

Micro Application Example



applications & TOOLS

Easy and Reliable Detection of Objects by Means
of Optical Proximity Switches (with LOGO! and
SIMATIC PXO200)

SIEMENS

Micro Automation Set 18

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Foreword

Micro Automation Sets are fully functional and tested automation configurations based on A&D standard products for simple, fast and inexpensive implementation of automation tasks for small-scale automation. Each of these Micro Automatic Sets covers a frequently used subtask of a typical customer problem in the low-end range.

The sets help the customer to obtain answers with regard to required products and the question how they function when combined.

However, depending on the system requirements, a variety of other components (e.g. other CPUs, power supplies, etc.) can be used to implement the functionality on which this set is based. Please refer to the respective SIEMENS A&D catalogs for these components.

The Micro Automation Sets are also available by clicking the following link:

<http://www.siemens.de/microset>

Table of Contents

Table of Contents	3
1 Application Areas and Usage	4
2 Setup.....	7
2.1 Connection to a 400V Three-phase Mains	7
2.2 Connection to a 230V Mains.....	8
2.3 Installation and Alignment of Optical Proximity Switches	9
3 Hardware and Software Components.....	10
4 Function Principle	12
4.1 Detecting Objects and Providing Information as Digital Signal.....	12
4.2 Controlling and Starting the Motor	14
4.3 Operating the Roller Shutter at Defined Times Only	15
5 Configuring the Startup Software	16
5.1 Preliminary Remark	16
5.2 Download of the Startup Code.....	16
5.3 Configuring Components	16
6 Live Demo	22
6.1 Operating the Roller Shutter Control in Normal Operation	22
6.2 Roller Shutter Control Outside Working Hours	24
7 Technical Data	26

1 Application Areas and Usage

Automation Task

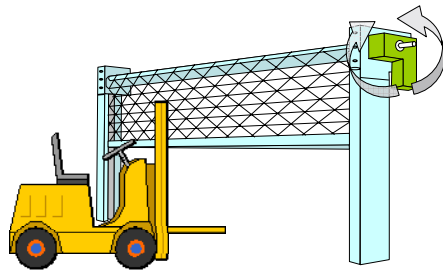
For good comprehensibility, the features of the Micro Automation Set are explained on the basis of an automation task.

In a logistics center, several roller shutters are available for persons and industrial trucks such as e.g. forklift trucks and other motor-driven means of transportation.

In order to pass more easily and more rapidly, opening and closing of these roller shutters is to be automated taking into consideration the protection of persons and goods. Outside the working hours, it must not be possible to open the roller shutter except by especially authorized personnel.

Automatic control of the roller shutter is to be realized centrally by means of a module.

Figure 1-1



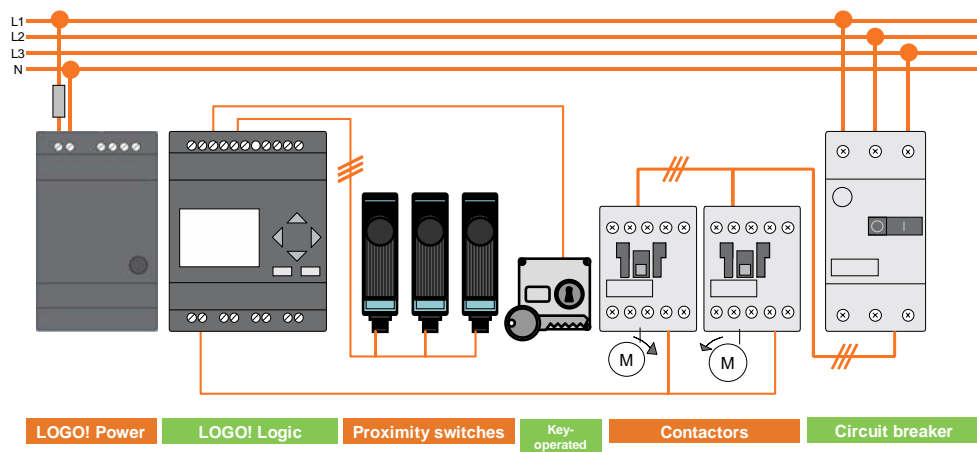
Automation Solution – Set 18

To control the roller shutter, the automation solution uses a **LOGO! logic module** with display and integrated date and time function. Three optical sensors **SIMATIC PXO200** connected to the LOGO! logic module ensure the detection of incoming and outgoing objects as well as of objects in the hazardous area.

The LOGO! logic module controls the roller shutter motor by means of a reversing contactor combination consisting of two SIRIUS contactors. The motor is protected by means of a **SIRIUS circuit breaker**.

The calendar function of the LOGO! logic module allows locking the roller shutter outside the working hours. Authorized personnel can activate or deactivate this calendar function by means of a **key-operated switch**.

Figure 1-2



Micro Automation Set 18

Entry-ID 23588559

Application Areas

- hoisting devices
- transport equipment
- roller shutter controls
- conveyor systems
- ventilation control
- access monitoring
- automotive industry

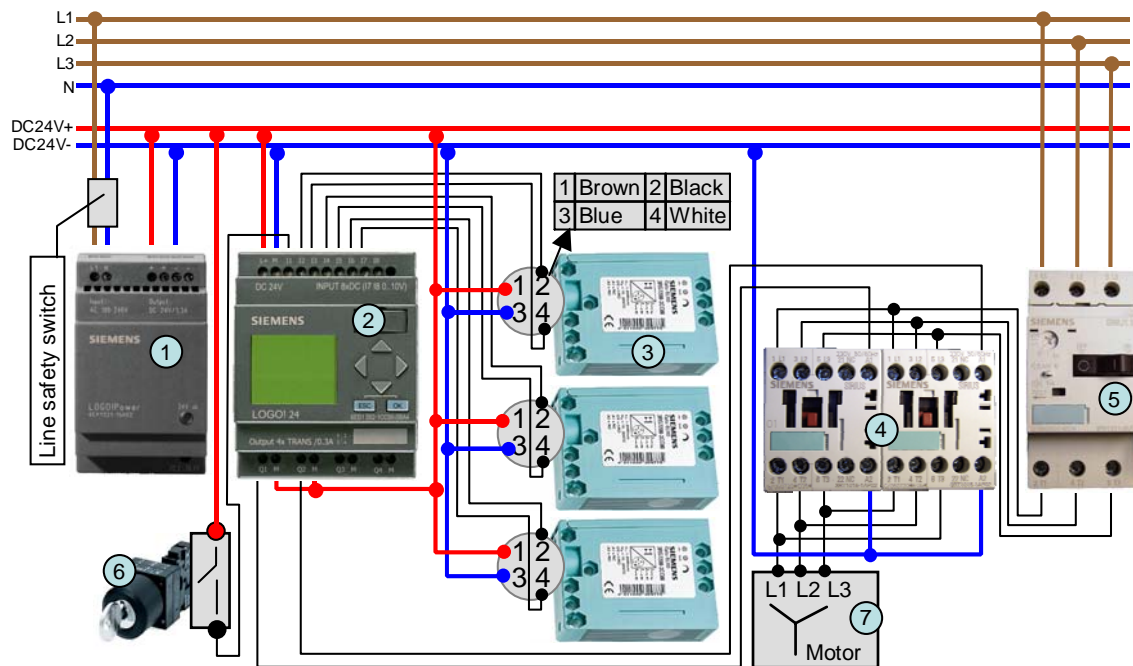
Benefits

- Cost-effective linking of sensor technology and control functions by means of the LOGO! logic module
- Connection of up to eight optical proximity switches to the LOGO! logic module
- Precise detection of objects by means of rapid and accurate optical proximity switches with ranges of up to 50 m
- Direct displaying of messages and devices states via the integrated display of the LOGO! logic module
- Easy modification of parameters of the control and regulation functions of the LOGO! logic module via the integrated operator panel

2 Setup

2.1 Connection to a 400V Three-phase Mains

Figure 2-1



The power supply for the 24V loads is provided by a **LOGO! Power (1)**.

The Micro Automation Set 18 consists of a **LOGO! logic module (2)** with relay outputs and an integrated calendar and time function. Three photoelectric barriers of type **SIMATIC PXO200 (3)** are connected to six digital inputs of the LOGO! logic module.

Two digital outputs control the rotational direction of the **asynchronous motor (7)** by means of a reversing contactor combination consisting of **SIRIUS contactors (4)**. A **SIRIUS circuit breaker (5)** directly connected to the three-phase mains protects the asynchronous motor.

A **key-operated switch (6)** is connected to a digital input of the LOGO! logic module.

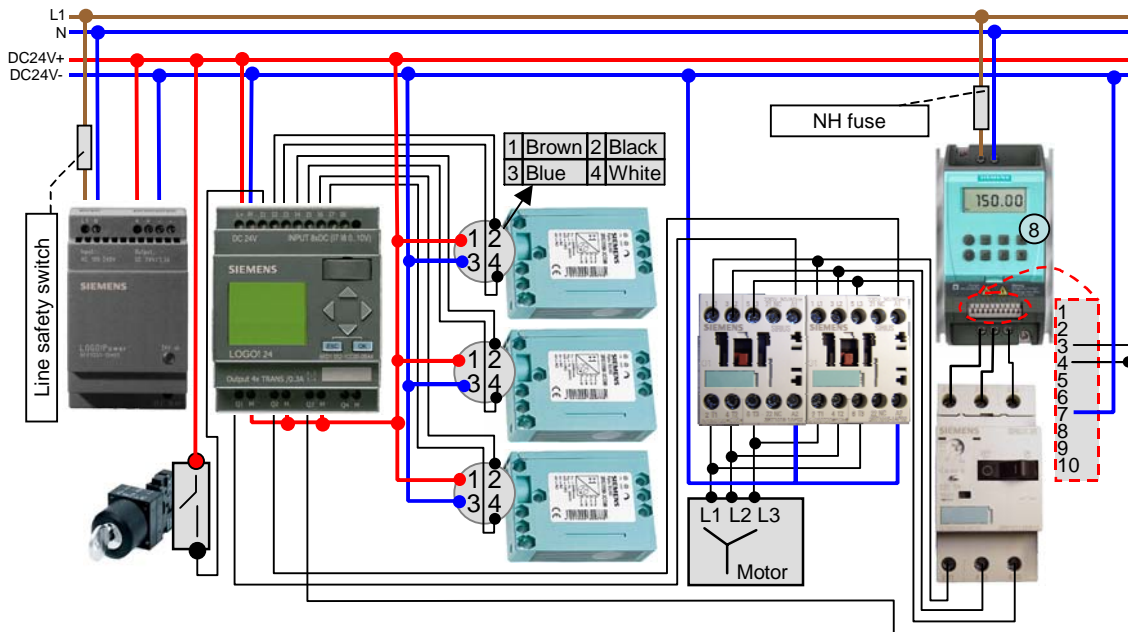
2.2 Connection to a 230V Mains

Note

If no three-phase mains supply is available, a SINAMICS G110 can be connected to a single-phase mains for a test setup. At its output, the SINAMICS G110 provides a three-phase alternating voltage.

This setup is only suitable for test purposes.

Figure 2-2



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Set18_DocTech_v1d0_en.doc

The connection diagram of the Micro Automation Set 18 for the 230V mains is identical to the connection diagram of the 400V mains.

Additionally, the **SINAMICS G110 frequency inverter (8)** is connected in front of the SIRS circuit breaker.

One digital output of the LOGO! logic module is connected to the digital inputs 2 and 3 of the frequency inverter.

2.3 Installation and Alignment of Optical Proximity Switches

The optical proximity switch PXO200 can be installed both vertically and horizontally. For attachment, the mounting device listed in chapter 3 is used.

For installation, bear in mind that dust, liquids and other films on the reflector or lens might reduce the range.

The proximity sensor and the reflector must have the same optical axis. Correct operation can be seen from the fact that if the photoelectric barrier is not interrupted, the green LED (function reserve FR) besides the yellow LED (OUT) lights as well.

The function reserve FR indicates whether the reflected quantity of light is sufficient for reliable operation.

3 Hardware and Software Components

Products

Table 3-1

Component	No.	MLFB / Order number	Note
LOGO! Power 24V / 1.3A	1	6EP1331-1SH02	
LOGO! 12/24RC	1	6ED1052-1MD00-0BA5	
SIMATIC PXO200, optical proximity switch	3	3RG7201-3CC00	up to 6m
SIRIUS contactor, AC-3, 3KW/400V	2	3RT1015-1BB42	1NC, DC 24V, S00
Lock CES SSG10	1	3SB3000-4LD11	
Closer for bottom attachment	1	3SB3420-0B	
Installation housing, grey	1	3SB3801-0AA3	
SIRIUS circuit breaker	1	3RV1011-0KA10	
Asynchronous motor	1	1LA7060-4AB10	
230V mains: SINAMICS G110 frequency inverter	1	6SL3211-0AB13-7BA1	

Note

The solution within the Micro Application Example is not approved for protection of persons in hazardous areas.

If there is such a requirement the hardware must be adapted to the needed fail-safe category. (For Example the fail-safe sensors of the types FS100, FS200, FS400 and FS600)

<http://www.automation.siemens.com/simatic-sensors>

Accessories

Table 3-2

Component	No.	MLFB / Order number	Note
Line safety switch	1	5SX2116-6	single-pole B, 16A
230V mains: Top hat rail mounting kit	1	6SL3261-1BA00-0AA0	for G110
230V mains: Basic Operator Panel	1	6SL3255-0AA00-4BA0	for G110

Component	No.	MLFB / Order number	Note
230V mains: NH fuse link	1	3NA3803 + 3NH3030	10A + socket
Reflectors	3	3RX7916	
Angle socket M12	3	3RX8000-0CC44-1AL0	
Mounting device	3	3RX7303	
Through terminal, beige		8WA1011-1DF11	Ø 2.5 mm ² , up to 24A, >800V
Bridge		8WA1822-7VF01	
PE through terminal		8WA1011-1PF00	Ø 2.5 mm ²
Standard DIN rail 35mm	1	6ES5 710-8MA11	483 mm

Configuration software / Tools

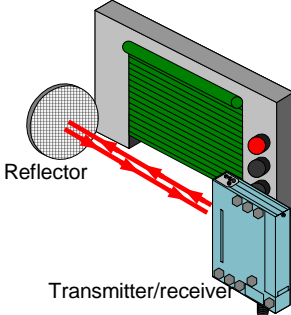
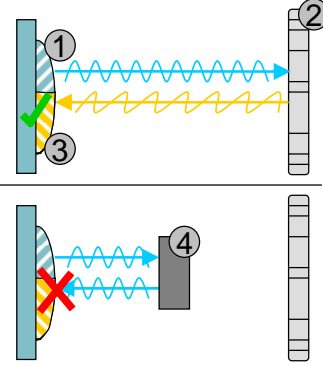
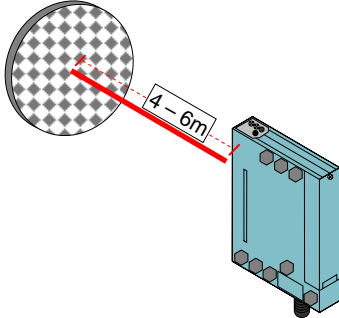
Table 3-3

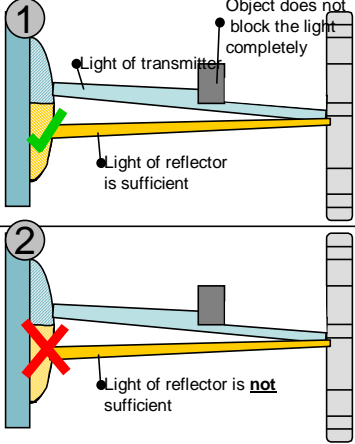
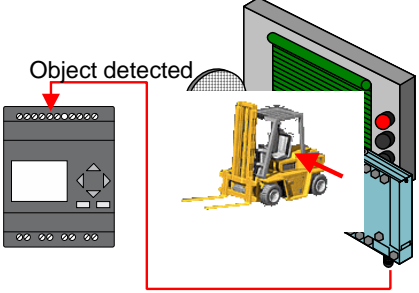
Component	No.	MLFB / Order number	Note
LOGO!Soft Comfort	1	6ED1058-0BA01-0YA0	
LOGO! PC cable	1	6ED1057-1AA00-0BA0	COM interface

4 Function Principle

4.1 Detecting Objects and Providing Information as Digital Signal

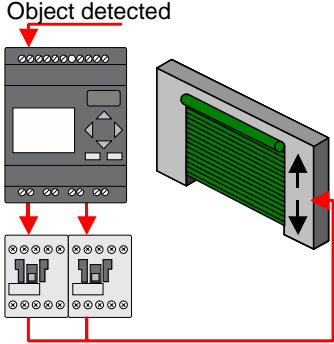
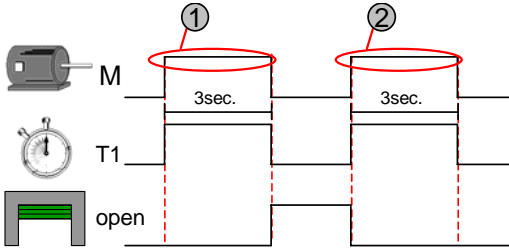
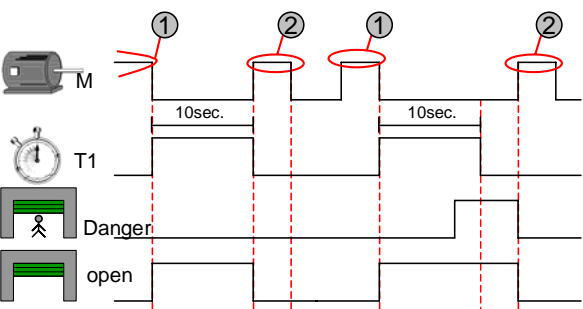
Table 4-1

No.	Function	Note
1.	The optical proximity switches used here are reflective light barriers. Transmitter and receiver are installed into one housing. A reflector is required.	
2.	The light of the transmitter is focused by a lens and is directed at a reflector (triple mirror) via a polarization filter. The polarization of the light at the reflector is turned by 90° and a part of the reflected light reaches the receiver via another polarization filter. The polarization filters are selected and arranged in such a way, that only the light turned by 90° and reflected by the reflector reaches the receiver, but no light of other objects in the light-beam range. Thus, objects with a smooth and reflecting surface such as e.g. stainless steel are securely detected though the light beam is reflected.	 <ul style="list-style-type: none"> • Transmitter with polarization filter (1) • Reflector, with polarization of 90° (2) • Receiver with polarization filter turned by 90° (3) • Object with smooth and reflecting surface (4)
3.	The optical proximity switch listed in chapter 3 has a detection range of up to 4-6 m .	

No.	Function	Note
4.	<p>The photosensitivity of the receiver is set by means of a potentiometer at the housing. If e.g. small objects are monitored and they are "surrounded" by the light, sufficient light gets back to the receiver and the photoelectric barrier is not considered as being "interrupted". If the photosensitivity of the receiver is reduced, more light must reach the receiver. Thus, the photoelectric barrier already is considered to be "interrupted" in case of small objects.</p>	 <ul style="list-style-type: none"> • Receiver with high photosensitivity (1) • Receiver with low photosensitivity (2)
5.	<p>The optical proximity switch provides two digital outputs. Output A1 is intended for dark switching:</p> <ul style="list-style-type: none"> • Output A1 is intended for dark switching. If the photoelectric barrier is interrupted, the output is active. • Output A2 is intended for light switching. The output is active, if light is received. <p>Both outputs A1 and A2 are connected to the digital inputs of the LOGO! logic module. The user program of the LOGO! logic module only uses the input A1. Input A2 can be used by means of a program modification in the LOGO!Soft Comfort project, if necessary.</p>	

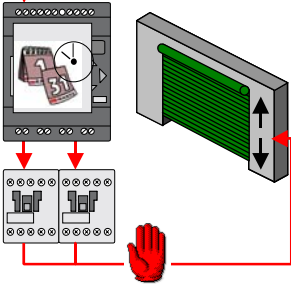
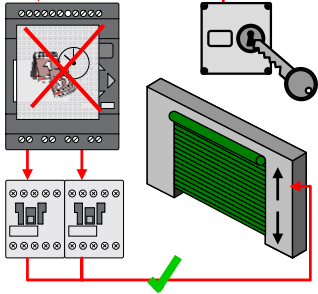
4.2 Controlling and Starting the Motor

Table 4-2

No.	Function	Note
1.	<p>The signal of the optical proximity switch for opening the roller shutter is processed directly in the LOGO! logic module. The motor is controlled by means of two contactors which are connected to the digital outputs. The rotational direction (to the left or right) of the motor is controlled by means of a reversing contactor combination by changing two of the three phases.</p>	<p>Object detected</p> 
2.	<p>Besides the evaluation of the sensor signals in the LOGO! logic module, locking functions and interlocking of the contactors by means of function elements are programmed in LOGO!Soft Comfort.</p>	
3.	<p>The rotational direction (to the left or right) of the motor (or the upward and downward movement of the roller shutter) is monitored in the LOGO! logic module via the roller shutter time. If the roller shutter has not finished the downward or upward movement within three seconds and has not reached the respective hardware end-position switch, the motor is switched off. In the present Micro Automation Set, no hardware switches are used and thus, there is no further explanation.</p>	 <ul style="list-style-type: none"> • Roller shutter opens (1) • Roller shutter closes (2)
4.	<p>The roller shutter remains open, until a roller shutter time of ten seconds is expired. If there is an object in the hazardous area of the roller shutter, the roller shutter does not close.</p>	 <ul style="list-style-type: none"> • Roller shutter opens (1) • Roller shutter closes (2)

4.3 Operating the Roller Shutter at Defined Times Only

Table 4-3

No.	Function	Note
1.	The integrated time and calendar function of the LOGO! logic module allows limiting the use of the roller shutter e.g. to working days from 06:00h to 22:00h. The roller shutter can be closed, but not opened during this time.	<p>Object detected</p> 
2.	The calendar function can be deactivated with a key-operated switch.	

5 Configuring the Startup Software

5.1 Preliminary Remark

For the startup we offer you software examples with test code and test parameters as download. The software examples support you during the first steps and tests with your Micro Automation Sets. They enable quick testing of hardware and software interfaces between the products described in the Micro Automation Sets.

The software examples are always assigned to the components used in the set and show their basic interaction.

5.2 Download of the Startup Code

The software example is available on the HTML page from which you downloaded this document.

Table 5-1

No.	File name	Content
1	Set18_LOGO!_V1d1_en.lsc	LOGO!Soft Comfort project

5.3 Configuring Components

Note

It is assumed here that the software LOGO!Soft Comfort has been installed on your computer and that you are familiar with handling the software.



Danger

Before starting wiring, check that the power is off.

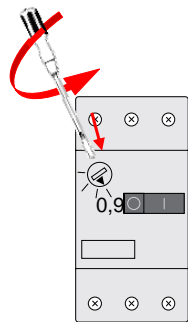
Installing and wiring hardware

Table 5-2

No.	Instructions	Note
1.	Install the components of chapter 3.1 onto the top hat rail.	
2.	All components have to be wired. Do not switch on the power supply yet.	See <ul style="list-style-type: none"> chapter 2.1 for connection to a 400V mains chapter 2.2 for connection to a 230V mains
3.	The motor is not yet connected.	

Configuring the SIRIUS circuit breaker

Table 5-3

No.	Instructions	Note
1.	Use the setting screw of the SIRIUS circuit breaker to set the threshold current to 0.9 A, if the motor specified in chapter 3 is used.	

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Configuring the SINAMICS G110 frequency inverter

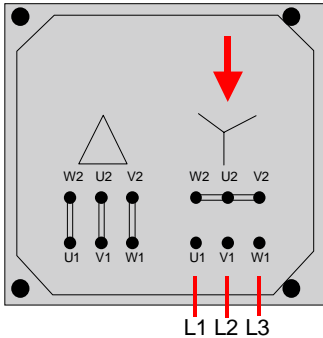
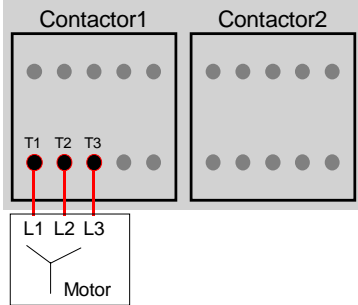
Table 5-4

No.	Instructions	Value	Parameter
1.	This step must be carried out exactly as it is described here, if the SINAMICS G110 frequency inverter mentioned in chapter 3 is used.		
2.	Press the parameter key P on the BOP of the SINAMICS G110 to get into the parameterizing mode. By means of the arrow keys, you can now go to the parameters indicated below. The values to be entered in the "Value" column refer to the asynchronous motor mentioned in chapter 3.		P 0000
3.	Start the quick commissioning.	1	P 0010
4.	Set the regional settings to "Europe".	0	P 0100
5.	Set the nominal motor voltage to	230	P 0304

No.	Instructions	Value	Parameter
	230V.		
6.	Set the nominal motor current to 0.73 A.	0.73	P 0305
7.	Set the nominal motor output to 0.12 kW.	0.12	P 0307
8.	Set the nominal motor frequency to 50 Hz.	50	P 0310
9.	Set the nominal motor speed to 1350 min ⁻¹ .	1350	P 0311
10.	Select the terminal strip as command source of the SINAMICS G110.	2	P 0700
11.	Admit fixed frequencies as nominal frequency value for the SINAMICS G110.	0	P 1000
12.	Set the minimum frequency to 0Hz.	0	P 1080
13.	Set the maximum frequency to 50Hz.	50	P 1082
14.	Set the startup time from minimum to maximum speed of the asynchronous motor to 1s.	1	P 1120
15.	Set the ramp-down time from maximum to minimum speed of the asynchronous motor to 1s.	1	P 1121
16.	Finish the quick commissioning.	1	P 3900
17.	Enable further parameters.	3	P 0003
18.	Define "Fixed frequency + ON".	16	P 0701
19.	Define the function for digital input 1 to "ON / OFF1".	1	P 0702
20.	Set the fixed frequency selected via digital input 0 to 50.00 Hz.	50.00	P 1001
21.	Save all values in the EEPROM.	1	P 0971

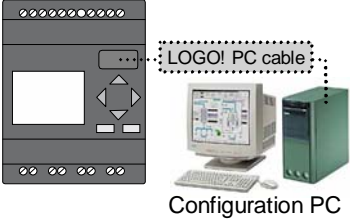
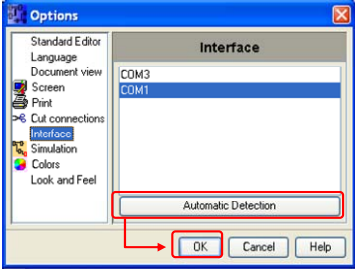
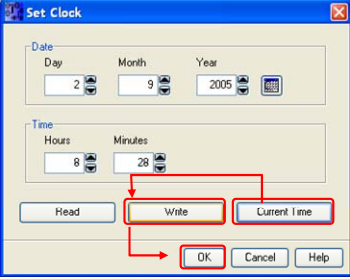
Configuring and Connecting the Motor

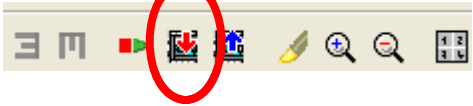
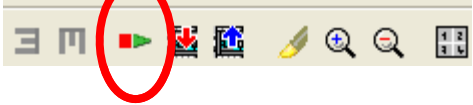
Table 5-5

No.	Instructions	Note
1.	<p>Before connecting the motor to the contactor combination, set the motor control to "Star". For this purpose, remove the motor cover and do the wiring according to the picture on the cover.</p>	<p style="text-align: center;">Rear</p> 
2.	<p>The motor can be connected to the contactor combination now.</p>	

Configuring the LOGO! logic module with LOGO!Soft Comfort

Table 5-6

No.	Instructions	Note																		
1.	Connect the LOGO! logic module to the COM interface of your configuration PC and open the LOGO!Soft Comfort program.	 <p>LOGO! PC cable</p> <p>Configuration PC</p>																		
2.	Select your COM port in LOGO!Soft Comfort under "Tools/Options → Interface".																			
3.	Set the date and time via "Tools/Transfer → Set Clock". Click "Write" to load the date and time into the LOGO! logic module.																			
4.	Check the date and time in the LOGO! logic module.	<table border="1"> <thead> <tr> <th data-bbox="874 1469 979 1503">Step</th> <th data-bbox="979 1469 1110 1503">Button</th> <th data-bbox="1110 1469 1375 1503">Function</th> </tr> </thead> <tbody> <tr> <td data-bbox="874 1503 979 1547">1</td> <td data-bbox="979 1503 1110 1547">▽ x2</td> <td data-bbox="1110 1503 1375 1547">Select "Setup".</td> </tr> <tr> <td data-bbox="874 1547 979 1592">2</td> <td data-bbox="979 1547 1110 1592">OK</td> <td data-bbox="1110 1547 1375 1592">Confirm "Setup".</td> </tr> <tr> <td data-bbox="874 1592 979 1637">3</td> <td data-bbox="979 1592 1110 1637">OK</td> <td data-bbox="1110 1592 1375 1637">Confirm "Clock".</td> </tr> <tr> <td data-bbox="874 1637 979 1771">4</td> <td data-bbox="979 1637 1110 1771">OK</td> <td data-bbox="1110 1637 1375 1771">Confirm "Set Clock" and check data and time on the display.</td> </tr> <tr> <td data-bbox="874 1771 979 1843">5</td> <td data-bbox="979 1771 1110 1843">ESC 2x</td> <td data-bbox="1110 1771 1375 1843">Return to the main menu.</td> </tr> </tbody> </table>	Step	Button	Function	1	▽ x2	Select "Setup".	2	OK	Confirm "Setup".	3	OK	Confirm "Clock".	4	OK	Confirm "Set Clock" and check data and time on the display.	5	ESC 2x	Return to the main menu.
Step	Button	Function																		
1	▽ x2	Select "Setup".																		
2	OK	Confirm "Setup".																		
3	OK	Confirm "Clock".																		
4	OK	Confirm "Set Clock" and check data and time on the display.																		
5	ESC 2x	Return to the main menu.																		
5.	Open the project "Set18_LOGO!_V2d0_en.lsc" with LOGO!Soft Comfort.																			

No.	Instructions	Note
6.	Now, transfer the program code to the LOGO! logic module via "Tools/Transfer --> PC -> LOGO!" .	
7.	Now, set the LOGO! logic module to the "RUN" mode.	

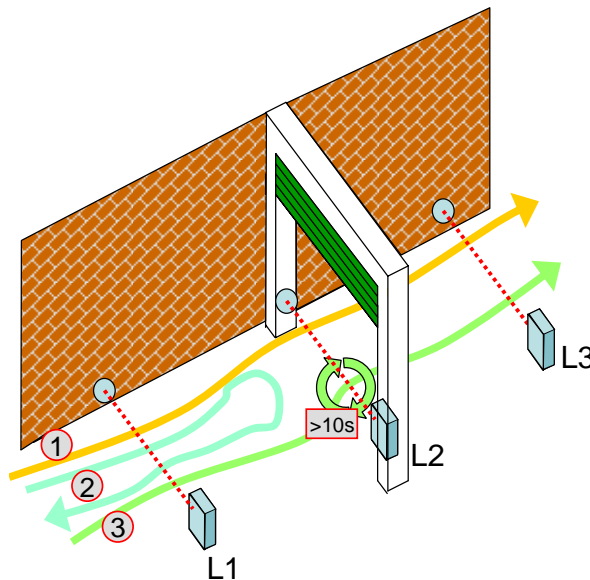
6 Live Demo

The functionalities of the Micro Automation Set 18 have been integrated into the application example of a roller shutter control for a logistics centre and can be tested as described in the following, if the components have been correctly configured as described in chapter 5.3.

To test the Micro Automation Set 18, the proximity switches have to be simulated similarly to a real roller shutter system.

6.1 Operating the Roller Shutter Control in Normal Operation

Figure 6-1



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Set18_DocTech_v1d0_en.doc

Passing the roller shutter (1)

Table 6-1

No.	Instructions	Function	Response
1.	Briefly interrupt the photoelectric barrier of proximity switch L1.	Personnel or a means of transportation enters the sensor area in front of the roller shutter.	The roller shutter opens. The motor rotates in positive direction. After 3 seconds, the motor is switched off. The roller shutter is open.
2.	Briefly interrupt the photoelectric barrier of proximity switch L2.	The personnel or the means of transportation is in the hazardous area under the roller shutter.	The roller shutter remains open.
3.	Briefly interrupt the photoelectric barrier of proximity switch	The personnel or the means of transportation enters the sensor area	The roller shutter remains open.

No.	Instructions	Function	Response
	L3.	behind the roller shutter.	
4.	Do not interrupt any other photoelectric barrier.	The personnel or the means of transportation goes away from the roller shutter.	The roller shutter is closed automatically after 10 seconds. The motor rotates in negative direction. After 3 seconds, the motor is switched off. The roller shutter is closed.

Entering the sensor area of the roller shutter (2)

Table 6-2

No.	Instructions	Function	Response
1.	Briefly interrupt the photoelectric barrier of proximity switch L1.	Personnel or a means of transportation enters the sensor area in front of the roller shutter without the intention of passing the roller shutter.	The roller shutter opens. The motor rotates in positive direction. After 3 seconds, the motor is switched off. The roller shutter is open.
2.	Do not interrupt any other photoelectric barrier.	The personnel or the means of transportation turned around.	The roller shutter is closed automatically after 10 seconds. The motor rotates in negative direction. After 3 seconds, the motor is switched off. The roller shutter is closed.

Passing the roller shutter and staying in the hazardous area for a longer period of time (3)

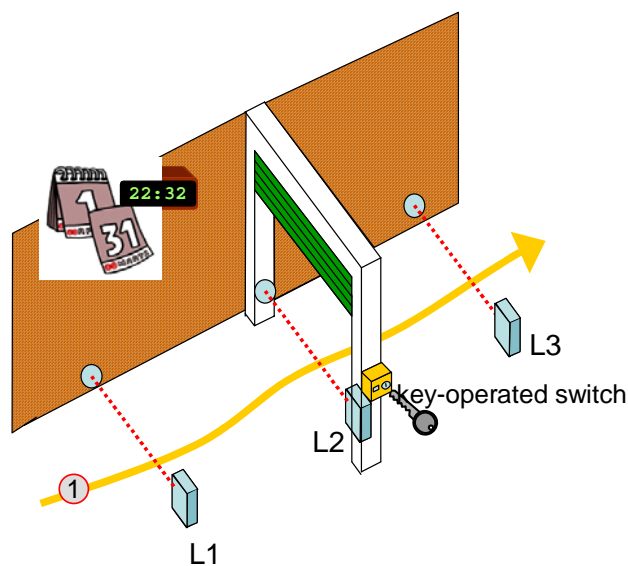
Table 6-3

No.	Instructions	Function	Response
1.	Briefly interrupt the photoelectric barrier of proximity switch L1.	Personnel or a means of transportation enters the sensor area in front of the roller shutter.	The roller shutter opens. The motor rotates in positive direction. After 3 seconds, the motor is switched off. The roller shutter is open.
2.	Interrupt the photoelectric barrier of proximity switch L2 for more than 10 seconds.	The personnel or the means of transportation stays in the hazardous area of the roller shutter for a longer period of time.	Even after the maximum roller shutter time of 10 seconds, the roller shutter does not close until there is nobody/nothing within the hazardous area.
3.	Photoelectric barrier of proximity switch L2 is no longer interrupted.	Personnel or a means of transportation moves away from the hazardous area in direction of the sensor area behind the roller shutter.	When L3 is no longer interrupted, the roller shutter time of 10 seconds is restarted in order to allow the person or the means of transportation to leave the area.
4.	The photoelectric	The personnel or the	As soon as the roller shutter time of

No.	Instructions	Function	Response
	barrier of proximity switch L3 is briefly interrupted.	means of transportation enters the sensor area behind the roller shutter.	10 seconds is expired, the roller shutter closes. The motor rotates in negative direction. After 3 seconds, the motor is switched off. The roller shutter is closed.

6.2 Roller Shutter Control Outside Working Hours

Figure 6-2






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Set18_DocTech_v1d0_en.doc

Simulating the blocking time

Table 6-4

No.	Description	Note																					
1.	To simulate the operation of the roller shutter outside the working hours, a blocking time defined in the LOGO! logic module has to be set.																						
2.	Set the time between 22:00h and 06:00h or the weekday to Saturday or Sunday via the operator panel.	<table border="1"> <thead> <tr> <th>Step</th> <th>Button</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>▼</td> <td>Exit</td> </tr> <tr> <td>2</td> <td>[Esc]</td> <td>Menu</td> </tr> <tr> <td>3</td> <td>▼ x2</td> <td>Select "Set".</td> </tr> <tr> <td>4</td> <td>[OK]</td> <td>Confirm "Set".</td> </tr> <tr> <td>5</td> <td>[OK]</td> <td>Confirm "Clock".</td> </tr> <tr> <td>6</td> <td>[OK]</td> <td>Confirm "Set Clock".</td> </tr> </tbody> </table>	Step	Button	Function	1	▼	Exit	2	[Esc]	Menu	3	▼ x2	Select "Set".	4	[OK]	Confirm "Set".	5	[OK]	Confirm "Clock".	6	[OK]	Confirm "Set Clock".
Step	Button	Function																					
1	▼	Exit																					
2	[Esc]	Menu																					
3	▼ x2	Select "Set".																					
4	[OK]	Confirm "Set".																					
5	[OK]	Confirm "Clock".																					
6	[OK]	Confirm "Set Clock".																					

No.	Description	Note		
		7		Enter new time and date.
		8		Confirm the input.
		9	 x2	Run mode.

Passing the roller shutter (1)

Table 6-5

No.	Instructions	Function	Response
1.	Briefly interrupt the photoelectric barrier of proximity switch L1.	Personnel or a means of transportation enters the sensor area in front of the roller shutter.	The roller shutter does not open, because operation is inadmissible outside the working hours.
2.	Activate the key-operated switch.	Authorized personnel enters the area even outside the working hours.	The roller shutter opens. The motor rotates in positive direction. After 3 seconds, the motor is switched off. The roller shutter is open.
3.	Briefly interrupt the photoelectric barrier of proximity switch L2.	Personnel or a means of transportation is in the hazardous area under the roller shutter.	The roller shutter remains open.
4.	Briefly interrupt the photoelectric barrier of proximity switch L3.	Personnel or a means of transportation enters the sensor area behind the roller shutter.	The roller shutter remains open.
5.	Do not interrupt any other photoelectric barrier.	The personnel or the means of transportation goes away from the roller shutter.	The roller shutter is closed automatically after 10 seconds. The motor rotates in negative direction. After 3 seconds, the motor is switched off. The roller shutter is closed.

Micro Automation Set 18

Entry-ID 23588559

7 Technical Data

LOGO! Power 24V 1.3

Table 7-1

Criterion	Technical data	Additional note
Supply voltage	85 to 264 V AC	
Output voltage	DC 24 V (setting range DC 22.2 to 26.4 V)	
Output current	1.3	
Dimensions (W x H x D) in mm	54 x 90 x 55	

LOGO! 12/24 RC

Table 7-2

Criterion	Technical data	Additional note
Supply voltage	10.8 V to 28.8 V DC	
Digital inputs	8	I5, I6: high-speed counters I7, I8: can be used also as analog input (0-10V) (I7 = AI1, I8 = AI2)
Digital outputs	4 relays	No short-circuit protection, external fuse necessary
Clock (Time switch)	available (date/time)	
Dimensions (W x H x D) in mm	72 x 90 x 55	

SIMATIC PX0200

Table 7-3

Criterion	Technical data	Additional note
Supply voltage	DC 10 to 36 V	
Measuring range	up to 4-6 m	
Rated operating current	200 mA	
Displays	<ul style="list-style-type: none"> Switching state; yellow LED Function reserve; green LED 	
Ambient temperature	-5 to 55 °C	
Operating mode	Reflective light barriers	

Micro Automation Set 18

Entry-ID 23588559

SIRIUS contactor

Table 7-4

Criterion	Technical data	Additional note
Rated operating voltage	690 V	
Rated operating current	up to 18 A	
Rated operating capacity	up to 19 kW	
Rated frequency	50/60 Hz	

SIRIUS circuit breaker

Table 7-5

Criterion	Technical data	Additional note
Rated operating voltage	up to 690 V	
Rated operating current	up to 12 A	
Output current	Adjustable to 0.9 to 1.25 A	
Rated frequency	50/60	
Life time	100,000 switching cycles	

Asynchronous motor

Table 7-6

Criterion	Technical data	Additional note
Rated output	0.12 kW	
Rated speed	1350 1/min	
Rated current at 230V	0.42 A	
Rated torque	0.85	

LOGO!Soft Comfort V5.0

Table 7-7

Criterion	Technical data	Additional note
Program representation	Function block diagram, ladder diagram	
Simulation	yes	without hardware
Online test	yes	with connected hardware
Languages	Six languages (D,E,F,S,I,P)	
Required operating system	WIN98SE/	Runnable on any Linux

Micro Automation Set 18

Entry-ID 23588559

Criterion	Technical data	
	NT4.0/ME/2000/XP, MAC OS X, LINUX	distributions on which Java 2 SDK Version 1.3.1 runs