

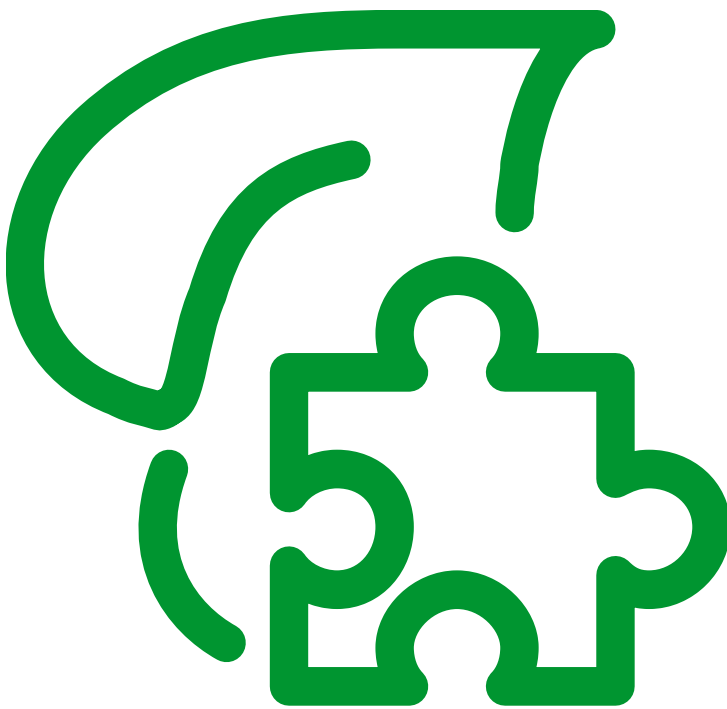
LLC

Commissioning Guide

Version: LLC

Outputs characteristics: 8 outputs

05/2013



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All pertinent state, regional, and local safety regulations must be observed when installing and using this solution. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Table of Contents

Safety information	4
At a Glance	5
1. Presentation	6
1.1 Overview	6
1.2 Opening hours.....	6
1.3 Light and Socket Management Principle	6
1.4 Emergency Light and Socket Control	7
2. Typical Architecture	8
2.1 Features Overview Table.....	8
2.2 General architecture	9
3. Bill of Material	10
4. Wiring the Solution	11
4.1 Wiring the Open/Close Bypass Switch.....	11
4.2 Wiring the Holidays Bypass Switch	12
4.3 Wiring the Zelio Logic Smart Relay	13
4.3.1 Outputs wiring	13
4.3.2 Protection of the Zelio power supply	14
4.4 Wiring the circulation paths	15
4.5 Wiring the common parts and the offices.....	15
4.6 Wiring of the sockets, sign and parking lights.....	16
4.7 Wiring the Emergency Bypass Circuit	16
5. Connect, transfer and set Zelio controller	17
6. Setting the Solution Parameters	18
6.1 Solutions parameters.....	18
6.2 Building schedule	18
6.3 Setting through front panel	19
7. Final Check List after Settings	21
8. Solution Status	22
9. Maintenance	23
9.1 Updating the Zelio Logic Smart Relay Application	23
9.2 Trouble Shooting Guide	23
9.3 Frequently Asked Questions.....	24

Safety information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

BEFORE YOU BEGIN

The products specified in this document have been tested under actual service conditions. Of course, your specific application requirements may be different from those assumed for this and any related examples described herein. In that case, you will have to adapt the information provided in this and related documents to your particular needs. To do so, you will need to consult the specific product documentation of the hardware and/or software components that you may add or substitute specified in this documentation and any examples that may be provided in this documentation. Pay particular attention and conform to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

Only the user or integrator can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment, and any other related equipment or software, for a particular application, the user or integrator must also consider any applicable local, regional or national standards and/or regulations.

At a Glance

Document Scope

This guide provides instructions for installing, setting up and commissioning the solution consisting in a smart system of lights and sockets management in buildings.

The instructions are presented in the order in which they are to be carried out. They supplement the assembly or installation documents supplied with each product provided in the solution.

This guide is intended for the electrical contractor or integrator in charge of installing and setting the solution.

Validity Note

This guide is dedicated to version 3 of the EcoXpert solution called "**Load and Light Control**". You can download it from our site: <https://ecoxpert.schneider-electric.com>

User Comments

We welcome your comments about this guide.
You can reach us by e-mail at techcomm@schneiderelectric.com.

1. Presentation

1.1 Overview

The solution consists in a smart system of lights and sockets management in buildings. It adapts the lights and loads to the real needs avoiding to waste energy during vacancy periods. In most of existing premises, sockets are powered up all the time. Pilot lights and loaders can consume all night uselessly.

The solution limits unnecessary consumption by:

- Forcing the lights and sockets to be off during vacancy periods,
- Controlling parking lights and external sign according to predefined hours and sun position.

The solution controls different outputs:

- Sockets. They can be divided into two or three subsets, which can be powered up independently through contactors.
- Lights in circulation paths, common places (i.e. meeting rooms) and offices. They also can be managed as different subsets
- Parking lights and external light sign.

To avoid inrush current, outputs are not powered up at the same time. For instance, with a solution with several sockets subsets, they are powered up with 30 seconds delay in between them.

NOTE: The solution aims to mainly be a ready to use solution. It uses Schneider components available at November 2011.

1.2 Opening hours

The light and socket management is based on activity hours of the building :

- Building opened : during the activity hours
- Building closed : during the vacancy periods

The solution anticipates the state changing of the building (closed/opened):

- Before and after the opening
- Before and after the closing

During these transient periods, the solution prepares the building by waking up cycle, for example, at the end of the closing period.

To make the commissioning easier, all these periods have the same duration, which is defined in the commissioning.

1.3 Light and Socket Management Principle

The solution manages different kind of outputs:

- The sockets and the circulation paths are alight as soon as the building opens to one transient period after the closing of the building.
- The lights of the common parts (meeting rooms for example) and of the offices are managed by impulse relays with local command. During the opened periods, those places are set free to the user's control. Before the closing, the lights are turned off, to warn the user that the building is about to close, but he is free to light them on. During the vacancy periods, the lights are turned off regularly to prevent oblivions.

- The parking light turns on one transient period before the opening et turns off three transient periods after the closing. In the meantime, the light turns off when the natural lights is supposed to be sufficient.
- The solution can also manage an external sign. The lighting hours are settable independently from the general opening hours. Like the parking, the sign is turned off when the natural light is supposed to be sufficient.
- An alarm can be available depending on the version of the solution. A simple impulse controls this alarm.

1.4 Emergency Light and Socket Control

In rare cases, the Zelio Logic smart relay may not work properly.

The parts controlled by a contactor are maintained turned on, independently of the scheduler. The inside lights (offices, circulation paths, common parts) cannot be turned on by the failure mode because they are controlled by impulse relays.

An output of the Zelio is available to send an impulse for an alarm.

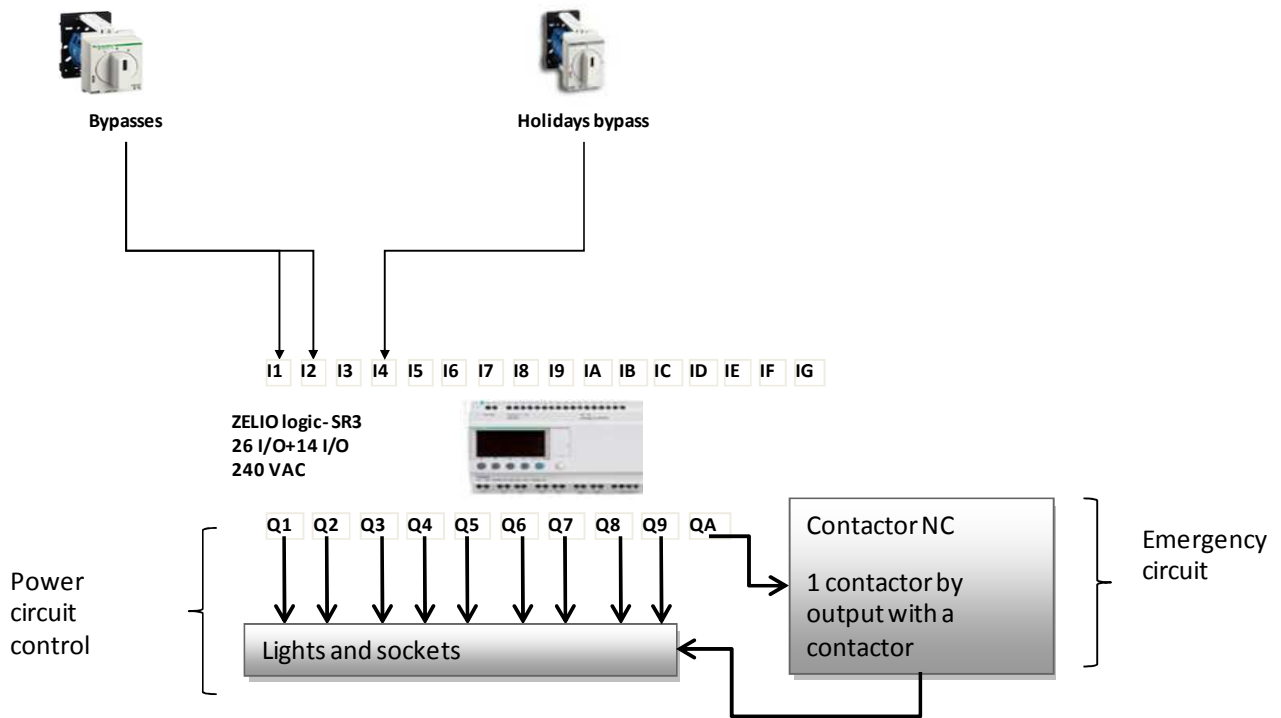
2. Typical Architecture

2.1 Features Overview Table

The solution is available in three versions, which has to be selected during the commissioning.

Feature	Configuration 1	Configuration 2	Configuration 3
External sign	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Parking lights	<input checked="" type="checkbox"/>		
Lights in circulation paths	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Lights in common parts 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Lights in common parts 2		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Lights in offices	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sockets 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sockets 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sockets 3		<input checked="" type="checkbox"/>	
Alarm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2.2 General architecture



3. Bill of Material

Part number	Designation	Function	Quantity
Controler			
SR3B261FU	Zelio Logic SR3 26 I/O 240 VAC	Zelio smart relay	1
Protections			
To choose in the catalog	Circuit breaker iC60N 1P + N 1 A B curve	Protection of ZELIO Logic power supply	1
To choose in the catalog	Circuit breaker iC60N 1P + N 4 A B curve	Protection of ZELIO Logic outputs	1
Command devices			
A9E15120	Rotary selector switch CMB	Hourly/daily bypass	1
A9E15122	2 positions change over-switch - CME	Holidays bypass	1
Emergency circuit			
To choose in the catalog	Contacteur 1P NC/ 1P NO xx A 240 V	Failure indication control circuit	1
To choose in the catalog	Contacteur 1P NC xx A 240 V	Emergency lights and sockets - Control of output contactors/relays	One NC contact per contactor/relay
To choose in the catalog	VLic 240 VAC lights RED + GREEN	Optional : System failure indication	1
To choose in the catalog	Circuit breaker iC60N 1P + N 16 A B curve	Coil protection	1
Power circuit - CONFIGURATION 1			
To choose in the catalog	Circuit breaker iC60N 1P + N 25 A B curve	Load protection	8
To choose in the catalog	Contacteur 2 NO 25 A 240 V coils	Power circuit control	4
To choose in the catalog	Impulse relay iTLc	Power circuit control	4
Power circuit - CONFIGURATIONS 2 et 3			
To choose in the catalog	Circuit breaker iC60N 1P + N 25 A B curve	Load protection	8
To choose in the catalog	Contacteur 2 NO 25 A 240 V coils	Power circuit control	3
To choose in the catalog	Impulse relay iTLc	Power circuit control	5

4. Wiring the Solution

⚠ ⚠ **DANGER**

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

- Wear appropriate personal protective equipment and follow the standard electrical safety precautions.
- Only qualified electricians who have read the relevant instructions are authorized to install this equipment.
- **NEVER** work alone.
- Disconnect all current and voltage sources before carrying out visual inspections, testing or maintenance work on this equipment. Always assume that all circuits are live until they have been de-energized, tested and labeled. Pay particular attention to the design of the power supply circuit. Take account of all power supply sources, including in particular feedback possibilities.
- Before closing the covers and doors, carefully inspect the working area to ensure that no tools or others items have been left inside the equipment.
- Take care when removing or replacing panels. In particular, make sure that they do not touch live busbars. To minimize the risk of injury, avoid handling panels.
- If this equipment is to remain in good working order, it must be handled, installed and operated correctly. Failure to comply with basic installation instructions may lead to injury and may damage the electrical equipment or other property.
- **NEVER** shunt an external fuse/circuit breaker.
- This equipment must be installed inside a suitable electrical cabinet.

Failure to follow these instructions will result in death or serious injury.

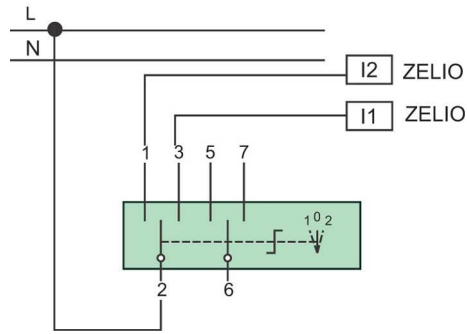
4.1 Wiring the Open/Close Bypass Switch



Reference A9E15120

This switch is a 2-pole selector pulse switch (equivalent to 2 pushbuttons). It is used to activate the close bypass or the open bypass:

- Close bypass: Close the system if it was opened or extends the extinction to a time defined by the bypass reset. It also cancels an open bypass.
- Open bypass: Open the system if it was closed or extends the opening to a time defined by the bypass reset. It also cancels a close bypass.



Close/Open Bypass Switch Pin number	To be connected to:
1	Zelio Logic smart relay – pin I2 (Open)
2	Phase
3	Zelio Logic smart relay – pin I1 (Close)
5	Not connected
6	Not connected
7	Not connected

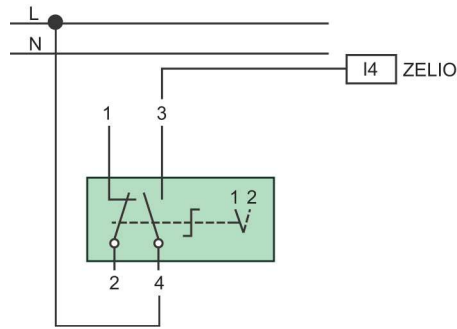
4.2 Wiring the Holidays Bypass Switch



Reference A9E15122

This switch is a 2-pole selector pulse switch (equivalent to a push button). It is used to close the building for an unknown number of days:

- Position 0: holidays bypass is deactivated.
- Position 1: holidays bypass is activated. The building is closed.



Holidays Bypass Switch Pin number	To be connected to:
1	Not connected
2	Not connected
3	Zelio Logic smart relay – pin I4
4	Phase

4.3 Wiring the Zelio Logic Smart Relay



The Zelio SR3B261FU is used for this solution.

4.3.1 Outputs wiring

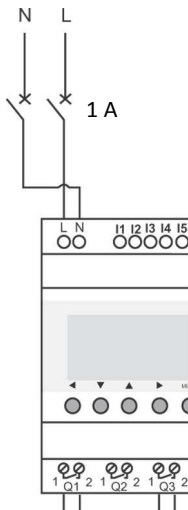
The Outputs command impulse relays' and contactors' coils.

Zelio Output	Configuration 1	Configuration 2	Configuration 3
Q1	Circulation paths – Impulse relay - ON	Circulation paths – Impulse relay - ON	Circulation paths – Impulse relay - ON
Q2	Circulation paths – Impulse relay - OFF	Circulation paths – Impulse relay - OFF	Circulation paths – Impulse relay - OFF
Q3	Common parts 1 - Impulse relay - OFF	Common parts 1 - Impulse relay - OFF	Common parts 1 - Impulse relay - OFF
Q4	Offices - Impulse relay - OFF	Offices - Impulse relay - OFF	Offices - Impulse relay - OFF

Q5	Sockets 1 – Contactor	Sockets 1 – Contactor	Sockets 1 – Contactor
Q6	Sockets 2 – Contactor	Sockets 2 – Contactor	Sockets 2 – Contactor
Q7	Sign – Contactor	Sockets 3 – Contactor	Sign – Contactor
Q8	Parking – Contactor	Common parts 2 - Impulse relay - OFF	Common parts 2 - Impulse relay - OFF
Q9	Alarm	Alarm	Alarm
QA	Activation contact of the emergency circuit	Activation contact of the emergency circuit	Activation contact of the emergency circuit

4.3.2 Protection of the Zelio power supply

NOTICE
<p>RISK OF DAMAGE TO ZELIO LOGIC SMART RELAY</p> <p>Protect the power supply input and logical inputs of the Zelio Logic using a protection (fuse or circuit breaker) with a rated current of 1A.</p> <p>Failure to follow these instructions can result in smart relay damage.</p>



NOTICE
<p>RISK OF DAMAGE TO ZELIO LOGIC SMART RELAY</p> <p>Protect the Q1 to Q7 outputs of the Zelio Logic using a protection (fuse or circuit breaker) with a rated current of 8 A.</p> <p>Protect the Q8 and Q9 outputs of the Zelio Logic using a protection (fuse or circuit breaker) with a rated current of 5 A.</p> <p>Failure to follow these instructions can result in Zelio Logic damage.</p>

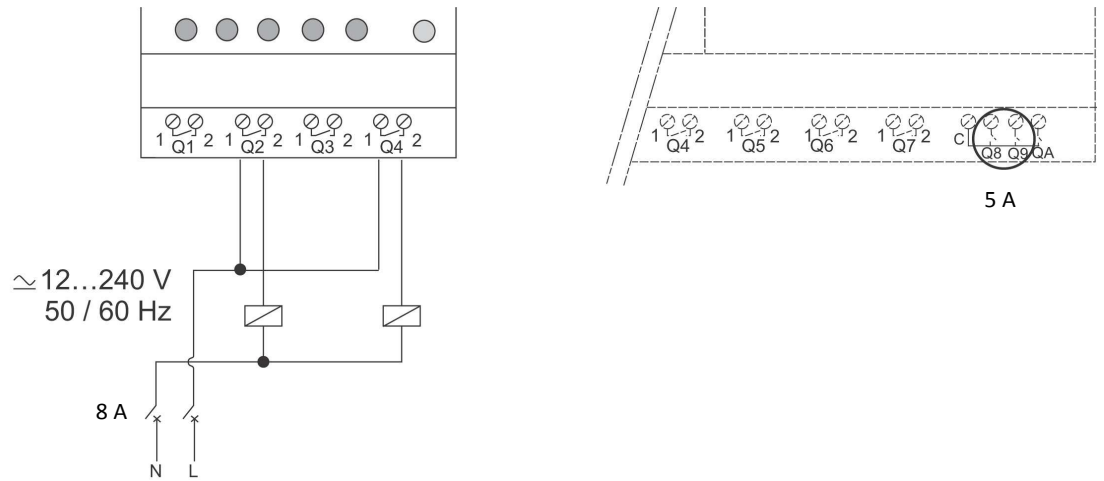
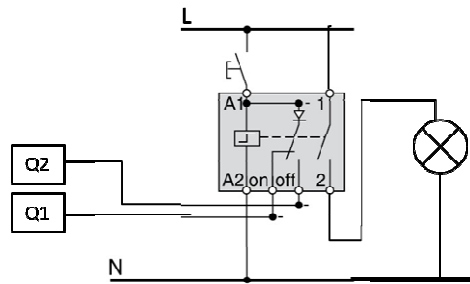


Figure 4-10 Protection of Zelio Logic outputs

4.4 Wiring the circulation paths

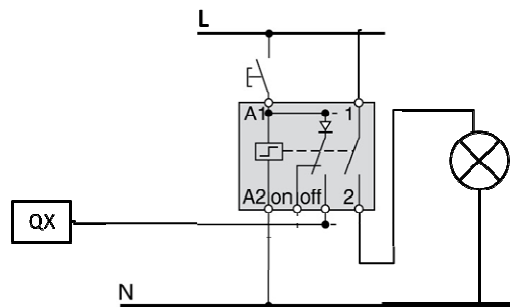
The solution can control lights of circulation paths. They are controlled by impulse relay with local command, which allow the user to bypass the solution and control the lights.

The solution controls two outputs, one to force the lighting « ON », and the other to force it « OFF ».



4.5 Wiring the common parts and the offices

The offices and the common parts lights are managed by the user. The solution makes sure that they are turned off during the vacancy period. So the lights are controlled by an impulse relay with a local command but the solution only control the « OFF » input of the relay.



To know to which output is connected the relay according to the chosen configuration, refer to the “wiring the Zelio outputs” part.

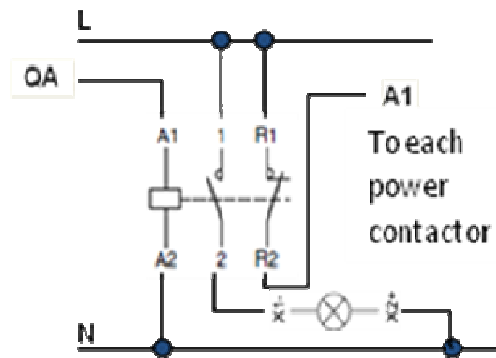
4.6 Wiring of the sockets, sign and parking lights

Contactors are used to control the sockets, the sign and the parking lights. The Zelio outputs are connected to the contactor's coil according to the chosen configuration.


4.7 Wiring the Emergency Bypass Circuit

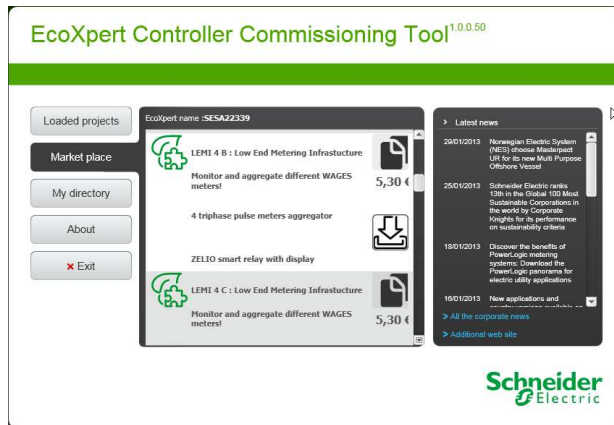
Whatever error the Zelio Logic smart relay undergoes, NC contactors bypasses the outputs of the smart relay and directly powers up the control relays of the power circuit. Thanks to this bypass, all contactors are switched on at once, without any sequence. This is an emergency mode, which stresses the installation but insures lights/sockets to be activated. This circuit needs as many NC contactors as contactors in the power circuit.

An additional warning indicator can be wired to signal the event to the user. A normally closed contactor associated with a lamp can be wired as below to ensure this safety feature.




5. Connect, transfer and set Zelio controller

The solution of this guide has been designed for the EcoXpert community. To insure your exclusive advantage, the solution program can only be downloaded from a secure EcoXpert market place. You can access it through a dedicated tool: the ECCT  software.



This free software will enable you to:

- Download programs of each solution exclusive to the EcoXpert community
- Be assisted while setting the solution's parameters
- Secure the uploading to the controller, enabling you to transfer the parameters set to your own customer.

A specific guide on the ECCT  software is available for download from the dedicated web area of EcoXperts.

This Guide includes complementary instructions on controller based solutions. It will help you to:

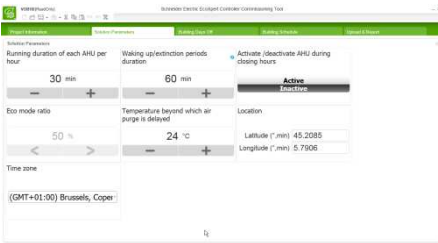
- Connect the controller to the PC
- Transfer the application to the controller through the ECCT tool
- Get generic instructions on how to set some parameter while using the controller's display instead the ECCT software.

Please refer to this document the first time you use the ECCT tool for commissioning.

6. Setting the Solution Parameters

6.1 Solutions parameters

The setting of the LLC3 solution requests you to input the following parameters.



- Waking up/extinction periods duration
- Sunrise/sunset offset
- Configuration
- Location (latitude & longitude)
- Time zone

Waking up/extinction periods duration

To prepare the system to wake up and extinct, a transient period is defined. The solution can turn on the light of the parking and on circulation paths before the official opening of the building. To simplify the commissioning the wake up and extinction periods durations are the same.

Sunrise/sunset offset

The external lights like the parking or the sign are turned off during the day when the natural light is supposed to be sufficient. The time of sunset and sunrise are estimated from the location information. To be sure that the sun is high enough to bring sufficient light, there is a delay between the sunrise and the extinction of the external light and between the lighting and the sunset.

This delay should be around one hour but it can go from 0 minutes to 120.

Configuration

This parameter is the configuration of the solution. Please refer to the part 2.1 to choose the correct

Location & time zone

Given your longitude and latitude, the system estimates sunshine and sunset hours for each day of the entire year. It is used to determine whether air purge is delayed or not.

Google your town to find out about your longitude & latitude.


- The latitude is given by °min N (north or south)
- The longitude is given by °min E (East or west)

The time zone is a list box. Choose your time zone. It will enable the system to automatically manage the Day Saving Time (summer / winter hours).


6.2 Building schedule

You set then the building schedule in 3 available Tabs. In an user friendly environment, you can set

- The weekly schedule enclosed in the tab “building schedule”
- The annual days off and schedule holidays in the tab “building day off”
- The weekly schedule for the lighting of the sign enclosed in the tab “Sign schedule”

Please refer to the ECCT  software documentation to learn more about the procedure.

6.3 Setting through front panel

Once the parameters have been set through the ECCT , it is possible to modify them via the front panel.

The setting procedure of different type of parameters is detailed in the implementation guide.

To modify each value, refer to the following block numbers:

Parameter	Block number
Building schedule*	R00B003
Sign schedule	R00B004
Annual days off	R00B226
Time zone*	R00B246
Configuration	R00B248
Longitude*	R00B250
Latitude*	R00B251
Sunrise/sunset offset	R00B252
Waking up/extinction periods duration	R00B253

***Attention:**

- While setting, opening & closing hours of the building must set minus duration time of the transient period. E.g., if a building is opening at 7 am and closing at 7pm for a transient period of 1 hour, the following parameter must be input:
 - Duration of transient period : 1 hour
 - Opening : 6 am
 - Closing 6 pm

This calculus is automatic in the ECCT .

- Longitude and Latitude must be entered in decimal degrees (hundredths of a degree), not in sexagesimal degrees.

To convert the geographical coordinate Longitude (or Latitude) m'n' of a point from degrees, minutes to h in hundredths of degrees, apply the formula $h=100x(m+(n/60))$:

- if Longitude is West (or Latitude is South), negate h.
- if h is fractional, round it to the nearest integer value.


NOTE: Time zone must be entered in minutes, not in hours.

The following table gives examples of converting geographical coordinates from sexagesimal degrees to decimal degrees and UTC to minutes:

Town	Geographical coordinates in sexagesimal degrees	Time zone: UTC	Longitude in decimal degrees	Latitude in decimal degrees	Time zone (min.)
Los Angeles	34°3' N, 118°15' W	-8	-118.25	34.05	-480
Brasilia	15°30' S, 47°51' W	-3	-47.85	-15.50	-180
Moscow	55°45' N, 37°37' E	+3	37.62	55.75	+180
Canberra	35°18' S, 149°8' E	+10	149.13	-35.30	+600

7. Final Check List after Settings

Before leaving the customer site, some important points have to be checked to make sure the solution operates properly.

Check list	OK	NOK
Wiring		
Test the “Close/Open Bypass” switch.		
Test the “Holidays Bypass” switch.		
Check that each coil of relays is properly connected to the appropriate Zelio Logic outputs.		
Check that red/green lights of the emergency bypass circuit are properly connected.		
Settings		
Check consistency of all parameters while in the ECCT  software corresponding tabs.		
Upload the solution & get the report.		
Miscellaneous		
Check that the solution user guide has been supplied to the customer.		

8. Solution Status

The solution status is displayed in real time on the Zelio Logic screen.

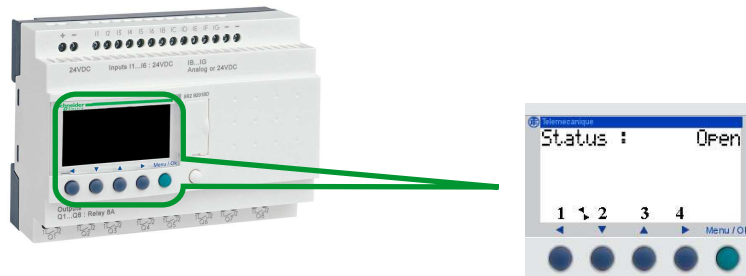


Figure 8-1 Display of the solution status on the Zelio Logic screen

Indication on Zelio Logic smart relay	Display	Signification
Status	Open	The building is in an activity period. It supposes there is somebody present inside the building.
	Close	The building is in a vacancy period (night, week end, holidays, day off). The building is supposed empty.
	Close bypass	The user has activated the “Close bypass”.
	Open bypass	The user has activated the “Open bypass”.

9. Maintenance

9.1 Updating the Zelio Logic Smart Relay Application

On a regular basis, updates should be available from the dedicated site.
 Attention: Update will erase the value stored into the system.
 Follow the procedure described in this manual to update the application.

9.2 Trouble Shooting Guide

Here is detailed information on the error messages that are returned by the Zelio Logic, their possible causes and how to remedy the problem.

Errors messages

The table below lists the error messages that a Zelio Logic could return. These messages generally indicate incompatible actions requested by the user.

Message	Cause	Corrective actions
NO PARAMETER	The user has requested to access the PARAMETERS option when no parameter is available (the diagram does not include any elements with parameters).	
TRANSF.ERR.	A transfer was in progress and the link with the PC was unexpectedly interrupted.	See the documentation for the programming software.
TRANSFER ERROR: NO MEMORY	A transfer to the EEPROM was requested and the EEPROM is not present or incorrectly located.	Check the presence and correct location of the EEPROM.
TRANSFER ERROR: CONFIG INCOMPAT	The user has requested to transfer a program that does not match the characteristics of the target Zelio Logic, for example: Clock, analog input, software version.	Check the origin of the program to transfer and choose a program that is compatible with the appropriate Zelio Logic.
TRANSFER ERROR: VERSION. INCOMPAT	This error appears if one of the versions of the Zelio Logic does not correspond to: Firmware or FBD functions	Check the firmware version used.
Outputs are displayed flashing on the screen	One or more static outputs have shorted or overloaded.	Troubleshoot, then stop the Zelio Logic to end the blinking before selecting RUN mode again (automatic reset).

9.3 Frequently Asked Questions

Here below are the most frequently asked questions and their answers:

Question	Answer
I cannot access some parameters.	Some parameters are not accessible. See the documentation to find out whether these elements can be changed.
I still cannot access some parameters.	To access the parameters, you must use the navigation keys left and right to position the cursor above them. The “▲” and “▼” buttons are used to change these values. Then press “Menu/OK” to confirm the changes.
I cannot RUN my Zelio Logic even though I enable the RUN/STOP option in the main menu using the “Menu/OK” key.	NOTE: make sure that the error symbol (!) is not displayed in the contextual menu line. Correct the error in order to RUN the Zelio Logic.
I would like to change my diagram lines but the “Menu/OK” key no longer works.	Changes are not allowed.

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