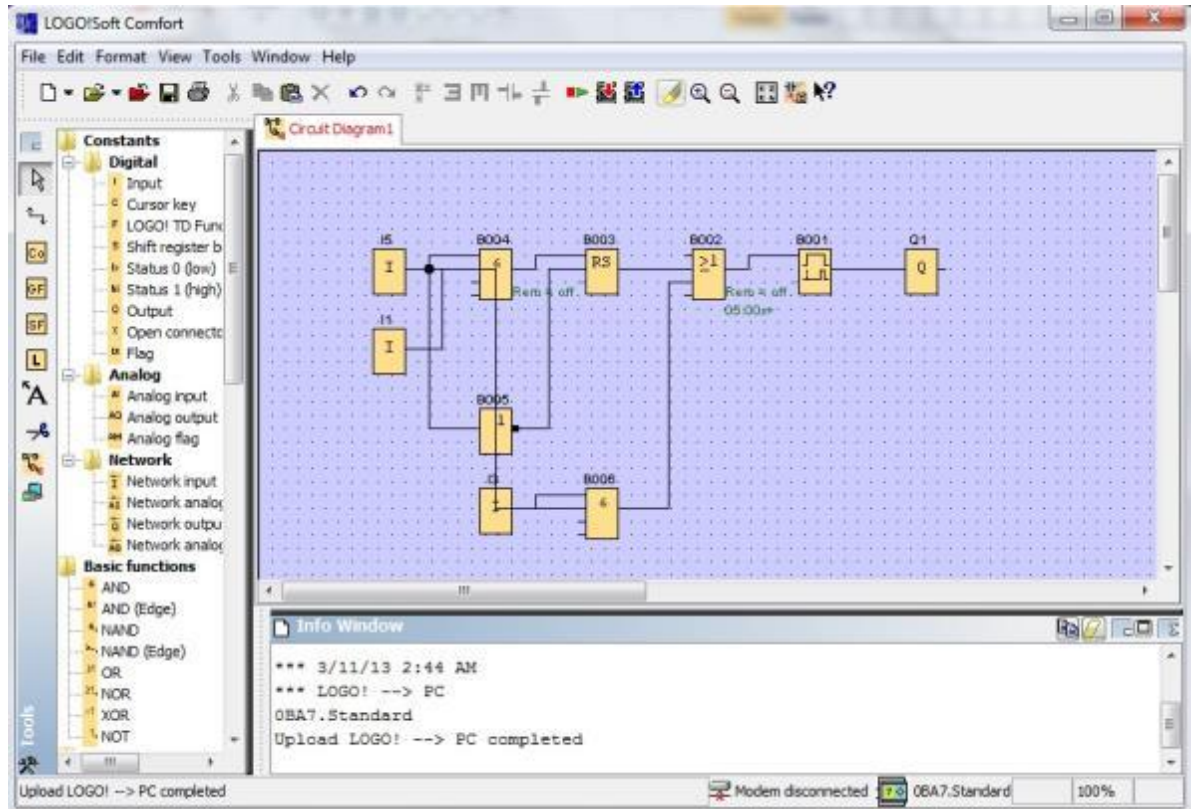


The user interface and the circuit diagram are displayed after download of the program.

User interface

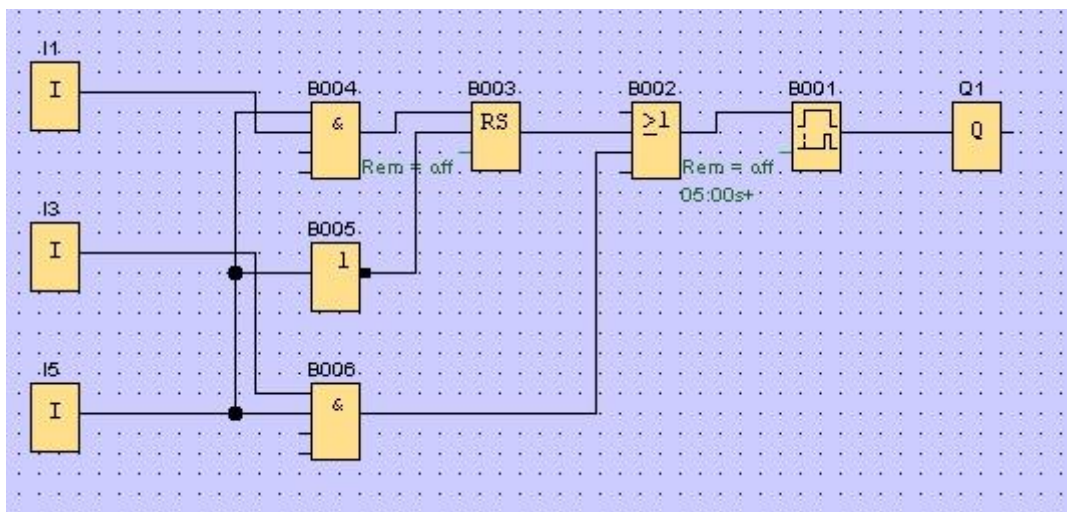
You can now see the complete user interface of LOGO!Soft Comfort. The majority of the screen is taken up by the interface for the circuit diagram creation.

The symbols and interconnections of the circuit program are arranged on this programming interface. You enlarge the display with the magnifying glass.



You should start out by clearly arranging the objects in the circuit diagram.

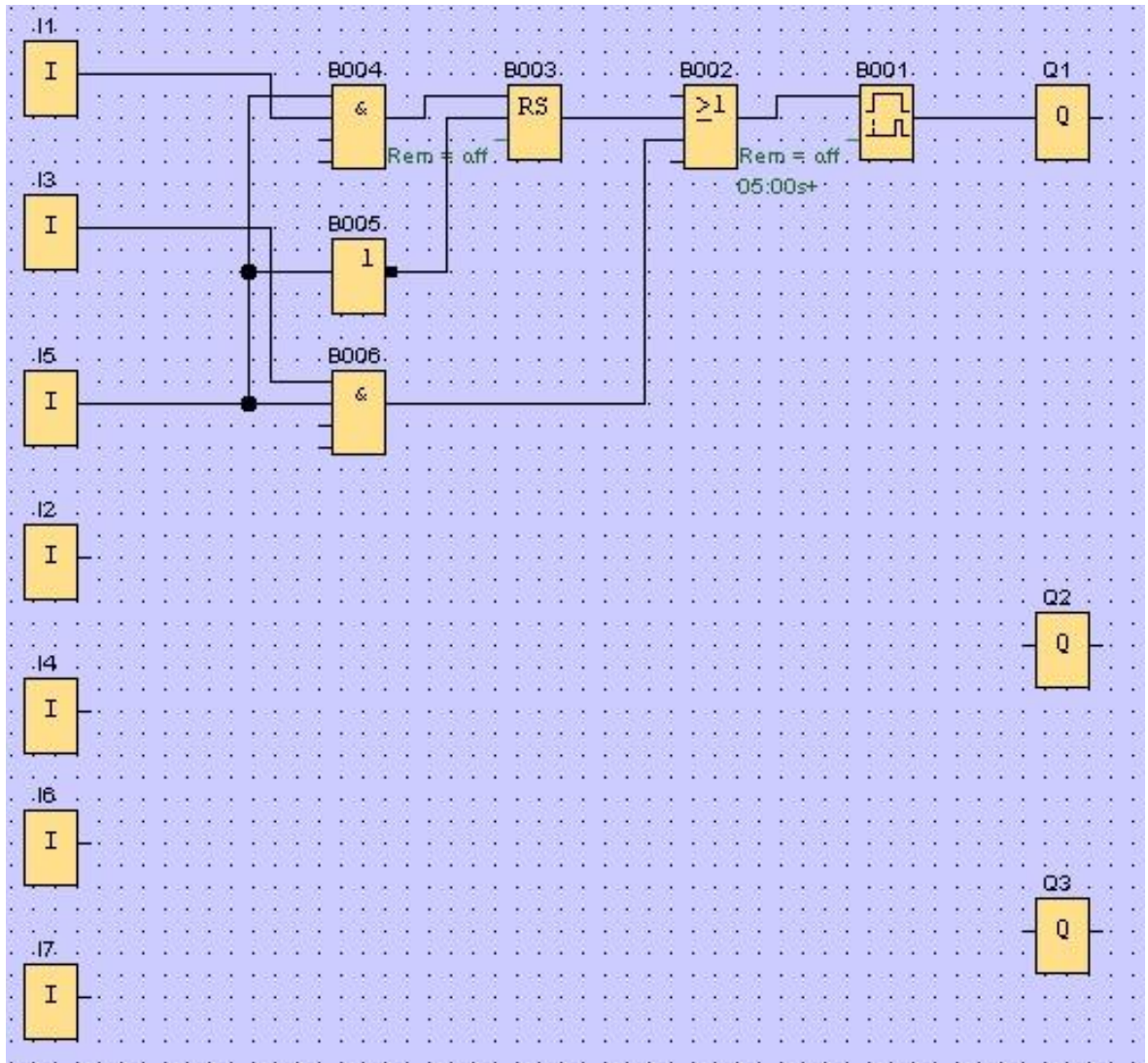
Click the **blocks and connecting cables** with the mouse and move them.



Selecting blocks

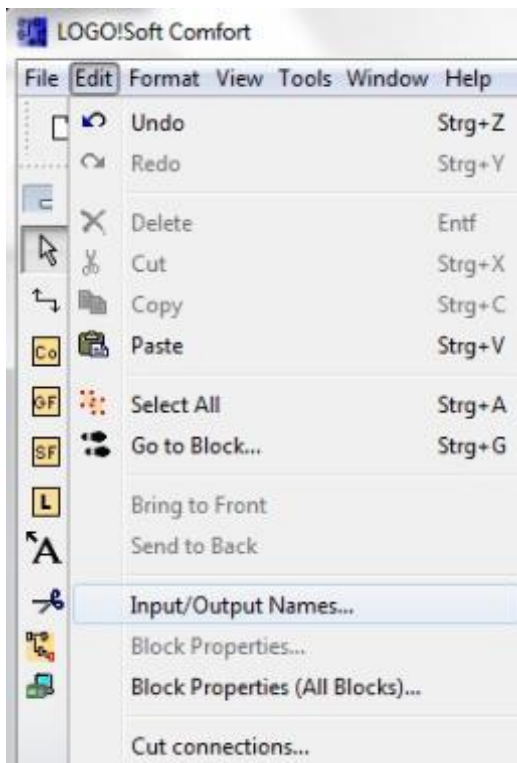
The first steps for creating a circuit diagram are the selection and assignment of the required inputs and outputs for the circuit you want to create.

You start out by inserting the **blocks** of the inputs I2, I4, I6 and I7 and of the outputs Q2 and Q3.

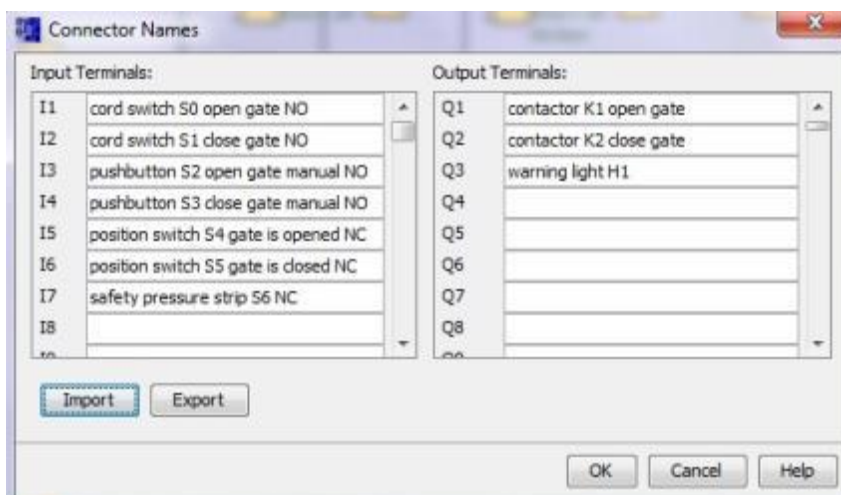


Then you assign the **connector names**.

Select **Input/Output Names** in the **Edit** menu.



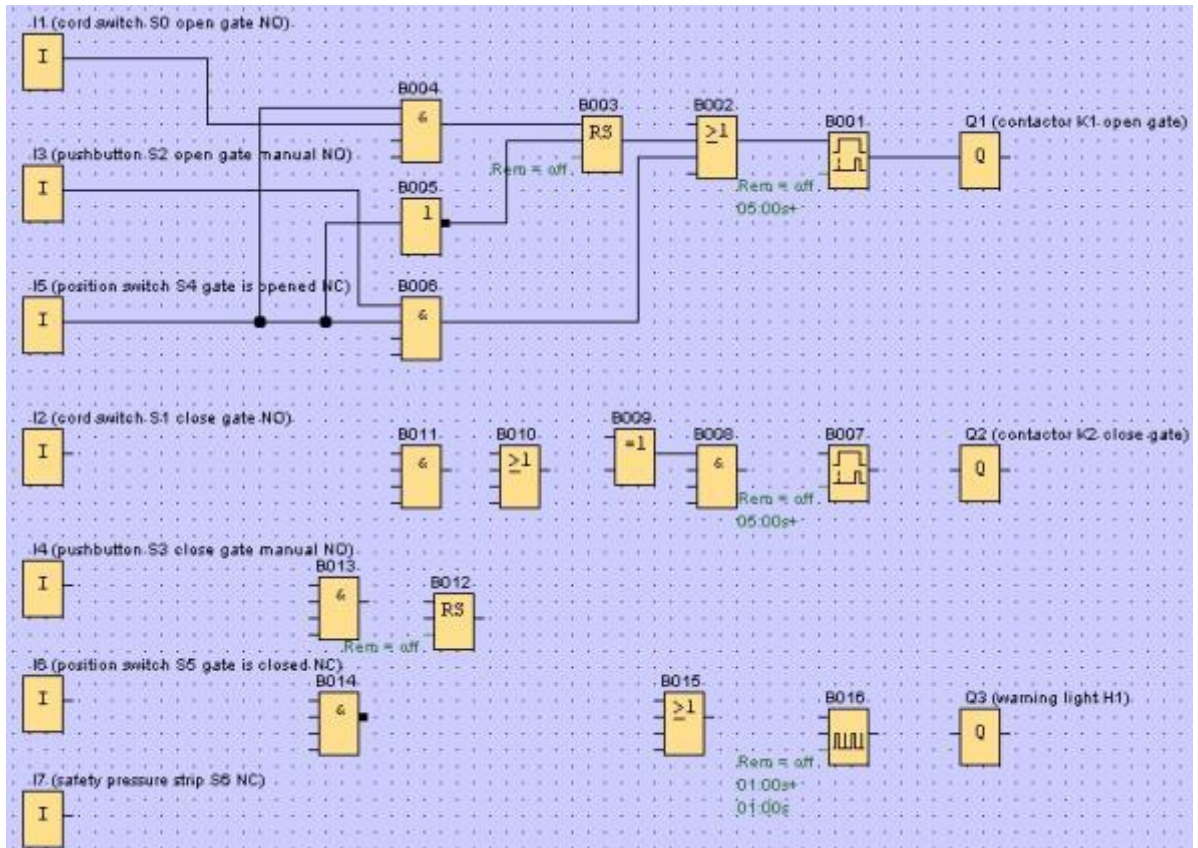
Here you can assign connector names (symbol assignment) to the **input terminals and output terminals** to get a better overview.



Then all blocks from output to input are inserted one after the other.

This way the block numbers are arranged the same way as in programming with LOGO!

Start out by clicking the symbol in the **selection bar** and then place the block in the **circuit diagram**.



Double-click a block in the **circuit diagram** to set the properties or parameters.

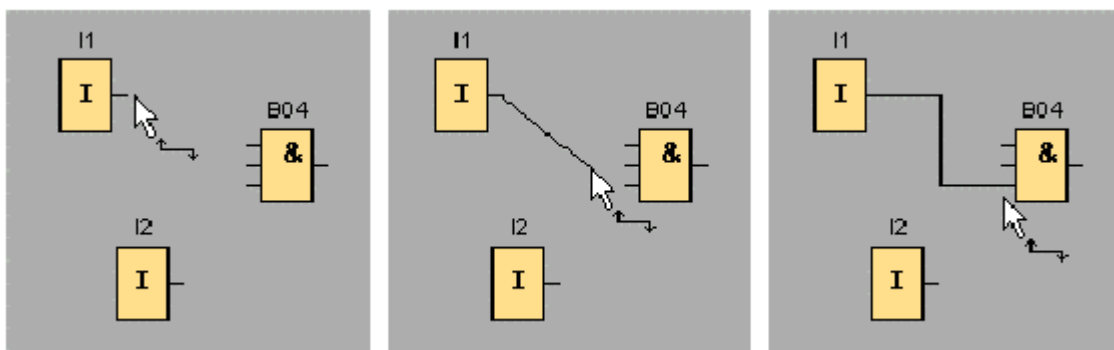


Connecting blocks

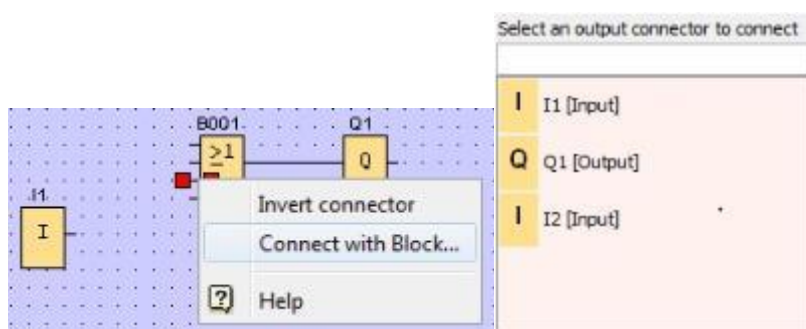
The individual blocks must be connected with each other to complete the circuit.

To do so select the  symbol for the **block connection** in the **Tools toolbar**.

Move the mouse pointer over the connector of a block and click the left mouse button. Now move the mouse pointer to a connector that you want to connect with the first connector while keeping the mouse button pressed and release the mouse button. LOGO!Soft Comfort connects the two connectors with each other.



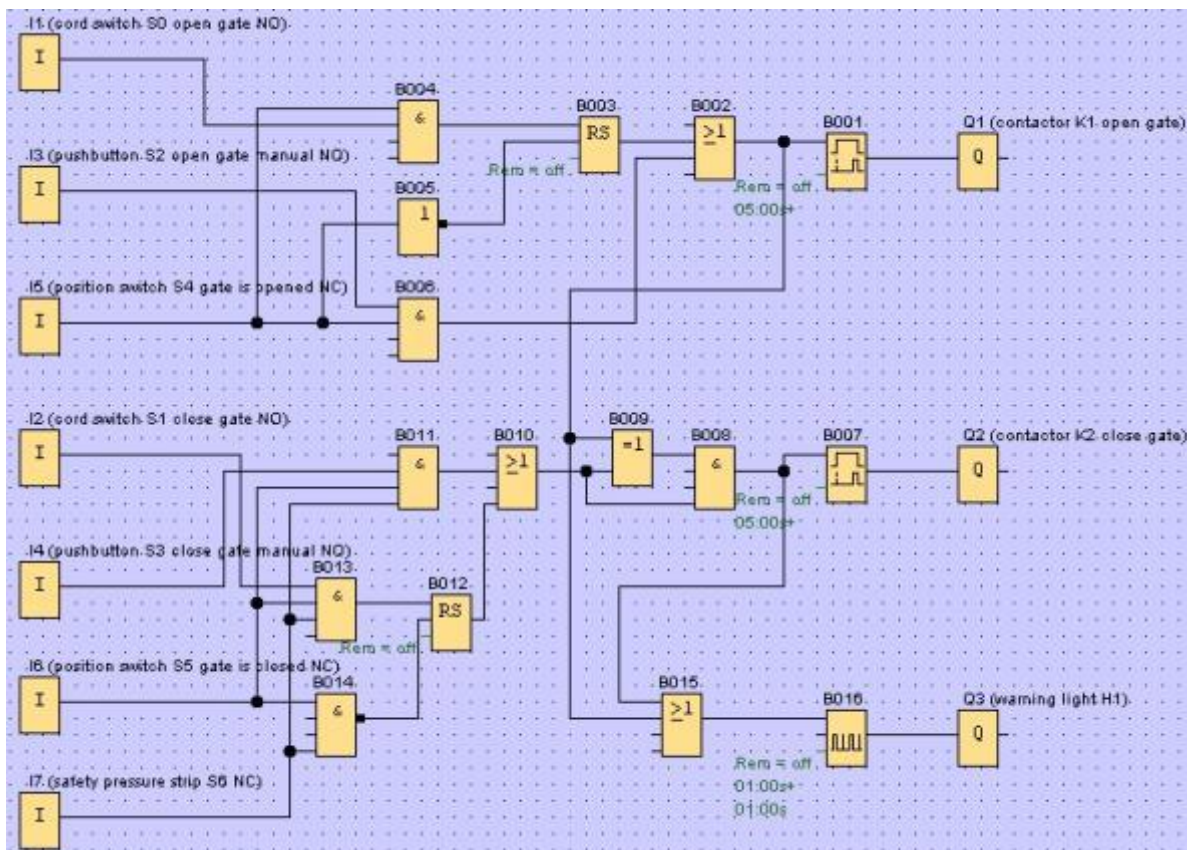
LOGO!Soft Comfort offers another option for connecting blocks when you click on the input or output of a block with the right mouse button. When you click the menu command **Connect with Block...** in the shortcut menu, a drop-down list opens which includes all blocks to which a connection can be created. Click on the block to which you want to create a connection and LOGO!Soft Comfort draws the connection. This type of connecting is particularly useful if you want to connect blocks that are very far apart on the programming interface.



Editing and optimizing the display


The circuit program is complete when the blocks and their connections have been entered. A bit of post-editing is still necessary to create a clear view of the created circuit.

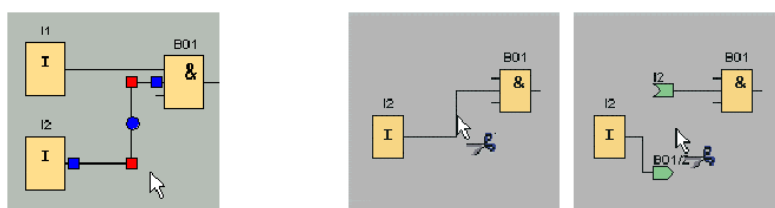
You can move placed objects, such as blocks and lines, for this purpose.



Editing marked connecting lines

There is a special option for editing connecting lines. Marked connecting lines come with round and square blue markings. Use the round markings to move the connecting lines perpendicular to their run. Use the square markings to reassign the beginning and end of a connecting line. The lines are moved at the round markings.

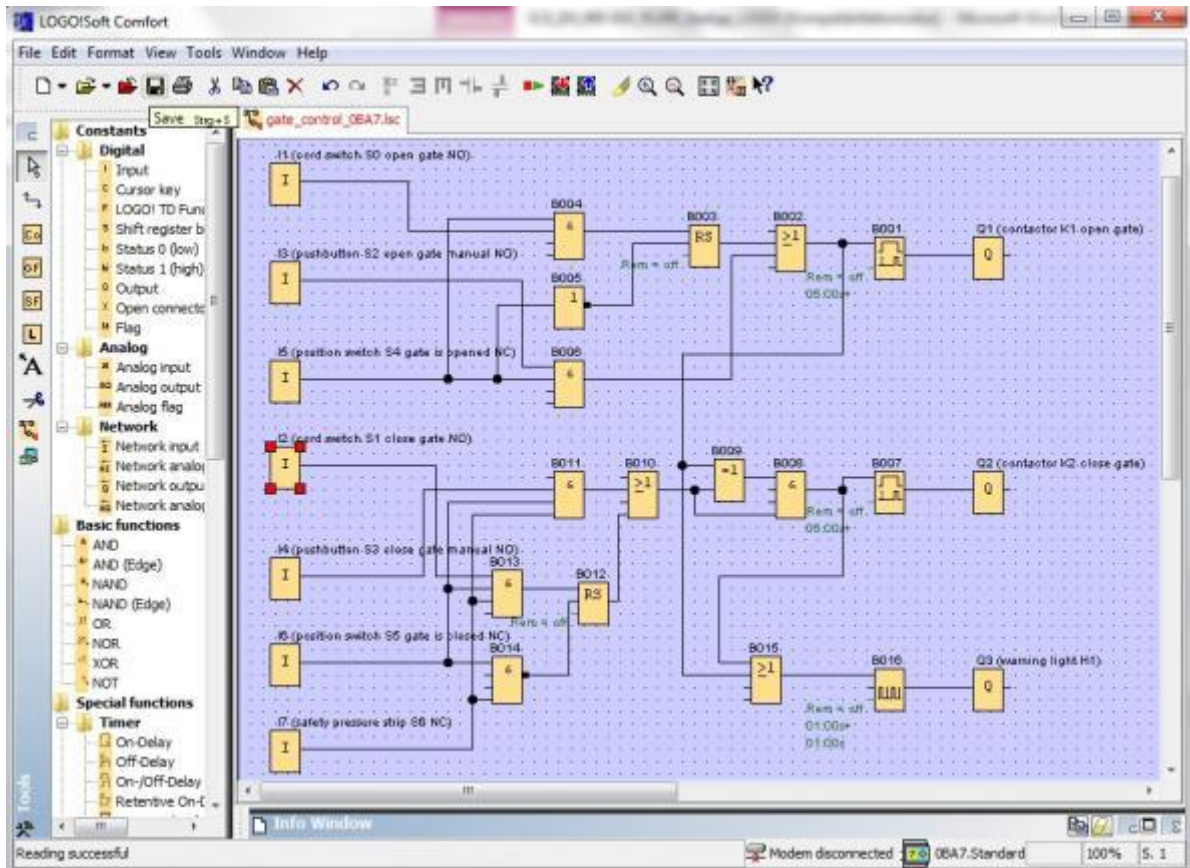
Select the scissors/connector tool  and click on a connection. The selected connection is split up graphically, but the connection between the blocks is still active.



Saving complete circuit diagram

Now that we have entered and optimized our circuit, we are ready to save it.

Click the **disk symbol**  to save it.



Use **Save As...** to assign the project name "gate_control".



7.3 Simulation of the circuit

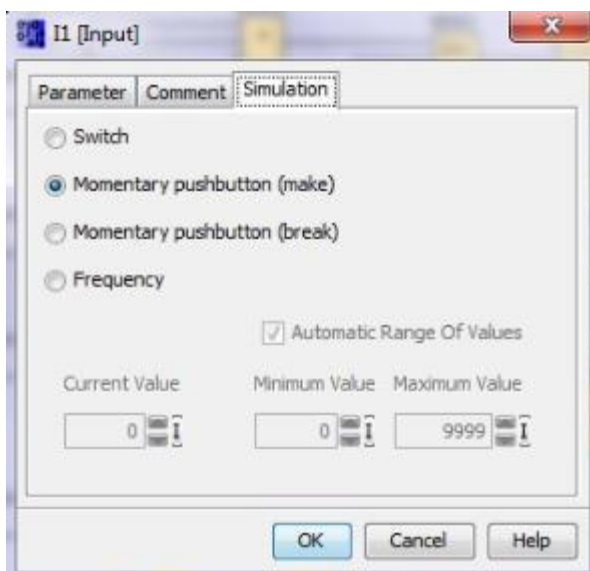
A circuit program can be tested with the program simulation and edited regarding its parameter assignment. This way you can ensure that you transfer a functioning and optimized circuit program to your LOGO!.

The input signals should be preset for the simulation.

Double-click the input **I1**.

Go to the Simulation tab and select **Momentary pushbutton (make)**.

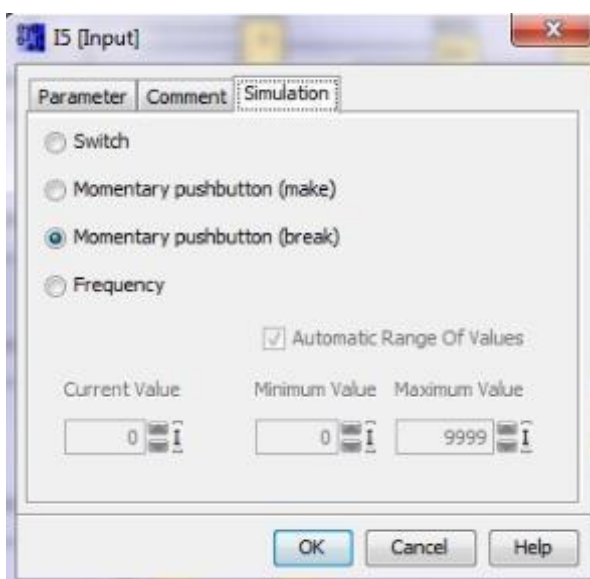
Set the inputs **I2**, **I3** and **I4** under Simulation to **Momentary pushbutton (make)**.




Double-click the input **I5**.

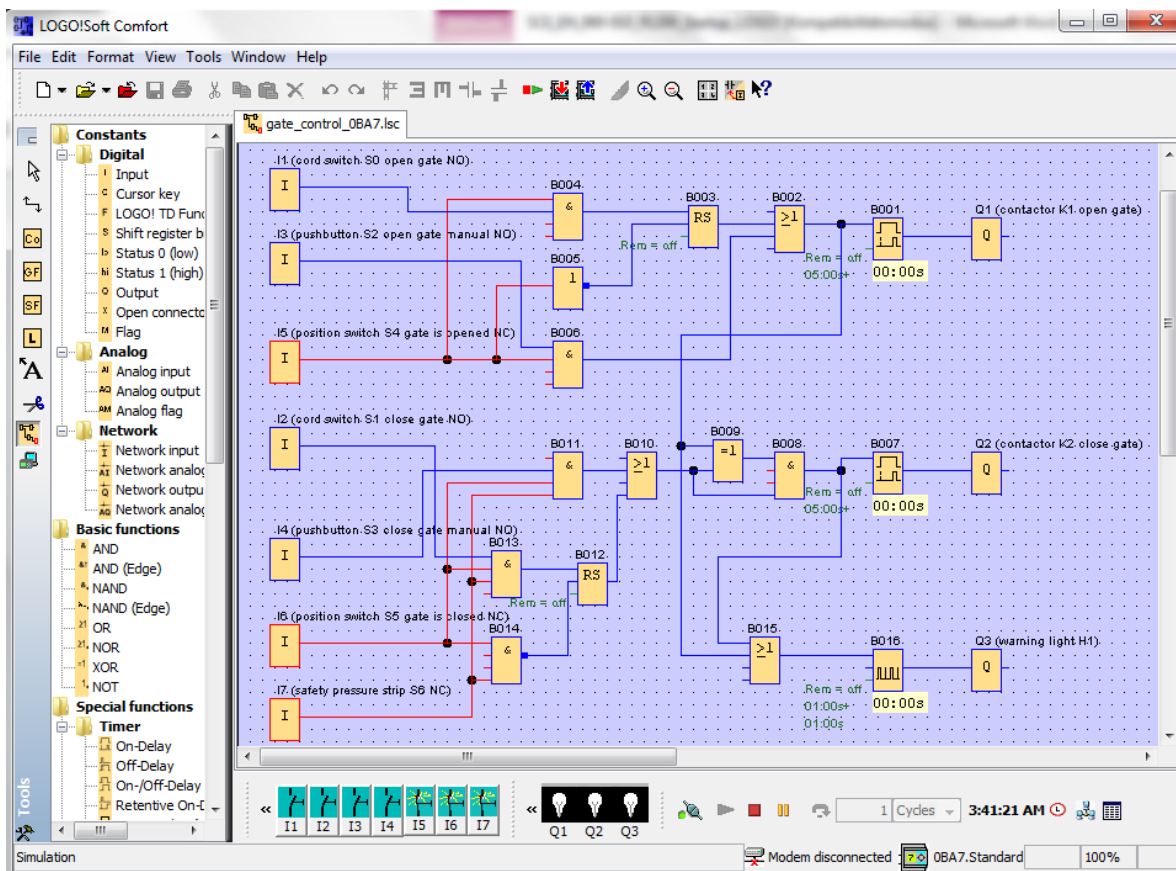
Go to the Simulation tab and select **Momentary pushbutton (break)**.

Set the inputs **I6** and **I7** under Simulation to **Momentary pushbutton (break)**.



Save your circuit diagram.

To start the simulation, click the Simulation symbol  in the Tools toolbar with your mouse. You switch to simulation mode this way.




Transferring tested program to the LOGO!

Once you have tested your program with LOGO!Soft Comfort Simulation, you can transfer it with the

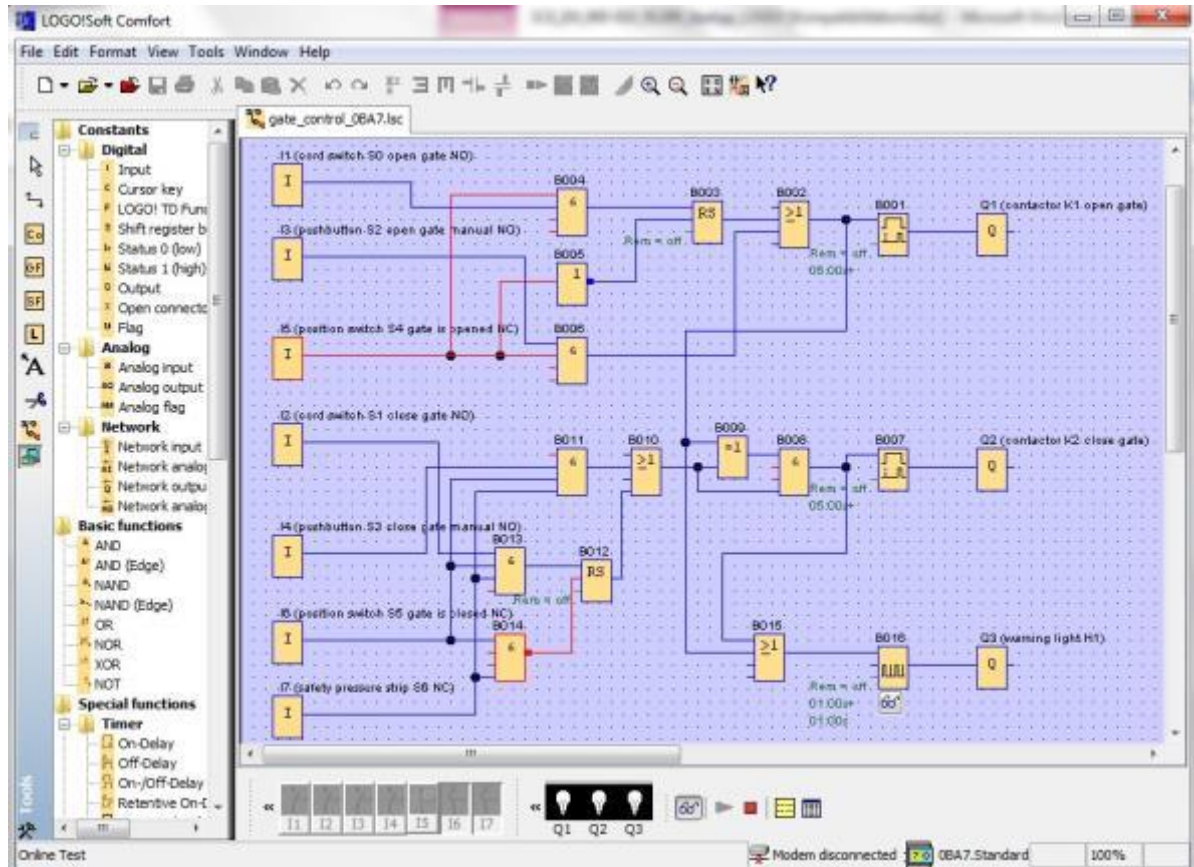


button from the PC -> LOGO!.

7.4 Online test

The circuit program can be tested online with the  button in connection with LOGO! Online. The states of the inputs and outputs and of the logical operations are displayed.

Click the Start monitoring  button.



8. COMMISSIONING A LOGO! 0BA8 WITH LOGO!SOFT COMFORT V8.0

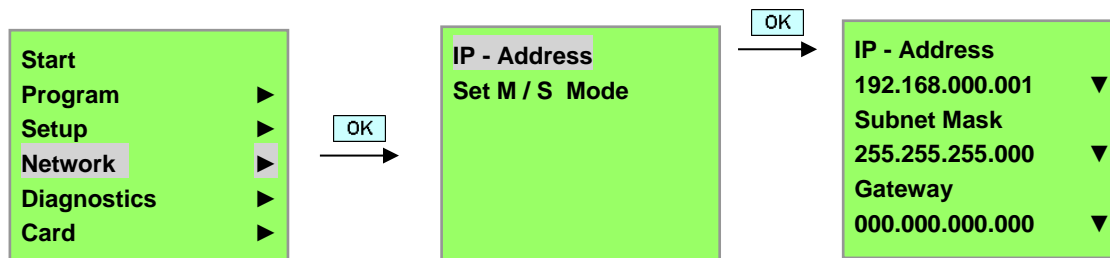
8.1 Setting the IP address on LOGO! 0BA8

In Stop mode of LOGO! 0BA7, navigate to the menu item **Network**.

Here you will find the settings of the IP address, the subnet mask and the gateway.

Use the ► **cursor** or press **OK** to enter the **Edit mode of the network settings**.

Assign the network settings according to the specifications of your network administrator.



Note

In the rows with the ► or ▼ symbols, navigation by means of cursor keys is also possible.

8.2 LOGO!Soft Comfort V8.0

LOGO!Soft Comfort V8.0 provides a brand new user interface with the following features:

- Consistent application menu display
- New network project-based working approach
- Split display of diagram mode and network mode
- Split display for “Standard” toolbar in the general software interface, the “Tools” toolbar in diagram mode, and the “Network” toolbar in project mode
- Split window display with focus switching and drag-and-drop capabilities
- Ability to work on a network project with tasks of saving, loading, creating and closing the network project
- New access control settings to authorize online access with different access options
- Ability to create connections through configuring NI and NQ function blocks
- Ability to configure screen display for messages, power-on screen and flags with 4 lines for LOGO! devices prior to 0BA8 and 6 lines for LOGO! devices as of 0BA8
- Enhanced system security through setting user passwords and access levels through access control settings

8.3 User interface of LOGO!Soft Comfort V8.0

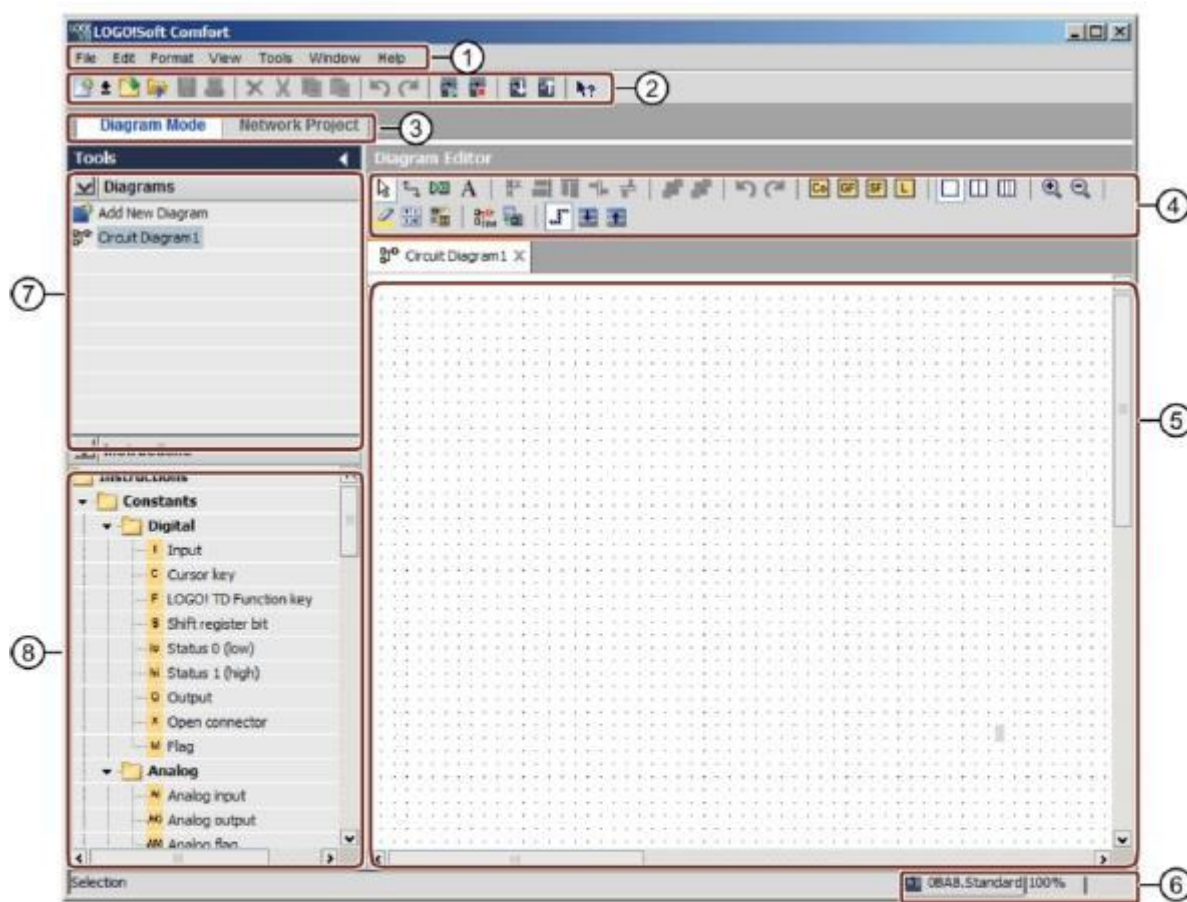
Programming interface

LOGO!Soft Comfort programming mode starts with an empty circuit diagram.

The programming interface for creating your circuit programs occupies the greater part of the screen.

The icons and logical operations of the circuit program are arranged on this programming interface.

To help you to maintain an overview of large circuit programs, the right side and the bottom of the programming interface contain scroll bars, which you can use for vertical and horizontal scrolling of the circuit program.



- | | |
|-----------------------|-------------------------|
| ① Menu bar | ⑤ Programming interface |
| ② Standard toolbar | ⑥ Status bar |
| ③ Mode bar | ⑦ Diagram tree |
| ④ Programming toolbar | ⑧ Instruction tree |

Project interface

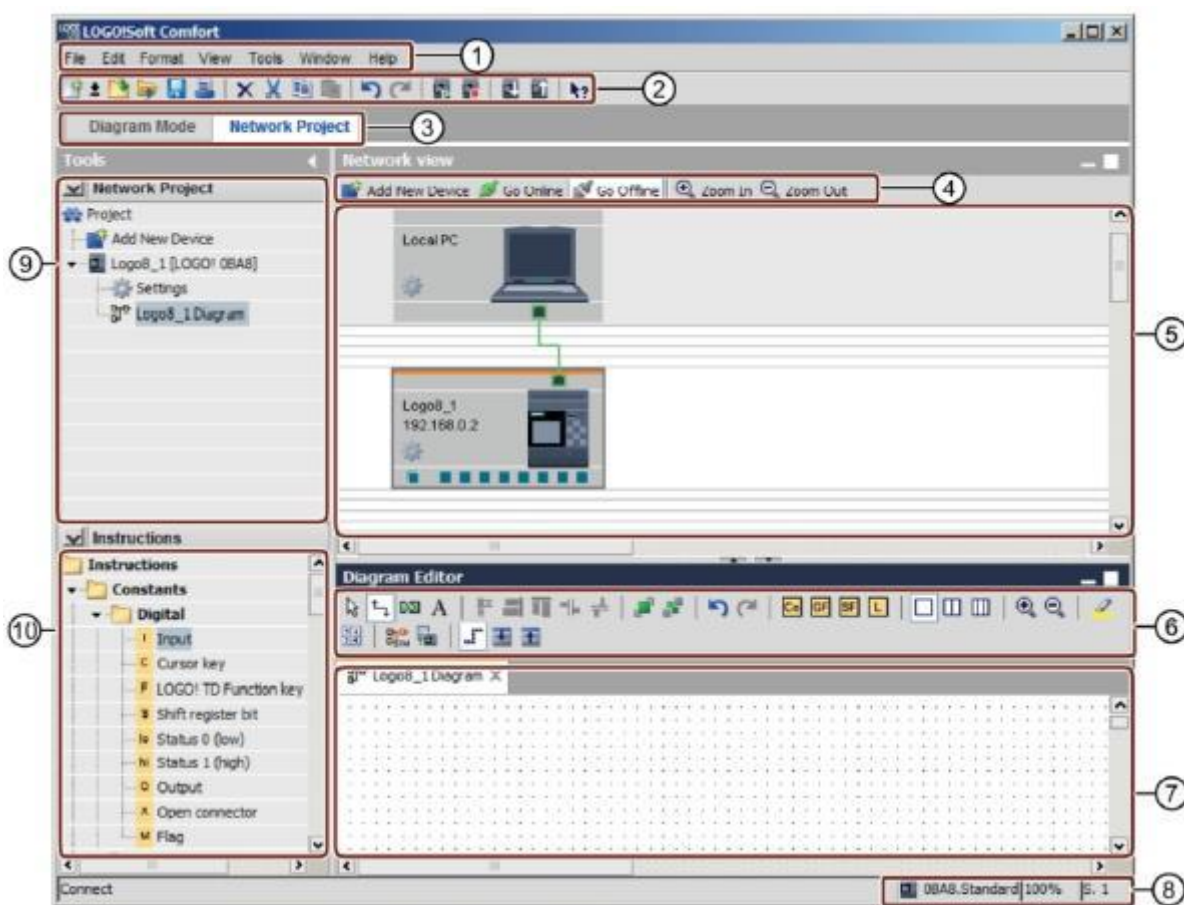
The LOGO!Soft Comfort project interface shows a network view with the devices and network connections.

After you have selected **Add New Device**, the diagram editor window appears.

Only LOGO! devices as of 0BA7 can be programmed in a network project.

The Diagram editor displays the program blocks and links of the circuit program. Initially, the circuit program is empty.

To help you to maintain an overview of large circuit project and programs, the right side and the bottom of the Network view and programming interface contain scroll bars, which you can use for vertical and horizontal scrolling of the circuit program.



- | | |
|---------------------|-------------------------|
| ① Menu bar | ⑥ "Tools" toolbar |
| ② Standard toolbar | ⑦ Programming interface |
| ③ Mode bar | ⑧ Status bar |
| ④ "Network" toolbar | ⑨ Device tree |
| ⑤ Network view | ⑩ Instruction tree |

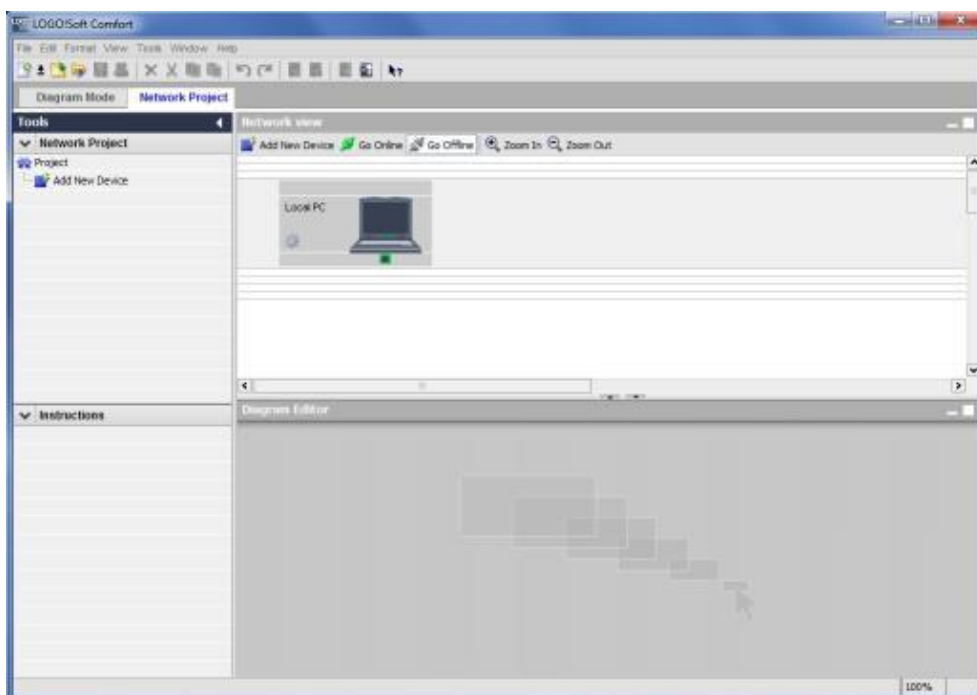
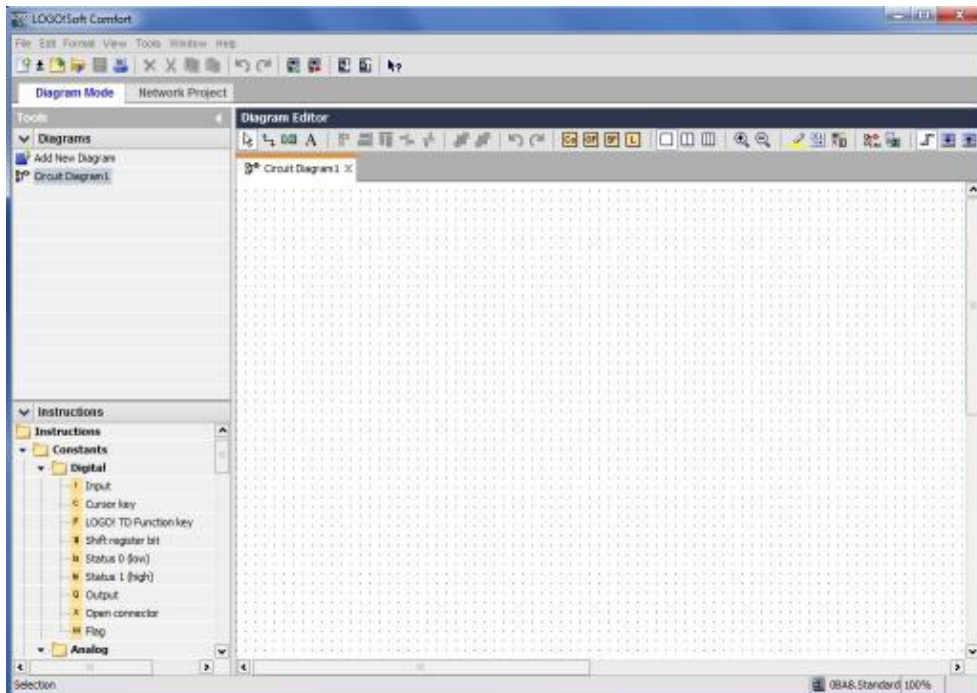
9. PROJECT PLANT GATE CONTROL WITH LOGO!SOFT COMFORT V8.0 AND LOGO! 0BA8

9.1 Starting LOGO!Soft Comfort V8.0 and adding LOGO! 0BA8

Start the LOGO!Soft Comfort V8.0 software.

The LOGO!Soft Comfort software opens in diagram mode.

Click the **Network Project** tab.

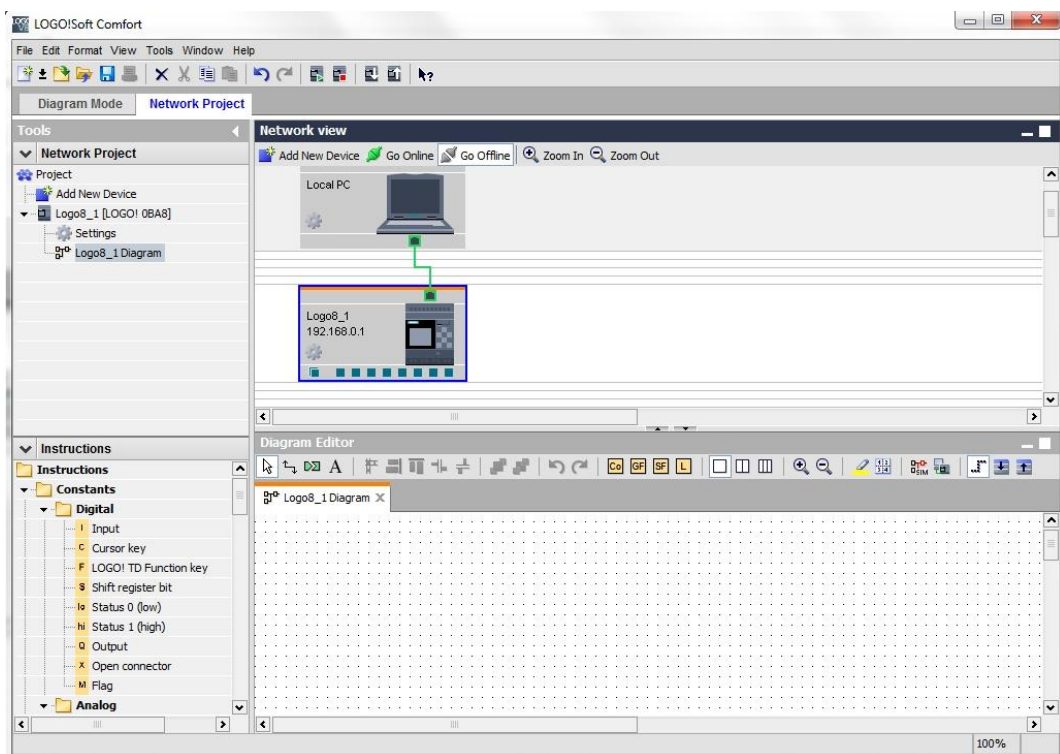
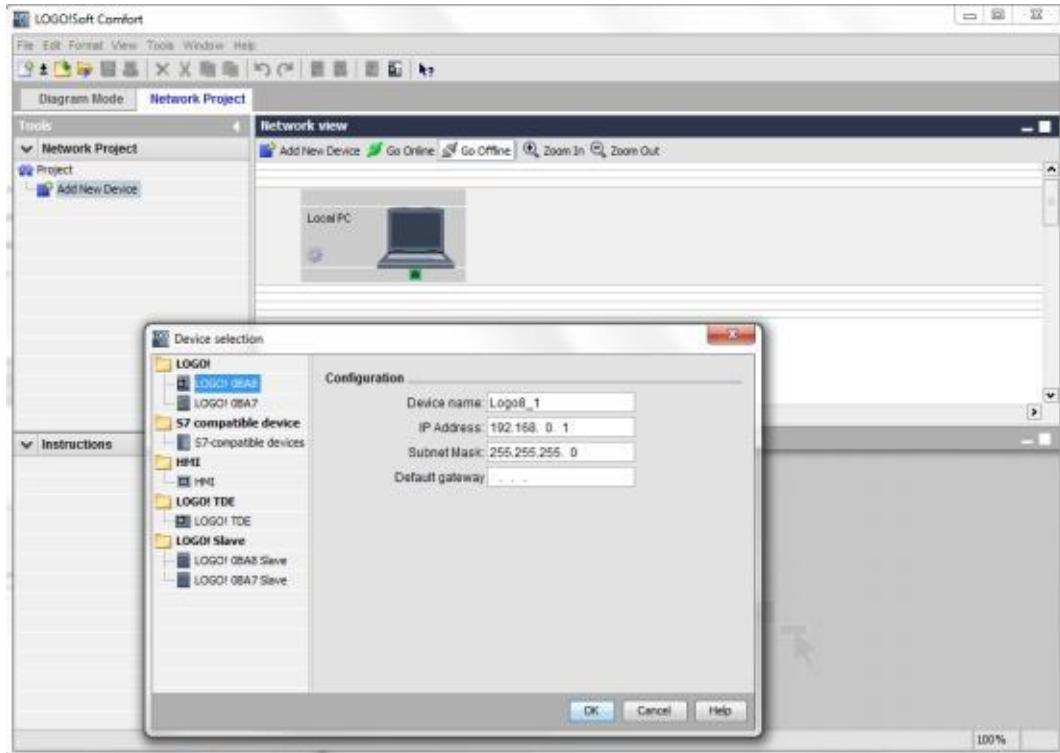


In the network view, click on **Add New Device**.

In the device selection window, select the **LOGO! 0BA8**.

Enter the **network settings** under Configuration.

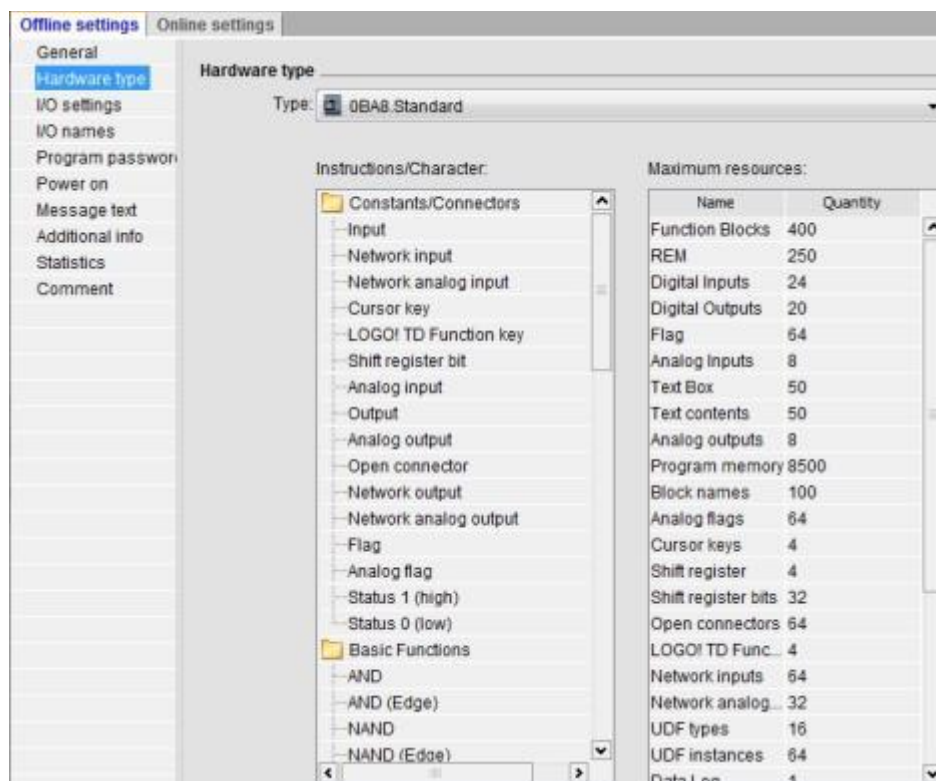
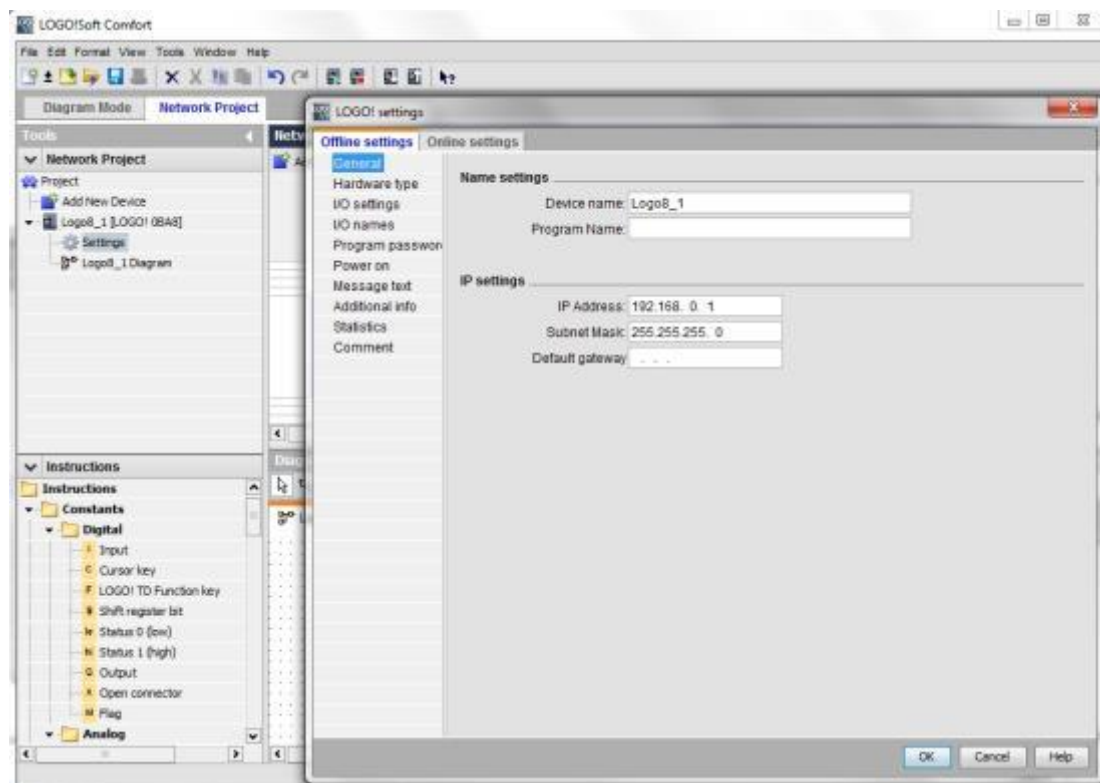
Confirm your selection with **OK**.



9.2 LOGO! 0BA8 settings

Open the LOGO! settings by double-clicking on Settings.

All offline/online settings of LOGO! 0BA8 can be edited here.



Offline settings | Online settings

General
Hardware type
I/O settings
I/O names
Program password
Power on
Message text
Additional info
Statistics
Comment

Behavior of analog outputs in STOP mode

☒ All outputs keep the last value

	Value range type	Value in STOP mode
AQ1	0-20mA / 0-10V	0.00
AQ2	0-20mA / 0-10V	0.00
AQ3	0-20mA / 0-10V	0.00
AQ4	0-20mA / 0-10V	0.00
AQ5	0-20mA / 0-10V	0.00
AQ6	0-20mA / 0-10V	0.00
AQ7	0-20mA / 0-10V	0.00
AQ8	0-20mA / 0-10V	0.00

Set AI3 and AI4 position

If 4 AIs are supported on LOGO!, do you want to enable 2 AIs or 4 AIs?
To ensure compatibility with older devices, enable 2 AIs.

☐ Enable 0 AIs
No AIs are available for your circuit program.

☒ Enable 2 AIs
Only AI1 and AI2 corresponding to input terminals I7 and I8 can be used in your circuit program.

☐ Enable 4 AIs
AI1 and AI2 corresponding to input terminals I7 and I8 are available for use in your circuit program.
Additionally, AI3 and AI4 corresponding to input terminals I1 and I2 are available for use.

Offline settings | Online settings

General
Hardware type
I/O settings
I/O names
Program password
Power on
Message text
Additional info
Statistics
Comment

I/O names

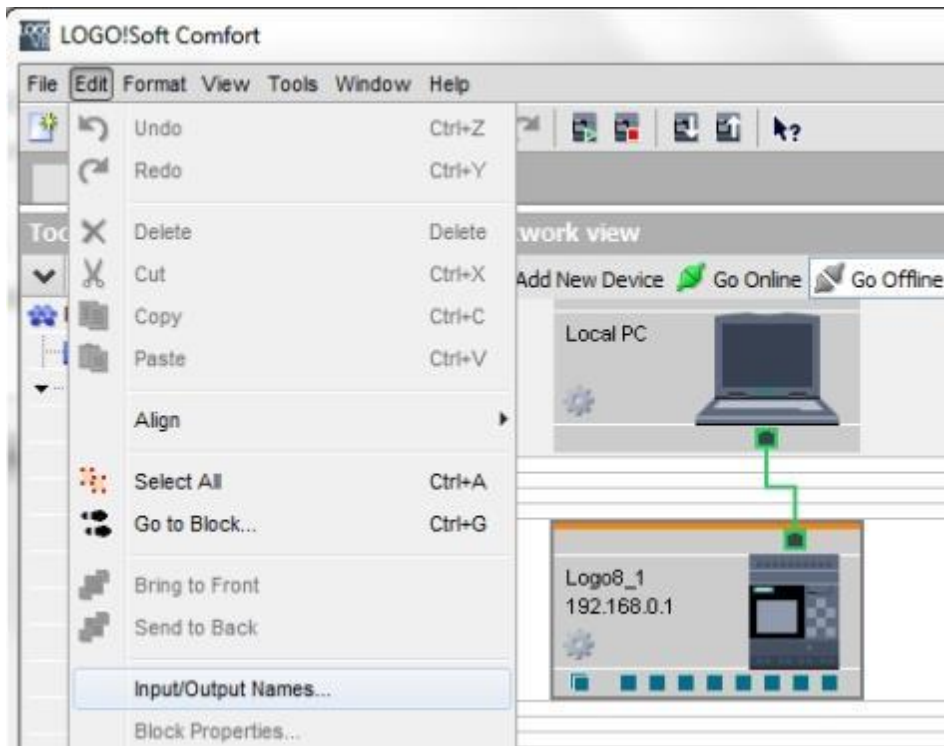
Input terminals:	Name	Output terminals:	Name
I1		Q1	
I2		Q2	
I3		Q3	
I4		Q4	
I5		Q5	
I6		Q6	
I7		Q7	
I8		Q8	
I9		Q9	
I10		Q10	
I11		Q11	
I12		Q12	
I13		Q13	
I14		Q14	
I15		Q15	
I16		Q16	
I17		Q17	
I18		Q18	
I19		Q19	
I20		Q20	
I21		AQ1	
I22		AQ2	

Import Export

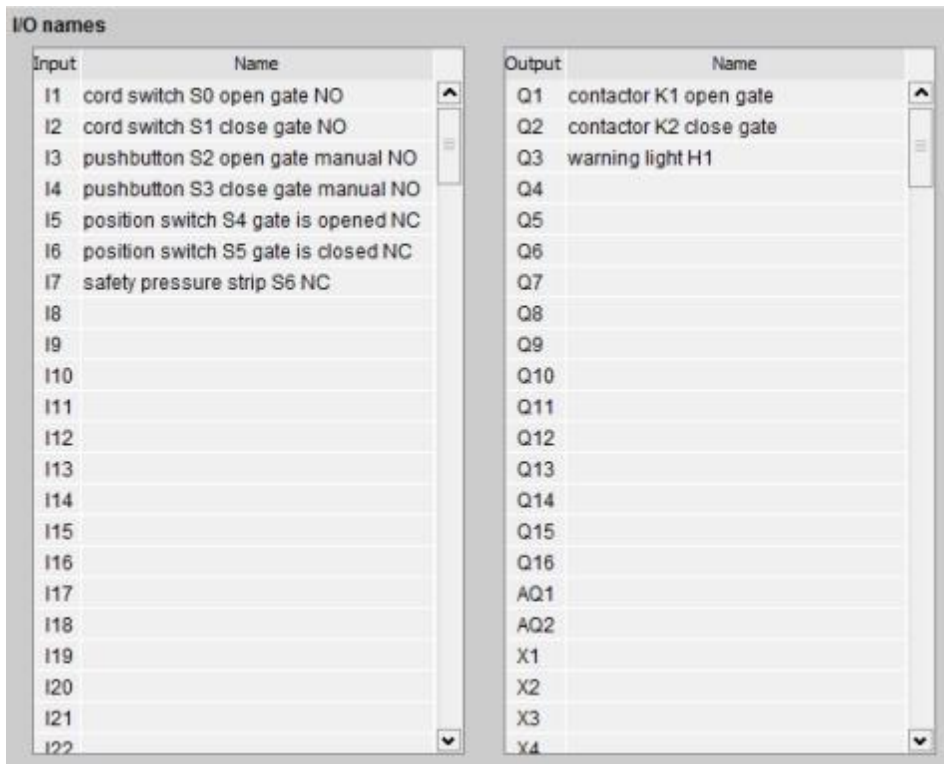
Close the LOGO! settings window with **OK**.

9.3 Entering input/output names

You can also open the I/O names window via the **Edit menu**.



Enter the I/O names of the plant gate control and close the window with **OK**.

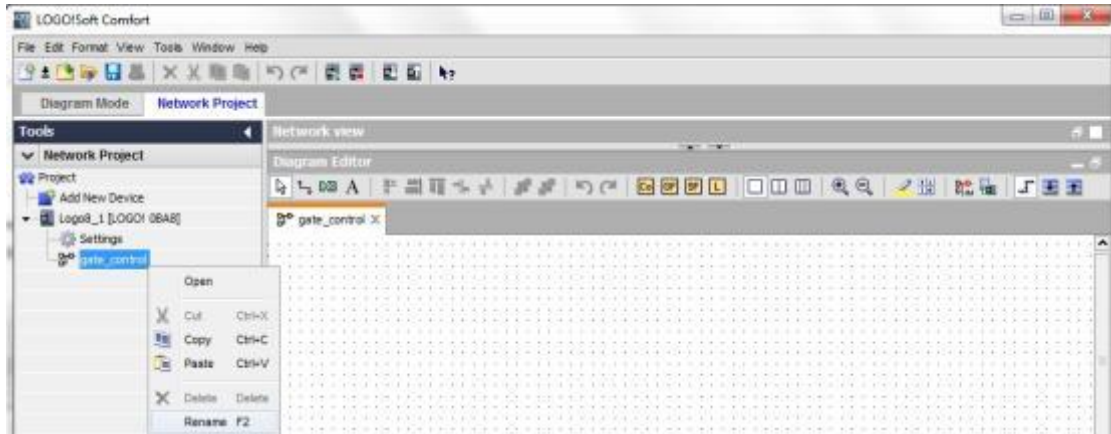


9.4 Entering a program in the Diagram Editor

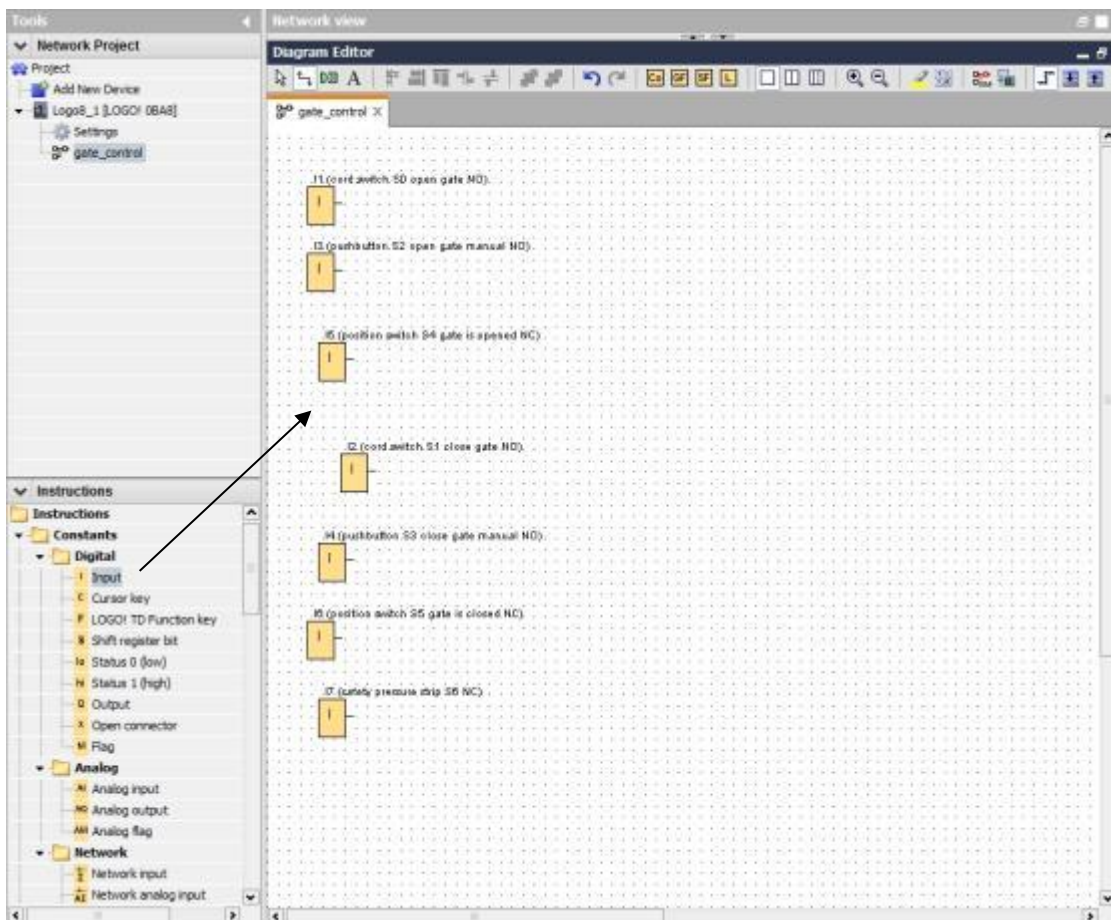
Inserting blocks

Minimize the network view.

Right-click to rename the diagram to gate_control.



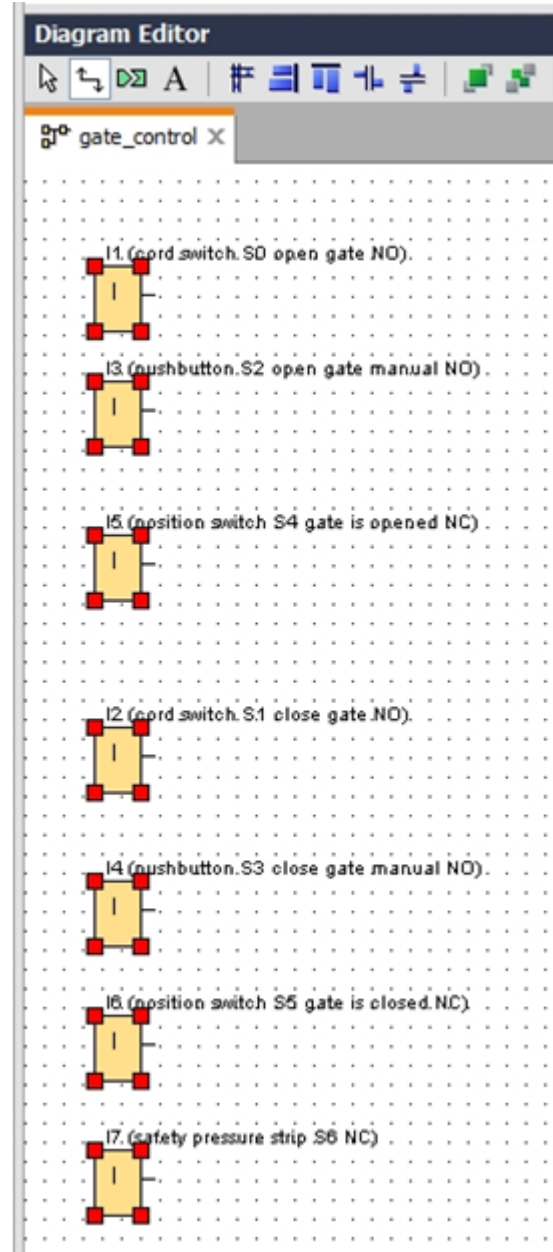
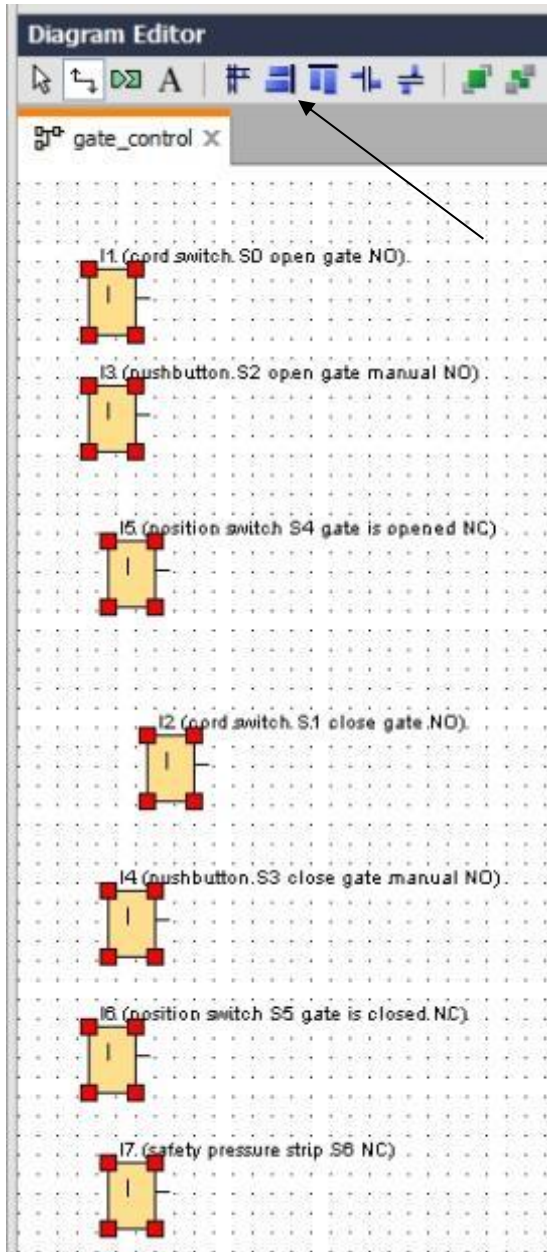
Drag inputs I1, I3, I5, I2, I4, I6 and I7 to the programming interface.



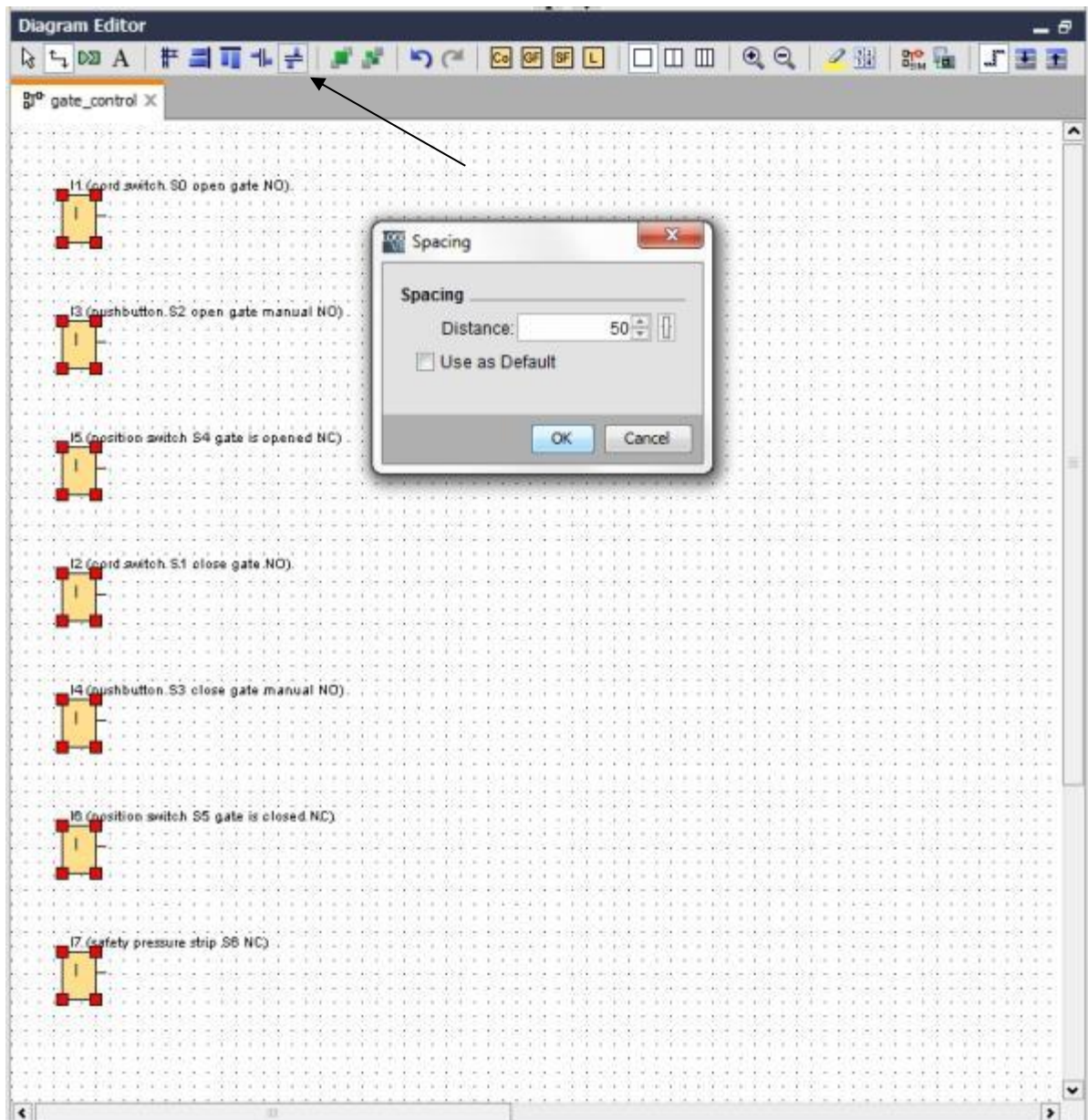
Aligning blocks

Select the inserted inputs (Ctrl+click).

Click **Align vertically**.



Click **Space vertically** and enter 50 as the value for the distance.
Confirm with **OK**.



Drag the outputs **Q1**, **Q2** and **Q3** to the programming interface.

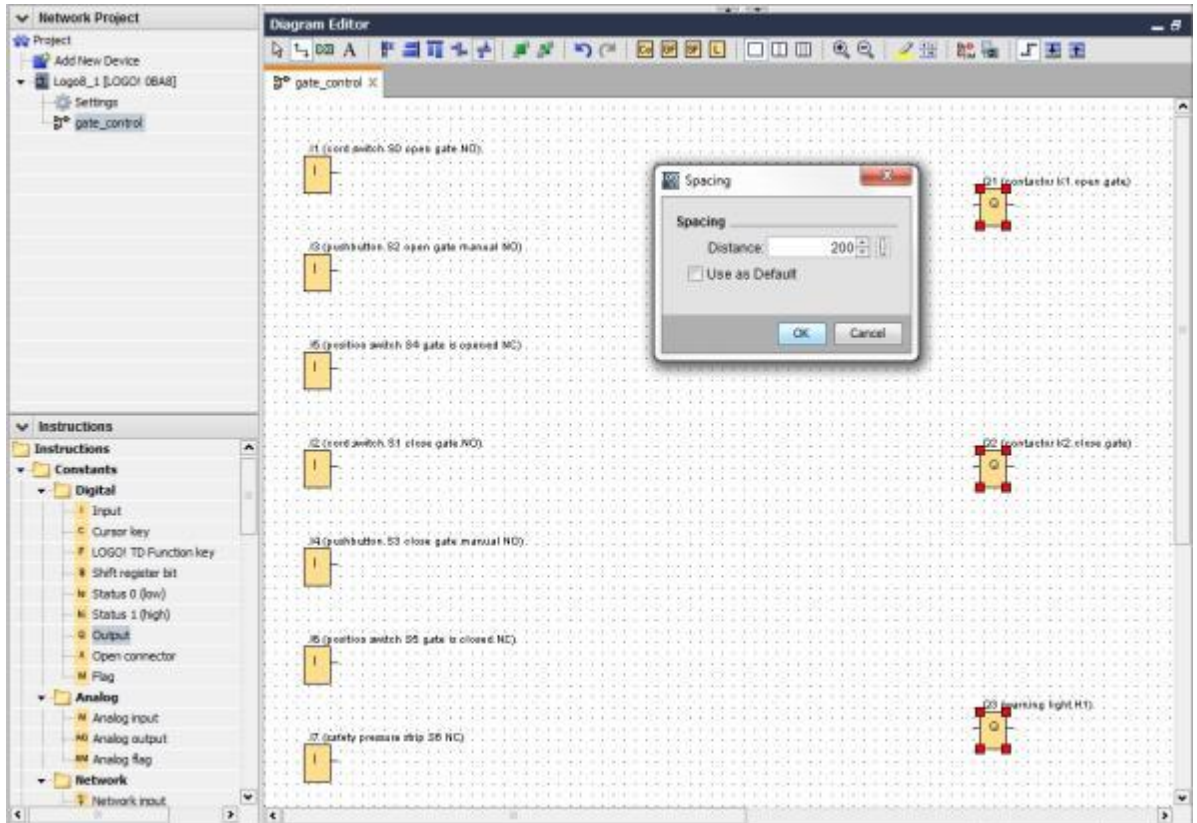
Select the inserted outputs (Ctrl+click).

Click **Align vertically**.

Click **Space vertically**.

Enter 200 as the value for the distance.

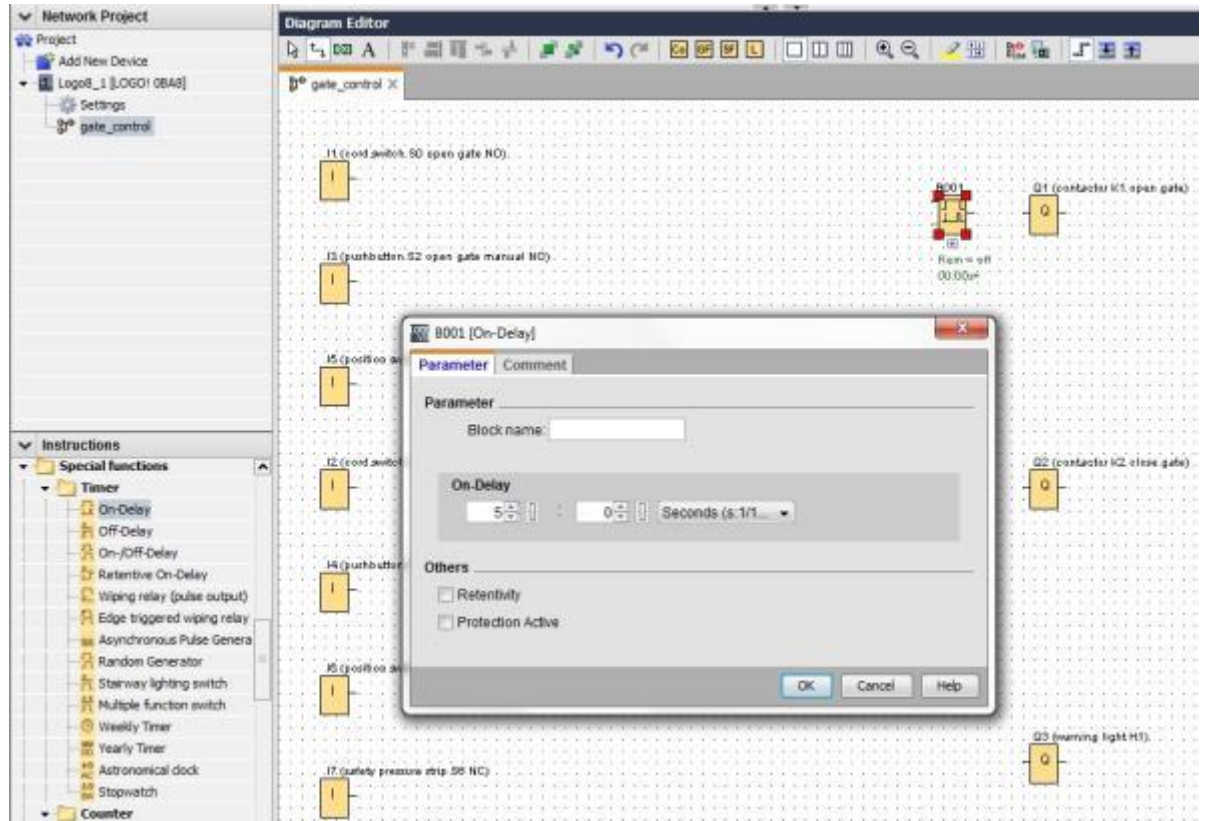
Confirm with **OK**.



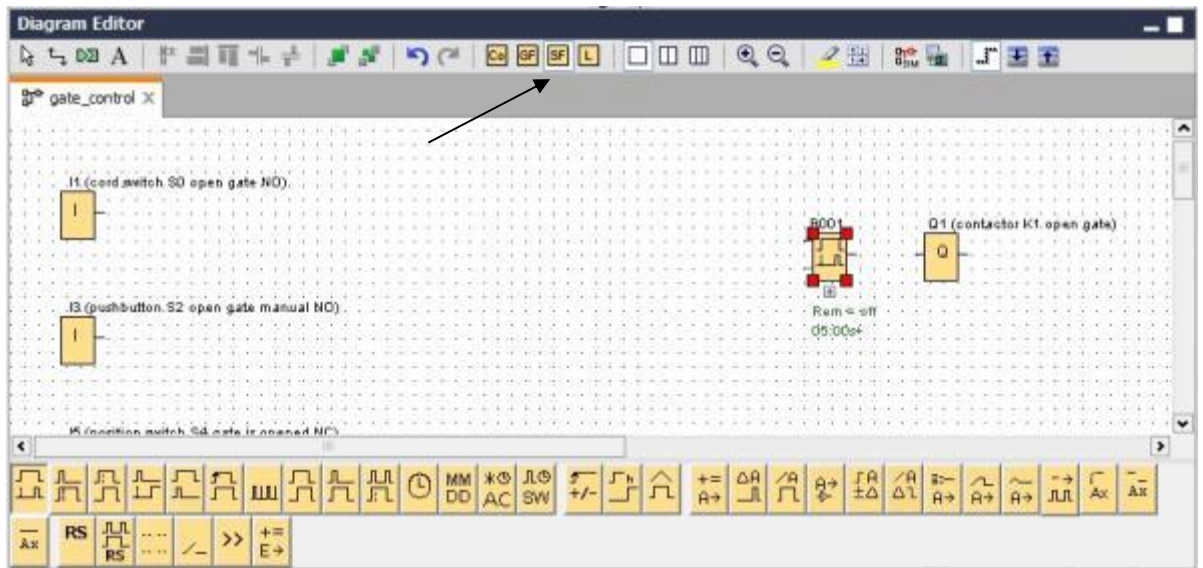
Setting parameters

Drag an on delay in front of output **Q1**.

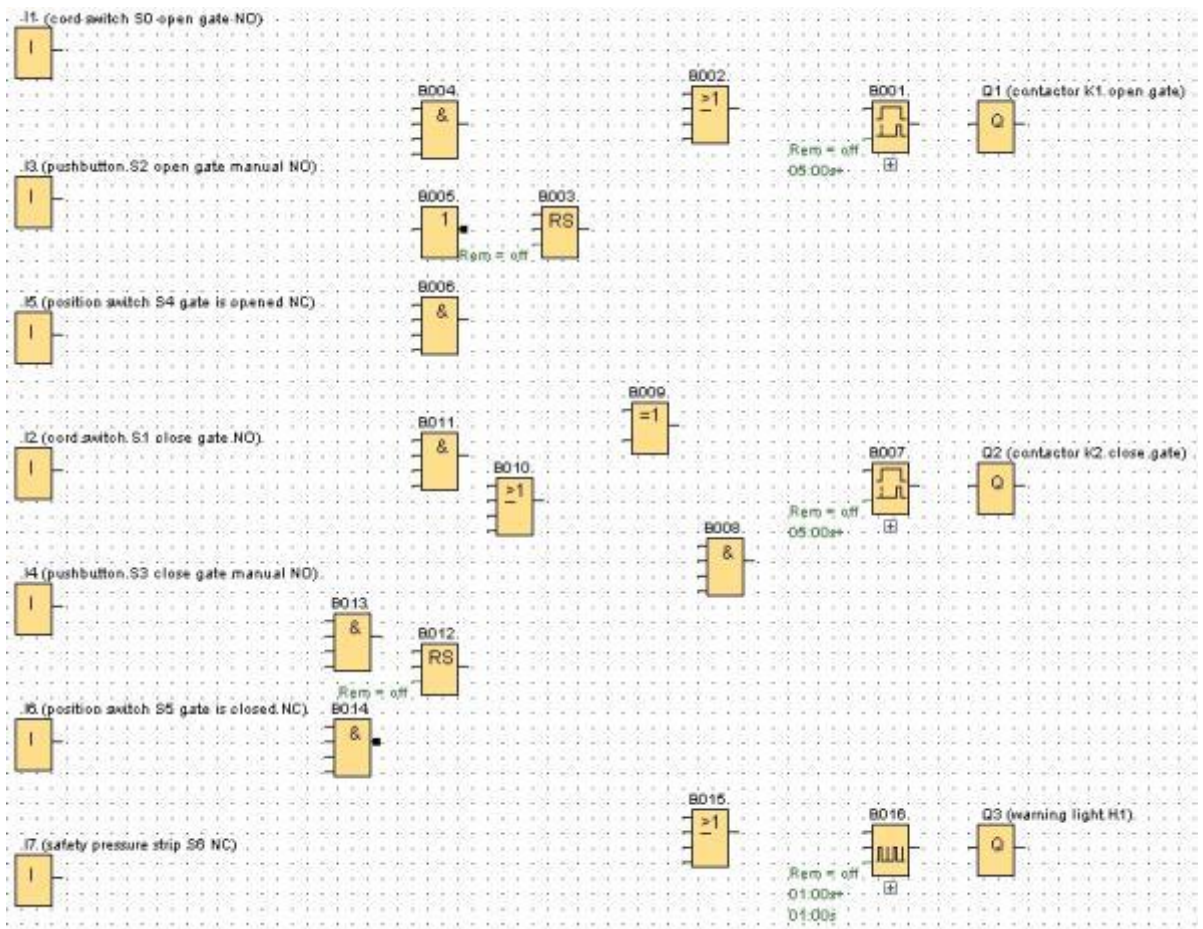
Double-click **B001** (input delay) and set the time to 5 seconds.




The block functions can be displayed in the programming interface using buttons.

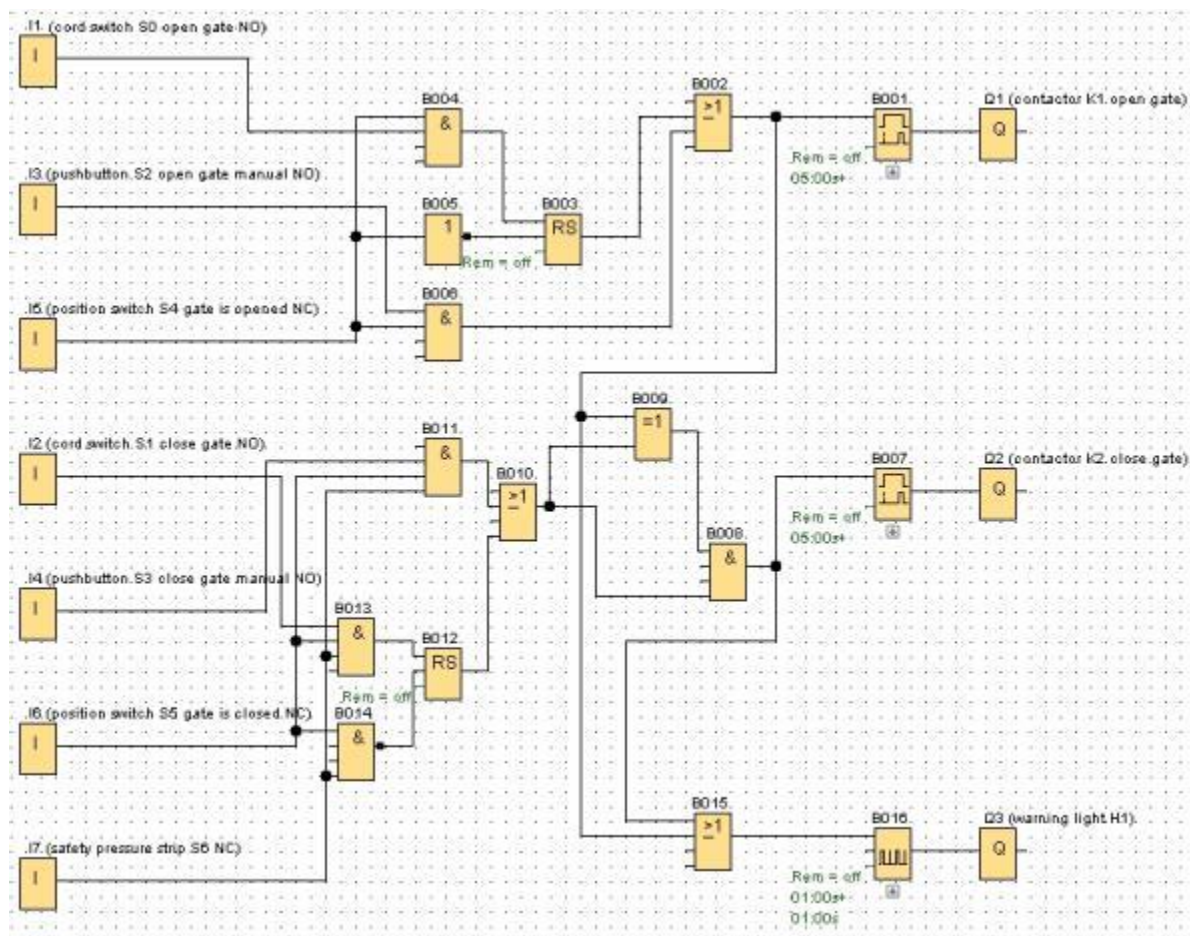


Place the remaining blocks B002 to B016 and set the times for B007 and B016.



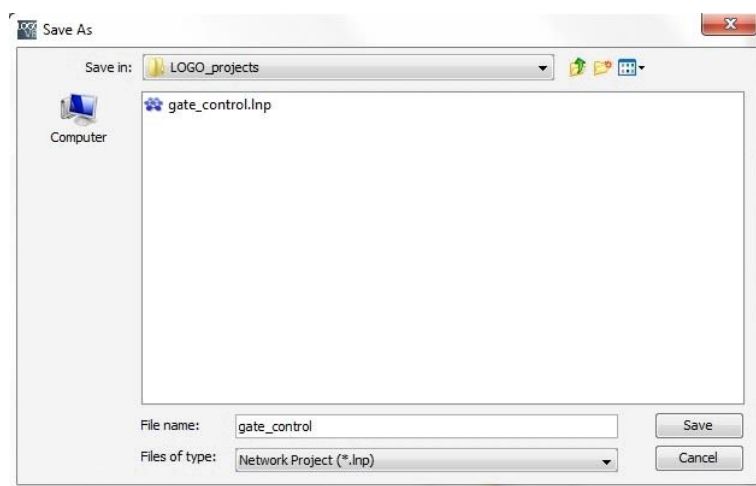
Connecting blocks

To complete the circuit, the individual blocks need to be connected among one another. For this purpose, select the  symbol for block connection in the Tools toolbar.



Saving the complete circuit of the plant gate control as network project

To save, click the diskette symbol  and enter gate_control.



9.5 Simulation of the circuit

A circuit program can be tested with the program simulation and edited regarding its parameter assignment. This way you can ensure that you transfer a functioning and optimized circuit program to your LOGO!.

The input signals should be preset for the simulation.

Double-click the input **I1**.

Go to the Simulation tab and select **Momentary pushbutton (make)**.

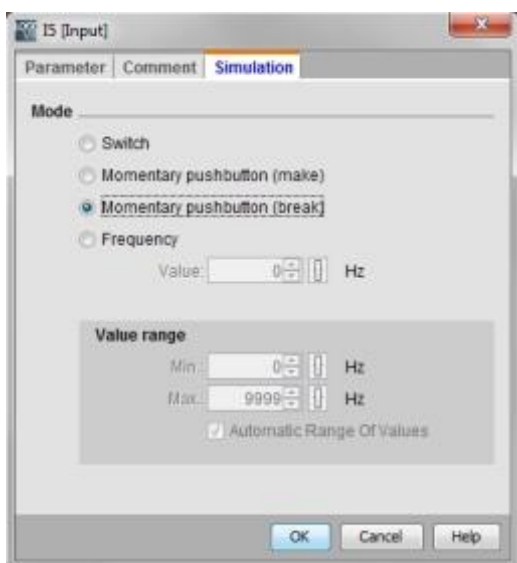
Set the inputs **I2**, **I3** and **I4** under Simulation to **Momentary pushbutton (make)**.




Double-click the input **I5**.

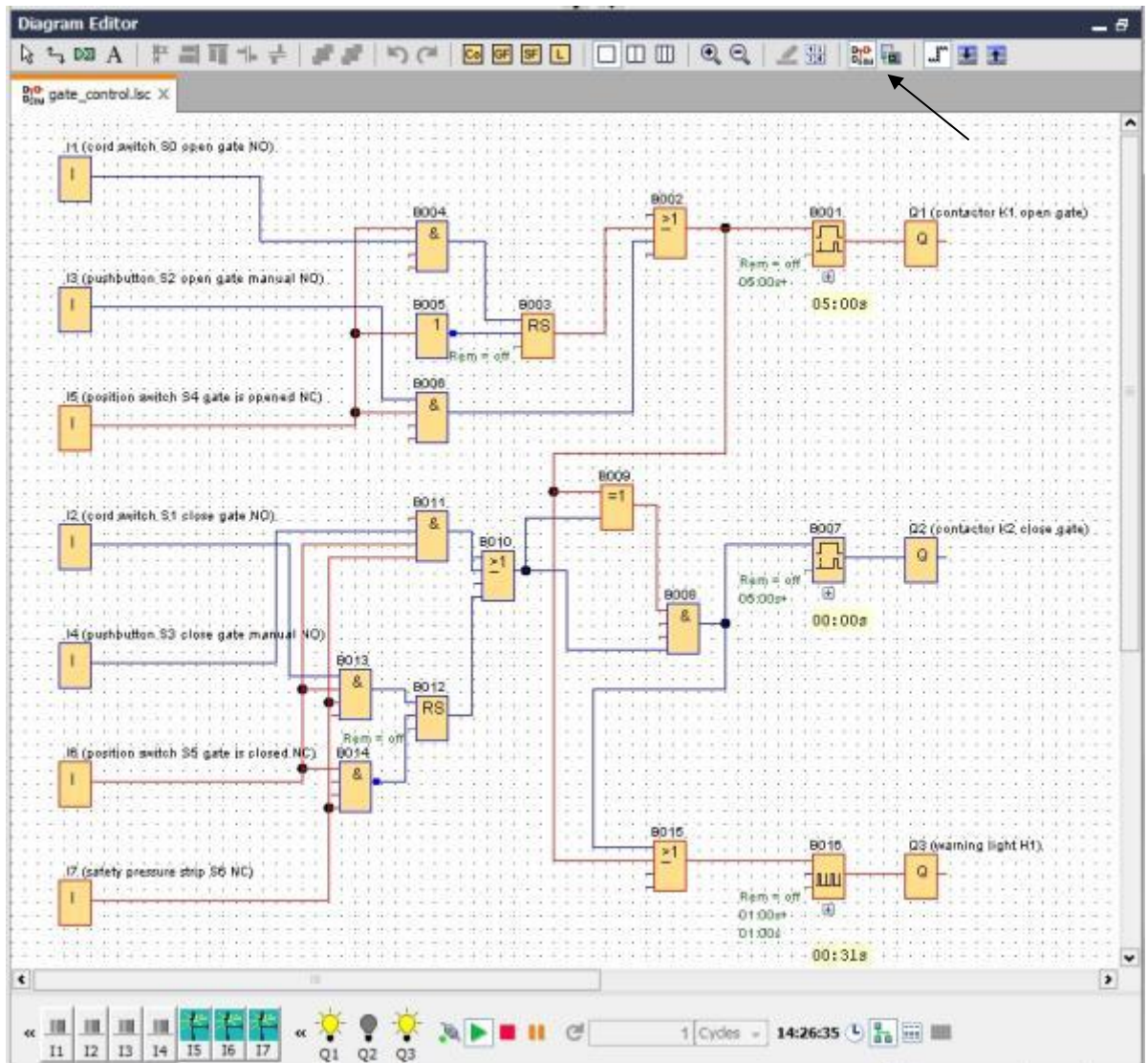
Go to the Simulation tab and select **Momentary pushbutton (break)**.

Set the inputs **I6** and **I7** under Simulation to **Momentary pushbutton (break)**.





Save your circuit diagram.

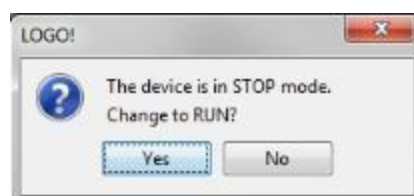
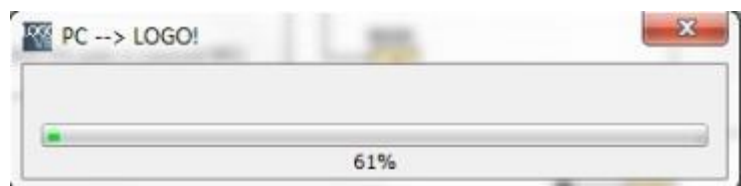
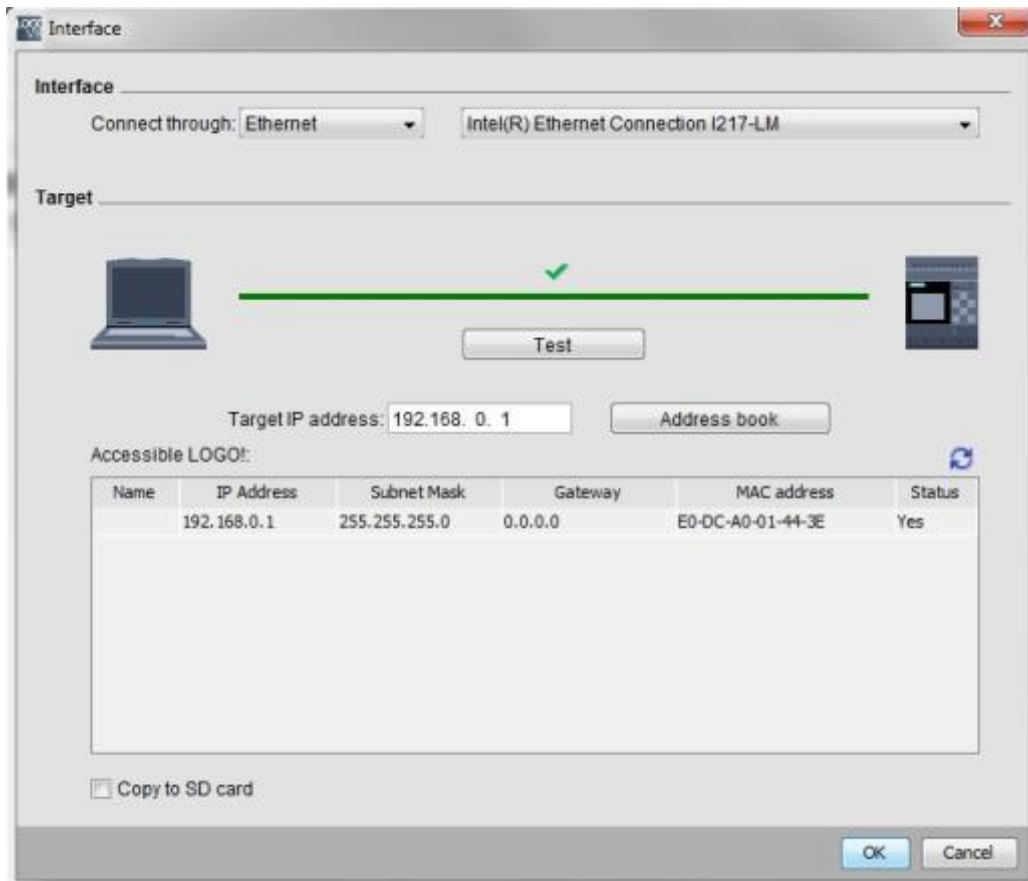
To start the simulation, click the Simulation symbol  in the Tools toolbar. With this, you change to simulation mode.




9.6 Transferring the tested program to LOGO!

After you have tested your program with LOGO!Soft Comfort simulation, you can transfer it from the **PC to LOGO!** with the  button.

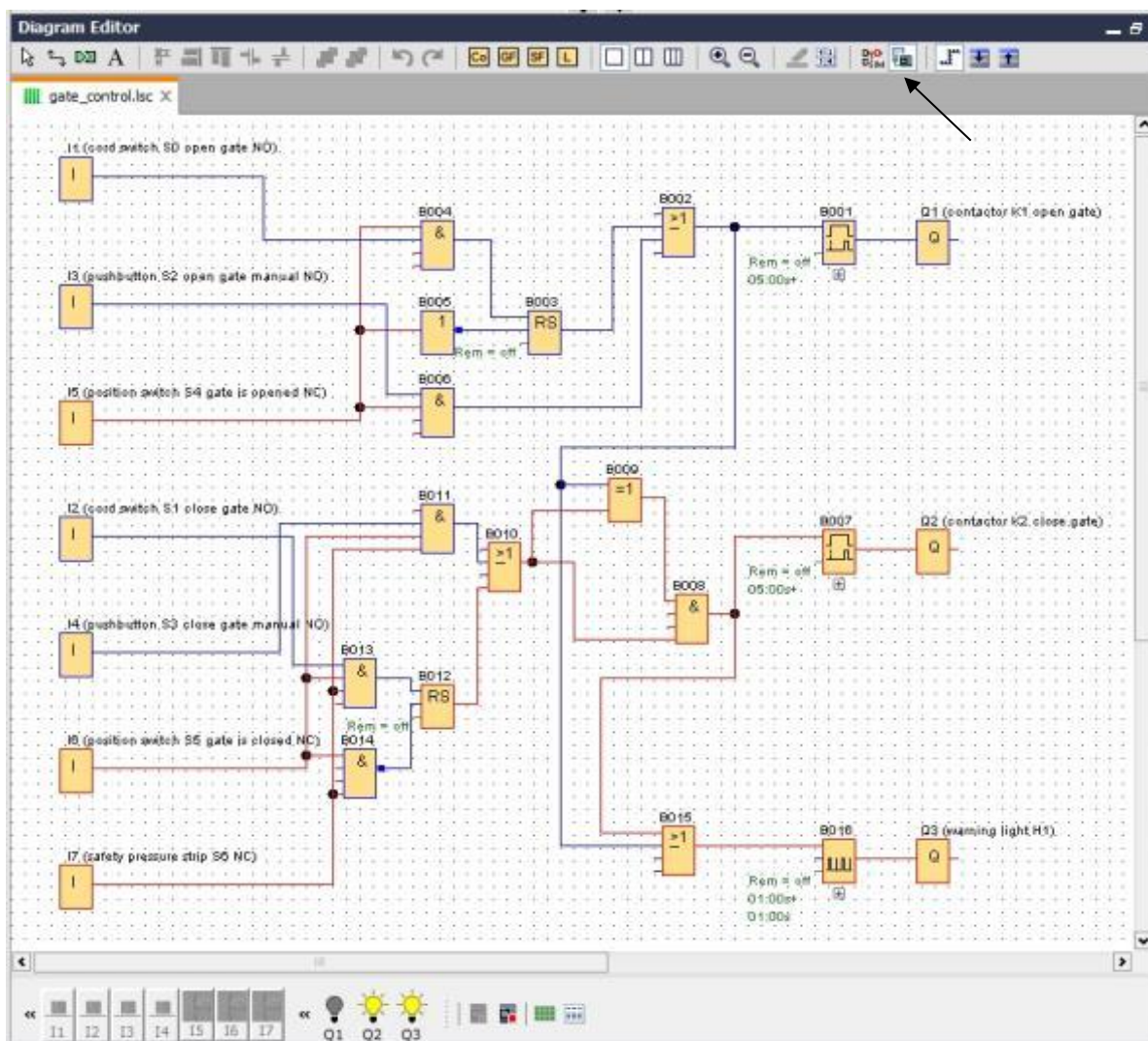
Click the **Refresh button**  to display the accessible LOGO! devices.
Confirm the following window with **OK** or **Yes**.



9.7 Online test

With the button for the online test , the circuit program can be tested online in connection with LOGO!. The states of the inputs and outputs and the logical operations are displayed.

Click the **online test button**  to start monitoring.



10. ADDITIONAL INFORMATION

Note

Additional information on programming and handling of LOGO! is available in the online help, the LOGO! device manual and the LOGO! presentations in the Instructions folder of this training curriculum or on the **LOGO! Computer Based Training and Documentation Collection DVD** or on the Internet under www.siemens.com/logo