

Simple / Hardwired / Logic Controller / Zelio

System User Guide



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Important 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 or Warning 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.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** equipment damage.

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 the installation, and has received safety training to recognize and avoid the hazards involved

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Before You Begin

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠ WARNING UNGUARDED MACHINERY CAN CAUSE SERIOUS INJURY • Do not use this software and related automation products on equipment which does not have point-of-operation protection. • Do not reach into machine during operation. Failure to follow these instructions can cause death, serious injury or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only the user can be aware of all the conditions and factors present during setup, operation and maintenance of the machine; therefore, only the user can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, the user should refer to the applicable local and national standards and regulations. A "National Safety Council's" Accident Prevention Manual also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products by itself cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks for point-of-operation protection have been installed and are operational before placing the equipment into service. All mechanical/electrical interlocks and safeties for point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of this document.

START UP AND TEST

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

⚠ CAUTION
EQUIPMENT OPERATION HAZARD • Verify that all installation and set up procedures have been completed. • Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices. • Remove tools, meters and debris from equipment. Failure to follow these instructions can result in injury or equipment damage.

Follow all start up tests recommended in the equipment documentation. Store all equipment documentation for future reference.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and grounds, except those grounds installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove ground from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and rating of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION • Only use software tools approved by Schneider Electric for use with this equipment. • Update your application program every time you change the physical hardware configuration. Failure to follow these instructions can cause death, serious injury or equipment damage.

Introduction

Introduction

This document is intended to provide a quick introduction to the described system. It is not intended to replace any specific product documentation, nor any of your own design documentation. On the contrary, it offers additional information to the product documentation, for installing, configuring and implementing the system.

The architecture described in this document is not a specific product in the normal commercial sense. It describes an example of how Schneider Electric and third-party components may be integrated to fulfill an industrial application.

A detailed functional description or the specification for a specific user application is not part of this document. Nevertheless, the document outlines some typical applications where the system might be implemented.

The architecture described in this document has been fully tested in our laboratories using all the specific references you will find in the component list near the end of this document. Of course, your specific application requirements may be different and will require additional and/or different components. In this case, you will have to adapt the information provided in this document to your particular needs. To do so, you will need to consult the specific product documentation of the components that you are substituting in this architecture. Pay particular attention in conforming to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

It should be noted that there are some major components in the architecture described in this document that cannot be substituted without completely invalidating the architecture, descriptions, instructions, wiring diagrams and compatibility between the various software and hardware components specified herein. You must be aware of the consequences of component substitution in the architecture described in this document as substitutions may impair the compatibility and interoperability of software and hardware.

CAUTION

EQUIPMENT INCOMPATIBILITY OR INOPERABLE EQUIPMENT

Read and thoroughly understand all hardware and software documentation before attempting any component substitutions.

Failure to follow these instructions can result in injury or equipment damage.

Abbreviations

Abbreviation	Signification
AC	Alternating Current
CB	Circuit Breaker
DI	Digital Input
DO	Digital Output
DC	Direct Current
E-STOP	Emergency Stop
FBD	Function Block Diagram - an IEC-61131 programming language
HMI	Human Machine Interface
I/O	Input/Output
LD	Ladder Diagram - a graphic IEC-61131 programming language
PC	Personal Computer
PS	Power Supply
RPM	Revolutions Per Minutes
SE	Schneider Electric
TVDA	Tested, Validated and Documented Architecture
VSD	Variable Speed Drive
WxHxD	Dimensions: Width, Height and Depth

Glossary

Expression	Signification
Altivar (ATV)	SE product name for a family of VSDs
Harmony	SE product name for a family of switches and indicators
OsiSense	SE product name for a family of sensors
Phaseo	SE product name for a family of power supplies
SoMove Lite	SE product name for a drive configuration software
TeSys	SE product name for a family for motor protection devices and load contactors
Vario	SE product name for a disconnect switch
Zelio Logic	SE product name for a smart relays family
Zelio Soft	SE product name for Zelio Logic configuration software

Application Source Code

Introduction

Examples of the source code and wiring diagrams used to attain the system function as described in this document can be downloaded from our website.

The example source code is in the form of configuration, application and import files. Use the appropriate software tool to either open or import the files.

Extension	File Type	Software Tool Required
CFG	Export File (Multiloader Export)	SoMove (Lite)
CSV	Comma Separated Values, Spreadsheet	MS Excel
DOC	Document file	Microsoft Word
PDF	Portable Document Format - document	Adobe Acrobat
PSX	Project file	SoMove (Lite)
ZM2	Project file	Zelio Soft
ZW1	Project file	EPLAN P8

Typical Applications

Introduction

Here you will find a list of the typical applications and their market segments, where this system or subsystem can be applied.

Hoisting

- Self-erecting
- Overhead traveling crane

Packaging

- Recycling machines

Textile

- Clothing machines

Pumping

- Water filtering

HVAC-R

- Ceiling heating unit
- Heating and air conditioning systems
- Refrigerated display

Commercial equipment

- Automatic washing
- Ticket vending machines
- Automatic dispensers
- Displays scrolling
- Advertising panels
- Ice-makers

Building / services

- Access and entry control automated systems (Door, awning, roller blind ...)
- Lighting control

Other Machines

- Solar energy management
- Agricultural and fish-farming machinery
- Ovens and incubators
- Swimming pools

SPECIAL NOTE

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 other 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 for any examples specified in this documentation. Pay particular attention and conform to any safety information, different electrical requirements and normative standards that would apply to your adaptation.

The application examples and descriptions contained in this document have been developed based on products and standards available and defined for Europe. Some or all of the application examples may contain recommendations of products that are not available in your country or locality, or may recommend wiring, products, procedures or functions that are in conflict with your local, regional or national electrical or safety codes and/or normative standards.

▲ WARNING
REGULATORY INCOMPATIBILITY
Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE:

The information in this document is based on European standards and may not be valid for use in the U.S.A.

The use and application of the information contained herein require expertise in the design and programming of automated control systems. 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 safety provisions 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.

System

Introduction

The system chapter describes the architecture, the dimensions, the quantities and different types of components used within this system.

Architecture

Overview

The system consists of a “low-end” controller with push buttons for controlling an electric shutter. A provision is also given for an optional Emergency Stop function.

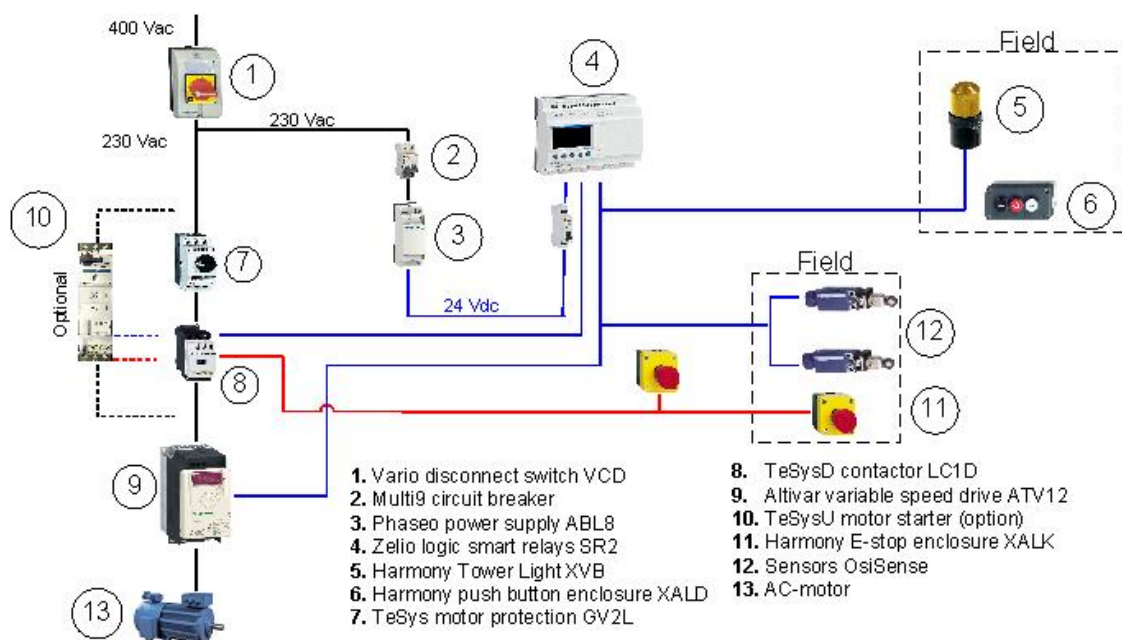
The final upper and lower positions of the shutter are detected by roller limit switches. The shutter movement is controlled via a push-button control - the corresponding signal statuses are displayed using illuminated buttons and a compact signal station.

To disable the system in an emergency, a red and yellow locking push button switch is used to interrupt the 24 Vdc supply to the contactor.

The Power OFF at the mains is implemented using a standard Vario disconnect switch (max. 25 A).

This configuration is hardwired. It does not include a communication network system. For the purpose of processing additional (optional) signals, the controller has several unallocated inputs and outputs.

Layout



Components	Hardware: • Vario disconnect switch VCD • TeSys GV2-L magnetic circuit breaker • TeSysD LC1 contactors • TeSysU as an alternative to motor circuit breaker and contactors • Harmony XALK Emergency Stop switch with rotation release • Phaseo ABL8 power supply unit • Zelio Logic Smart Relay of type SR2B201BD (12 Inputs / 8 Outputs) • Harmony XB5 push-buttons and indicator lamps, from the Harmony Style 5 range of push-buttons • Harmony XVBL compact signaling column • Harmony XCK OsiSense roller limit switches • Multi9 circuit breaker • Altivar 12 variable speed drive • Standard AC motor Software: • Zelio Soft 2 Version 4.4 • SoMove Lite Version V1.2.4.0 (optional)						
Quantities of Components	For a complete and detailed list of components, the quantities required and the order numbers, please refer to the components list at the rear of this document.						
Degree of Protection	Not all the components in this configuration are designed to withstand the same environmental conditions. Some components may need additional protection, in the form of housings, depending on the environment in which you intend to use them. For environmental details of the individual components please refer to the list in the appendix of this document and the appropriate user manual.						
Cabinet Technical Data	<table><tr><td>Input</td><td>Mains voltage Power requirement Cable Size Cable Connection</td><td>400 Vac ~ 2 kW 5 x 1.5 mm² (L1, L2, L3, N, PE) 3 phase + Neutral + Ground Neutral is needed for 230 Vac (Phase and Neutral)</td></tr><tr><td>Output</td><td>Motor power ratings</td><td>1 asynchronous motors (4 poles:1500 RPM) controlled by ATV12 (0.18 kW)</td></tr></table>	Input	Mains voltage Power requirement Cable Size Cable Connection	400 Vac ~ 2 kW 5 x 1.5 mm² (L1, L2, L3, N, PE) 3 phase + Neutral + Ground Neutral is needed for 230 Vac (Phase and Neutral)	Output	Motor power ratings	1 asynchronous motors (4 poles:1500 RPM) controlled by ATV12 (0.18 kW)
Input	Mains voltage Power requirement Cable Size Cable Connection	400 Vac ~ 2 kW 5 x 1.5 mm² (L1, L2, L3, N, PE) 3 phase + Neutral + Ground Neutral is needed for 230 Vac (Phase and Neutral)					
Output	Motor power ratings	1 asynchronous motors (4 poles:1500 RPM) controlled by ATV12 (0.18 kW)					
Functional Safety Notice (EN ISO13849-1 EN IEC62061)	The standard and level of functional safety you apply to your application is determined by your system design and the overall extent to which your system may be a hazard to people and machinery. Whether or not a specific functional safety category should be applied to your system should be ascertained with a proper risk analysis. This document is not comprehensive for any systems using the given architecture and does not absolve users of their duty to uphold the functional safety requirements with respect to the equipment used in their systems or of compliance with either national or international safety laws and regulations.						
Emergency Stop	Emergency Stop/Emergency Disconnection function This function for stopping in an emergency is a protective measure which complements the safety functions for the safeguarding of hazardous zones according to EN ISO 12100-2.						

Dimensions

The compact dimensions of the devices used, for example: the controller and PS (Power Supply), means that the components can be installed inside a control cabinet with the following approximate external dimensions: 600 x 600 x 400 mm (WxHxD).

Moreover, the display elements used to indicate a “group error”, “controller on” and “no protection” can be built into the door of the control cabinet along with the system master switch and Emergency Stop disconnect switch.

Installation

Introduction

This chapter describes the steps necessary to set up the hardware and configure the software required to fulfill the described function of the application.

Layout



Notes

The configuration used in this application is for a roll shutter in a large industrial building.

The components and I/O points following represent a cross-section of the components and signals that are absolutely essential for control and display purposes and a number of optional inputs and outputs, which can be used in conjunction with most typical applications (for example: induction loops/pull switches).

Although the motor circuit breaker together with reversing contactor circuit components (or alternatively TeSysU), Zelio Logic smart relay, fuses and power supply can all be mounted on DIN rails, they can also be installed individually (with the exception of the circuit breakers and fuses).

To install the 35 mm DIN rails, use standard M5x16 countersunk screws and washers or blind rivets.

The Emergency Stop button and push buttons for acknowledging the Emergency stop and on/off switch are designed for mounting in the front door of a control cabinet.

There are two options available for mounting the illuminated buttons:

- a) Using a 22 mm hole drilled into the front door of the control cabinet in the appropriate position.
- b) Using XALD housing, this can house up to 5 push buttons or indicator lamps. This XALD is designed for backplane assembly or direct wall mounting.

The individual components must be interconnected in accordance with the detailed circuit diagram to help ensure that they function correctly.

- 230 Vac wiring running between the disconnect switch, optional safety contactor, magnetic circuit breaker and reversing contactor circuit (alternatively TeSysU) to the motor, with some terminals in between
- 230 Vac wiring between terminals, fuses and power supply.
- 24 Vac wiring between power supply, Zelio Logic, push-buttons and indicator lamps as well as additional Emergency Stop and the control circuit of the load contactor.

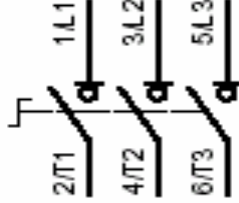
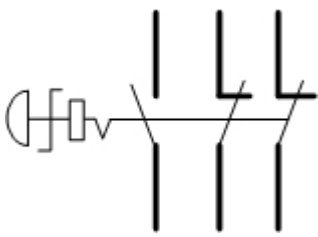
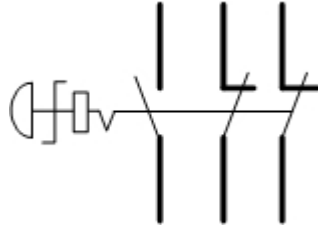
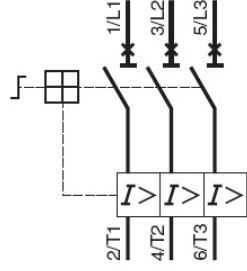
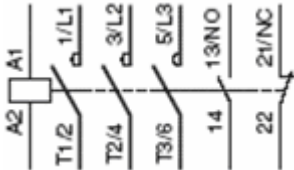
Controller wiring

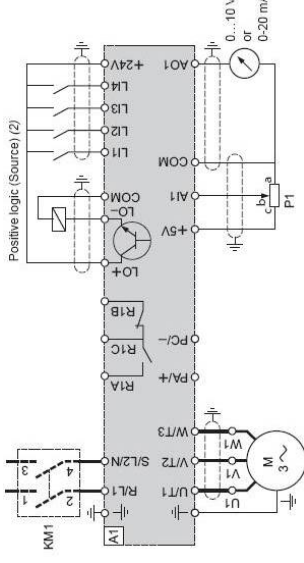
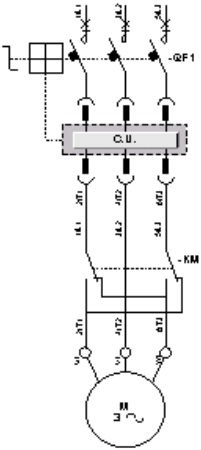
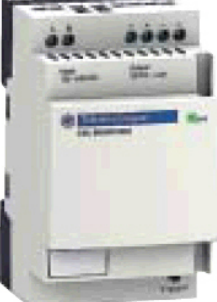
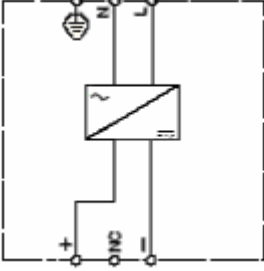
Zelio inputs	Description
DC I1	Up button
DC I2	Down button
DC I3	Stop button
DC I4	Upper limit switch
DC I5	Lower limit switch
DC I6	ATV12 and Motor protection No fault
DC IB	Speed 2 selection
DC IC	Plant ready for operation
DC ID	(not used)
DC IE	(not used)
DC IF	(not used)
DC IG	(not used)

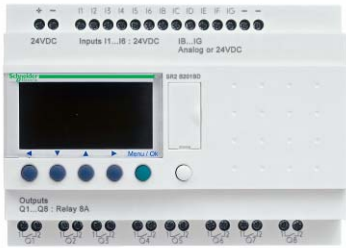
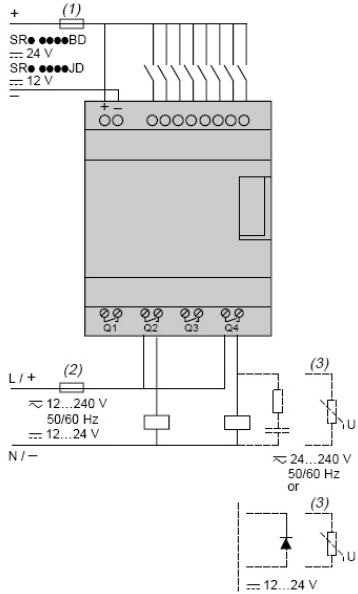
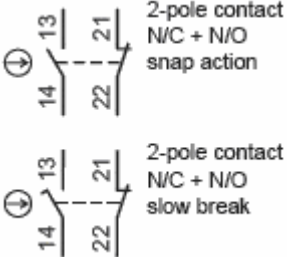
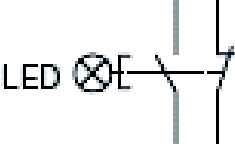
Zelio outputs and power supply	Description
Q1-Q8	24 Vdc power supply
Q1	Motor DOWN (LI2)
Q2	Motor Speed 2 (LI3)
Q3	LED motor up (illuminated button)
Q4	LED motor down (illuminated button)
Q5	General alarm
Q6	LED Alert signal (motion in progress)
Q7	Motor UP (LI1)
Q8	(not used)

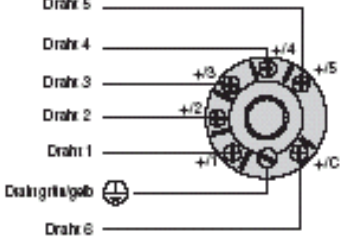
Zelio 24 Vdc power supply	Description
+	24 Vdc power supply
-	0 Vdc reference voltage

Hardware

Disconnect Switch Harmony VCD0 (red-yellow toggle)		
Emergency Stop Harmony XB5AS844 & XB5AZ141 door mounting Incl. Emergency Stop Label ZBY8330		
Emergency Stop switch Harmony XALK178G (trigger action)		
Motor circuit breaker with auxiliary contacts TeSys GV2L07		
Contactor TeSysD LC1D09BD		

Variable speed drive Altivar 12 ATV12H018M2 230 Vac, 0.18 kW		
Motor starter with reversing contactor combination (alternative) TeSysU LU2B12BL & LUCA05BL		
Power Supply Phaseo ABL8MEM24012 24 Vdc, 1.2 A		

Zelio Logic Smart Relay SR2B201BD 12 In / 8 Out		 (1) 1 A quick-blow fuse or circuit-breaker. (2) Fuse or circuit-breaker. (3) Inductive load.
Zelio Logic EEPROM Memory-Card (optional) SR2MEM02 application storage		
Limit switch OsiSense XCKD2118P16		 2-pole contact N/C + N/O snap action 2-pole contact N/C + N/O slow break
Push button with Indicator Lamp Harmony Style 5		 LED

Indicator lamp Harmony Style 5		LED 
Tower Light with amber continuous light Harmony XVBL0B5		

Software

General

Users do not need special software tools to set up the system. In principle, programming and setup can be performed via the operator's panel of the Zelio Logic.

However, from the point of view of saving data, carrying out simulations and re-usability, it is more convenient to install and use the associated Zelio Soft tool which is available for the controller.

To use the software packages, your PC must have the appropriate Microsoft Windows operating system installed:

- Windows XP Professional

The software tools have the following default install paths:

Zeliosoft:

C:\Program Files\Schneider Electric\Zelio Soft 2



SoMoveLite:

C:\Program Files\Schneider Electric\SoMove Lite



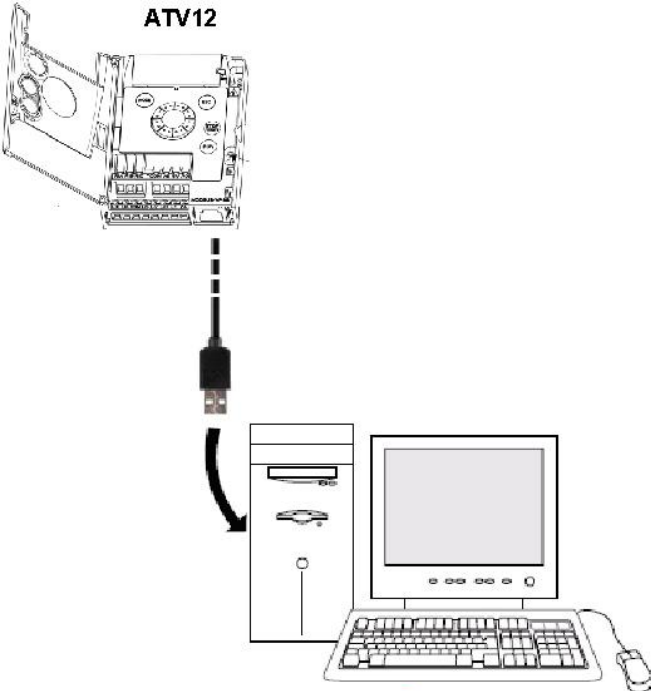
Communication

General

The configuration presented here is based exclusively on hardware connections and has no bus-system communications.

Operation and monitoring is achieved by means of push buttons and illuminated buttons as well as tower light.

The programming cable SR2USB01 with a USB connector, is required when using Zelio Logic. The Zelio set package, SR2PACK2BD, contains the controller, the software and the programming cable. The cable SR2CBL01 equipped with a 9-pin Sub-D 9 can be used optional.

Zelio Logic Communication cable USB cable SR2USB01	
Zelio Logic Communication cable Optional 9-pin SUB-D9 SR2CBL01	
USB Cable for SoMove Lite and ATV12 TCSMCNAM3M002P Use the USB-RJ45 cable to connect the PC (with SoMove Lite installed) to the Altivar 12.	

Implementation

Introduction

The implementation chapter describes all the steps necessary to initialize, to configure, to program and start-up the system to achieve the application functions as listed below.

Function

All the conditions required to clear the group error must be met, for example: current on, motor circuit breaker switched on, crush protection OK (or functional safety intact).

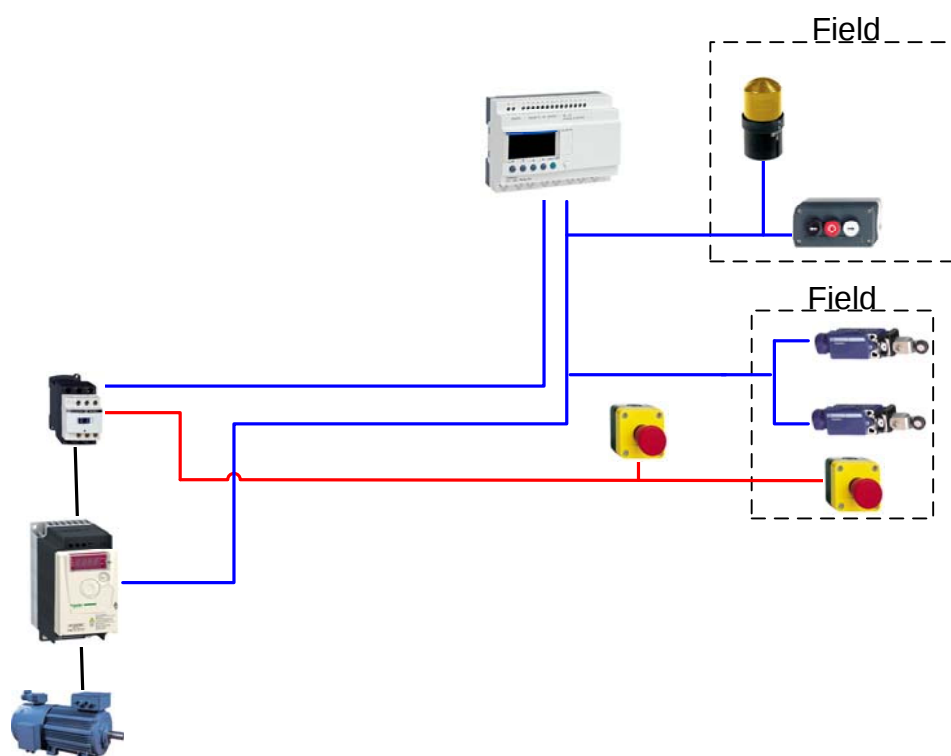
Sequence of operation

Opening the roller shutter: Press the **up** button to open the roller shutter (provided that the upper limit switch has not been actuated); the roller shutter stops moving if the stop button is pressed, or a group alarm occurs. The **up** button lights up to show that this movement has been selected.

Closing the roller shutter: Press the **down** button to close the roller shutter (provided that the lower limit switch has not been actuated); the roller shutter stops moving if the stop button is pressed, crush protection is activated or a group alarm occurs. The **down** button lights up to show that this movement has been selected.

Alert signal: An orange flashing light and/or klaxon indicates that the roller shutter has been enabled.

Layout



Controller

Introduction

The controller chapter describes the steps required for the initialization and configuration and the source program required to fulfill the functions.

Requirements

Before proceeding with the steps described below, first verify that the following has been done:

- The Zelio Soft V4.4 programming tool is installed on your PC
- The driver of the SR2USB01 cable is installed on your PC
- The Zelio Soft project **Simple_HW_Zelio.zm2** has been copied to your PC and is in the correct folder (C:\Program Files\Schneider Electric\Zelio Soft 2\Z2User)
- The ZelioLogic Smart Relay is connected to a power supply and turned on
- The Zelio and the PC are connected using the programming cable SR2USB01

Setting up the Zelio is done as follows:

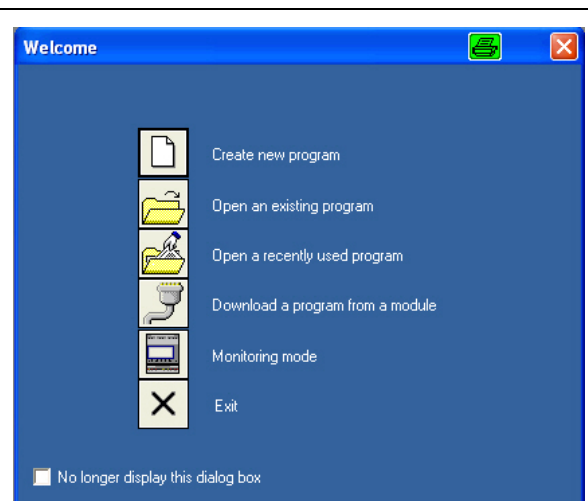
- Creating a new program
- Loading an existing program
- Configuring the interface
- Download Program
- Starting the Zelio
- Copying the Program from the Zelio to EEPROM
- Loading a program from EEPROM

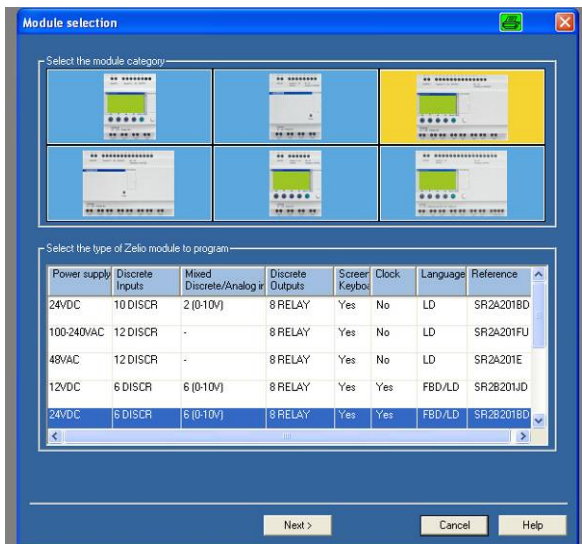
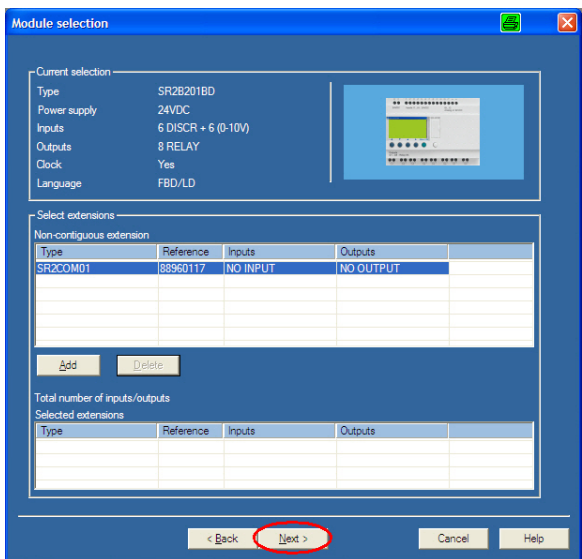
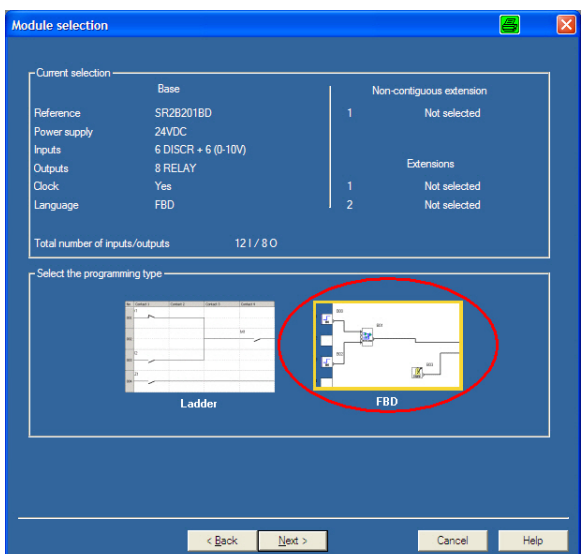
Creating a new program

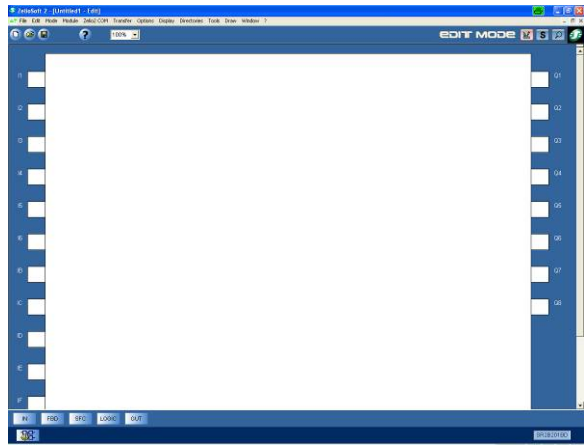
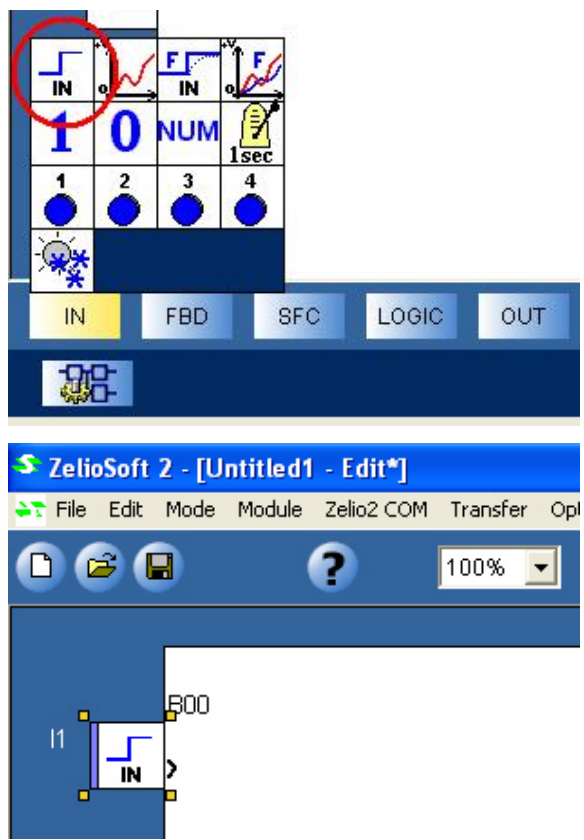
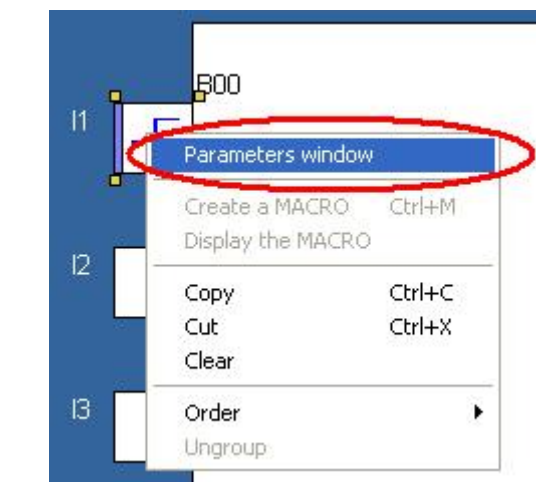
- 1 On starting Zelio Soft, the menu for selecting a new or existing program appears.

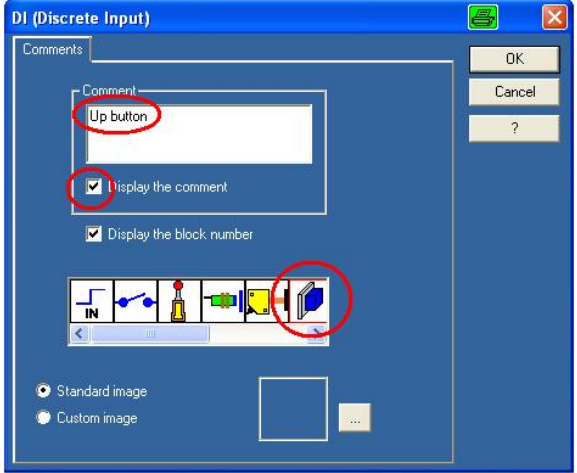
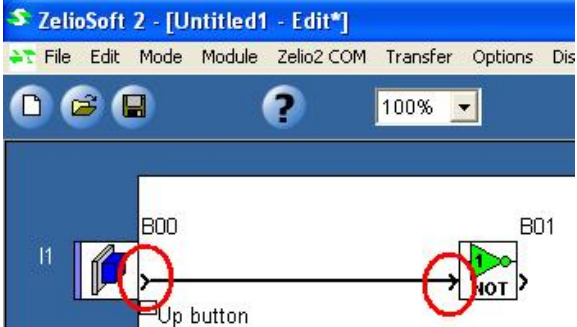
To create a new program, select:

Create new program.

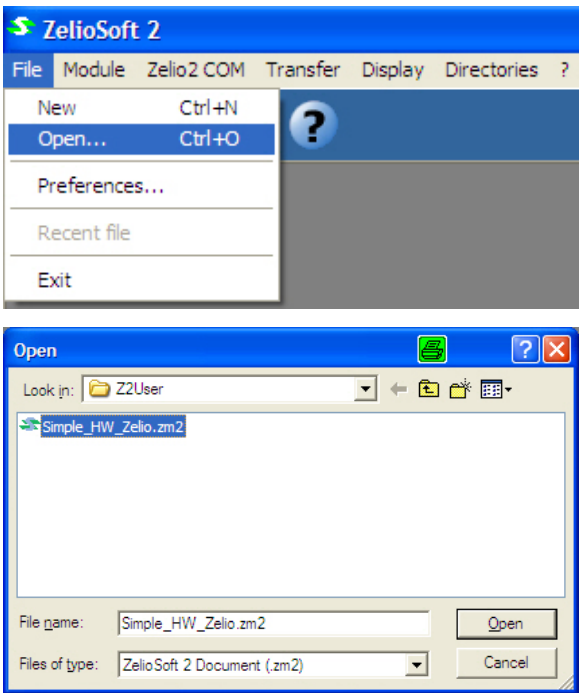
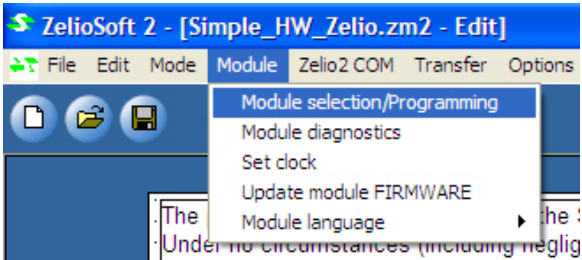


2	The Module selection dialog appears for you to select the Zelio module (see opposite) you are using. You can narrow the selection down by clicking on the relevant image in the upper frame, then select the technical data/module type description in the lower frame. For this application select the device type: SR2B201BD and click on Next >.	<table><tr><th>Power supply</th><th>Discrete Inputs</th><th>Mixed Discrete/Analog Inputs</th><th>Discrete Outputs</th><th>Screen/Keypad</th><th>Clock</th><th>Language</th><th>Reference</th></tr><tr><td>24VDC</td><td>10 DISCR</td><td>2 (0-10V)</td><td>8 RELAY</td><td>Yes</td><td>No</td><td>LD</td><td>SR2A201BD</td></tr><tr><td>100-240VAC</td><td>12 DISCR</td><td>-</td><td>8 RELAY</td><td>Yes</td><td>No</td><td>LD</td><td>SR2A201FU</td></tr><tr><td>48VAC</td><td>12 DISCR</td><td>-</td><td>8 RELAY</td><td>Yes</td><td>No</td><td>LD</td><td>SR2A201E</td></tr><tr><td>12VDC</td><td>6 DISCR</td><td>6 (0-10V)</td><td>8 RELAY</td><td>Yes</td><td>Yes</td><td>FBD/LD</td><td>SR2B201JD</td></tr><tr><td>24VDC</td><td>6 DISCR</td><td>6 (0-10V)</td><td>8 RELAY</td><td>Yes</td><td>Yes</td><td>FBD/LD</td><td>SR2B201BD</td></tr></table>	Power supply	Discrete Inputs	Mixed Discrete/Analog Inputs	Discrete Outputs	Screen/Keypad	Clock	Language	Reference	24VDC	10 DISCR	2 (0-10V)	8 RELAY	Yes	No	LD	SR2A201BD	100-240VAC	12 DISCR	-	8 RELAY	Yes	No	LD	SR2A201FU	48VAC	12 DISCR	-	8 RELAY	Yes	No	LD	SR2A201E	12VDC	6 DISCR	6 (0-10V)	8 RELAY	Yes	Yes	FBD/LD	SR2B201JD	24VDC	6 DISCR	6 (0-10V)	8 RELAY	Yes	Yes	FBD/LD	SR2B201BD
Power supply	Discrete Inputs	Mixed Discrete/Analog Inputs	Discrete Outputs	Screen/Keypad	Clock	Language	Reference																																											
24VDC	10 DISCR	2 (0-10V)	8 RELAY	Yes	No	LD	SR2A201BD																																											
100-240VAC	12 DISCR	-	8 RELAY	Yes	No	LD	SR2A201FU																																											
48VAC	12 DISCR	-	8 RELAY	Yes	No	LD	SR2A201E																																											
12VDC	6 DISCR	6 (0-10V)	8 RELAY	Yes	Yes	FBD/LD	SR2B201JD																																											
24VDC	6 DISCR	6 (0-10V)	8 RELAY	Yes	Yes	FBD/LD	SR2B201BD																																											
3	If the above selected device supports extension modules, these are now listed in a selection box in the center of the dialog. This configuration does not include any extension modules, so adding of the modules is not required. Click Next > to continue.	 Current selection Type: SR2B201BD Power supply: 24VDC Inputs: 6 DISCR + 6 (0-10V) Outputs: 8 RELAY Clock: Yes Language: FBD/LD Select extensions Non-contiguous extension <table><tr><th>Type</th><th>Reference</th><th>Inputs</th><th>Outputs</th></tr><tr><td>SR2COM01</td><td>88960117</td><td>NO INPUT</td><td>NO OUTPUT</td></tr></table> Add Delete Total number of inputs/outputs: 12 I / 8 O Selected extensions <table><tr><th>Type</th><th>Reference</th><th>Inputs</th><th>Outputs</th></tr></table> < Back Next > Cancel Help	Type	Reference	Inputs	Outputs	SR2COM01	88960117	NO INPUT	NO OUTPUT	Type	Reference	Inputs	Outputs																																				
Type	Reference	Inputs	Outputs																																															
SR2COM01	88960117	NO INPUT	NO OUTPUT																																															
Type	Reference	Inputs	Outputs																																															
4	Once a module has been selected, you can choose between two programming languages. The programming languages available are LD (Ladder Diagram) or FBD (Function Block Diagram). Select FBD and continue with Next >.	 Current selection Base: SR2B201BD Reference: SR2B201BD Power supply: 24VDC Inputs: 6 DISCR + 6 (0-10V) Outputs: 8 RELAY Clock: Yes Language: FBD Non-contiguous extension: 1 Not selected Extensions: 1 Not selected, 2 Not selected Total number of inputs/outputs: 12 I / 8 O Select the programming type Ladder FBD < Back Next > Cancel Help																																																

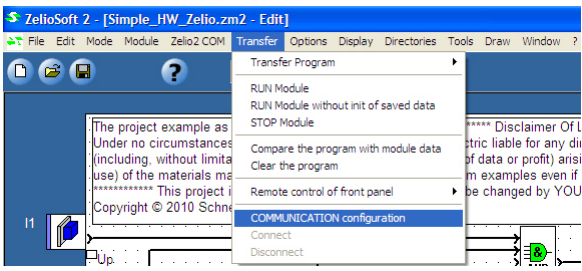
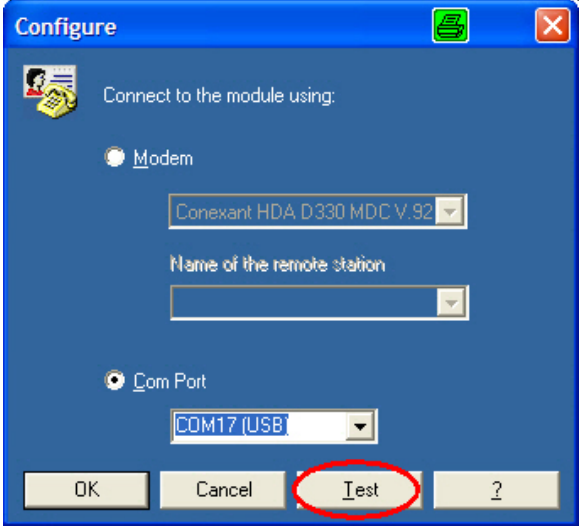
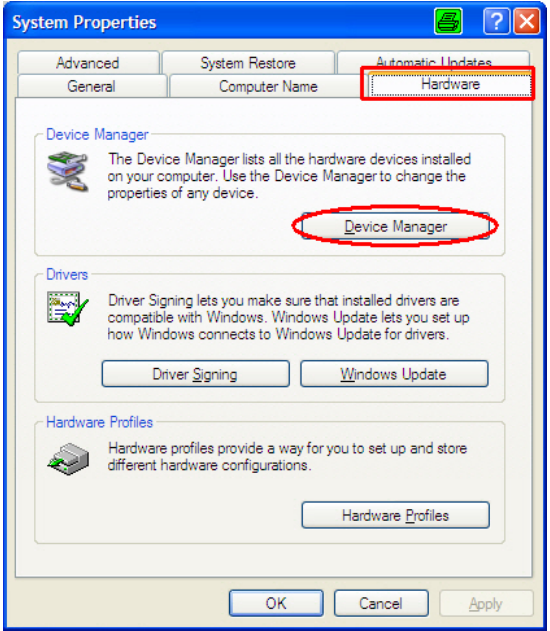
5	You are now in the editor and can start programming your application	
6	To program your application move the mouse over the sub-menus IN, FBD, SFC, Logic or Out to obtain a graphical pop-up selection of the possible elements. The red ring indicates the menu IN. Use Drag & Drop to select and position an element in the editor window. For example, select an input via the IN icon and drop it on the contact I1 (lower image).	
7	A right mouse click on the element in the editor window opens up a pop-up menu with the option to input the parameters for the element.	

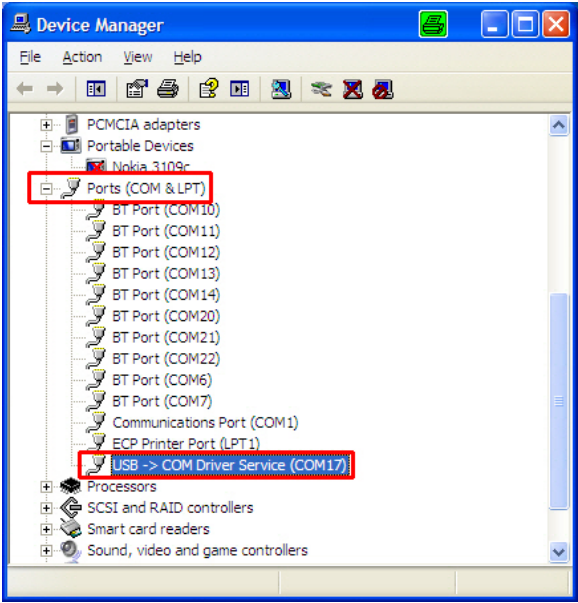
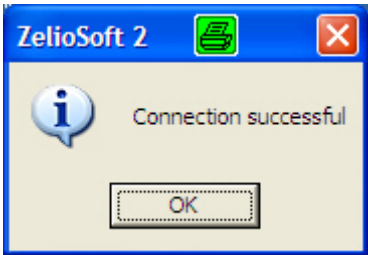
8	First give the element a name in the Comment field and activate the Display the comment function so that the name appears in the edit window. The lower field contains different icons which you can use to represent the element in the editor The element I1 is meant be an input switch. Choose the switch icon to represent this. Finish by clicking on OK.	
9	Continue to place and name elements in the same way until your program is finished. Connect the elements in the editor window by clicking on the connector field in the element and dragging a line to the connector of the element it is to be connected.	

Loading an existing program

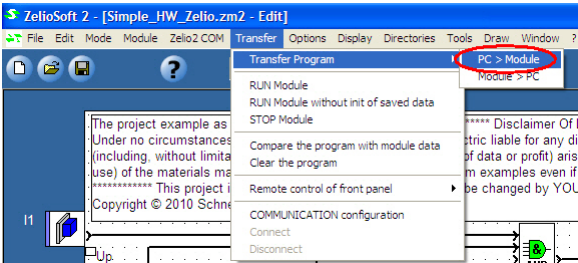
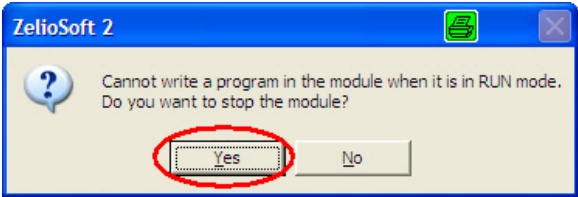
1	To load an existing program, select: File->Open... in the menu bar and go to the Open dialog. The default folder for storing programs is Z2USER. However, you can use the browse function to access any other folder containing a program with the file extension *.zm2. Open the Simple_HW_Zelio.zm2 program by selecting the file and clicking on Open.	
2	After opening the program, you should check that the module configuration in the software matches the module you actually have at hand. The easiest way to check this is by comparing the inscription on the Zelio (on the right-hand side as you look at it from the front) with the code displayed in the bottom right-hand corner of Zelio Soft.	
3	If the configuration does not match, use the menu Module to invoke the Module selection/Programming dialog to insert the correct device into the configuration.	

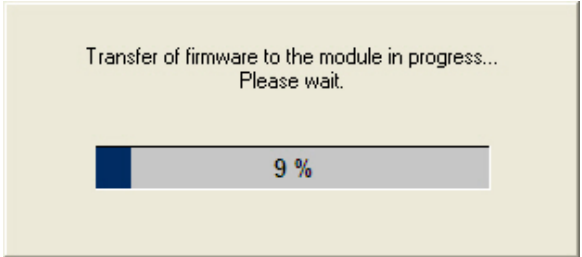
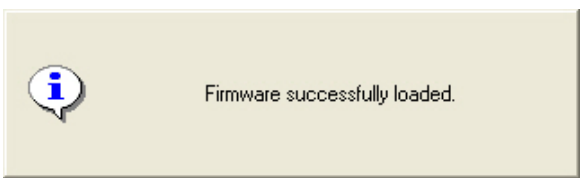
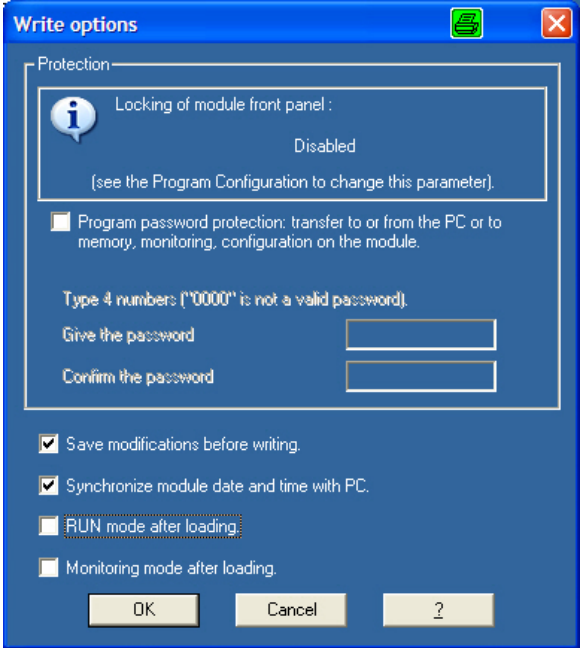
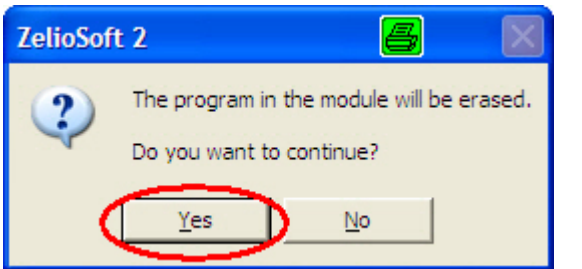
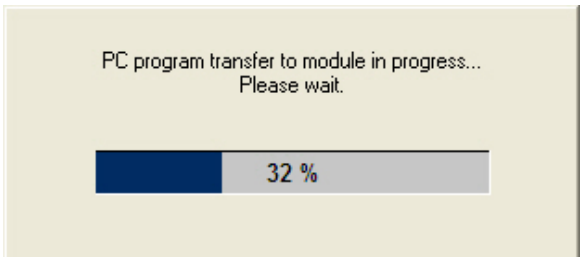
Configuring the interface

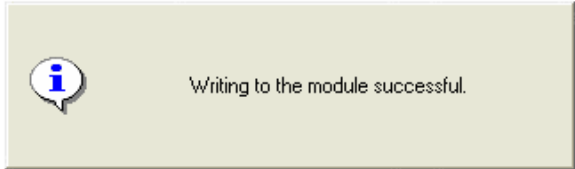
1	Before you can transfer your program to the Zelio, you need to configure the communication interface of your PC. To do this, select: Communication Configuration in the Transfer menu to configure the relevant port.	
2	In the Configure dialog set the Com Port radio button and select the virtual COM port which is linked to the USB port in the listbox, in this configuration it is linked to COM17 (USB). If the PC is connected to the Zelio Logic controller via the programming cable SR2USB01, you can now test the connection by clicking on the Test button. If you are using the programming cable SR2CBL01 select COM1. Note: If you don't know which COM port is assigned to the SR2USB01 cable continue with step 3. If you already know the COM port go directly to step 5.	
3	The cable SR2USB01 is a USB cable and is linked by Windows to a virtual COM port. To identify the right COM port you need to open the System Properties dialog by clicking on Windows key + Pause button on your keyboard. Open up the Hardware tab and click on Device Manager.	

4	In the Device Manager click on Ports (COM & LPT). The cable is listed with the alias name USB -> COM Driver Service with the corresponding port in brackets. In this case the port COM17 is assigned to it.	
5	After a successful connection you will receive a message to that effect. Acknowledge the message by pressing OK and then exit the Configure dialog with OK.	

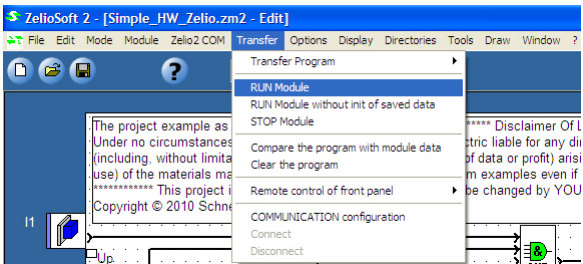
Download program

1	To download the application to the Zelio select: Transfer->Transfer Program. In the pop-up menu select: PC > Module.	
2	If the Zelio is in run mode, you must first stop the Zelio before loading a new program. Click on Yes to change from RUN mode to STOP mode.	
3	It is possible that the actual firmware in the Zelio is a different version to that in Zeliosoft. If this is the case, you are asked if you wish to update the firmware. Click on Yes to accept the firmware change.	

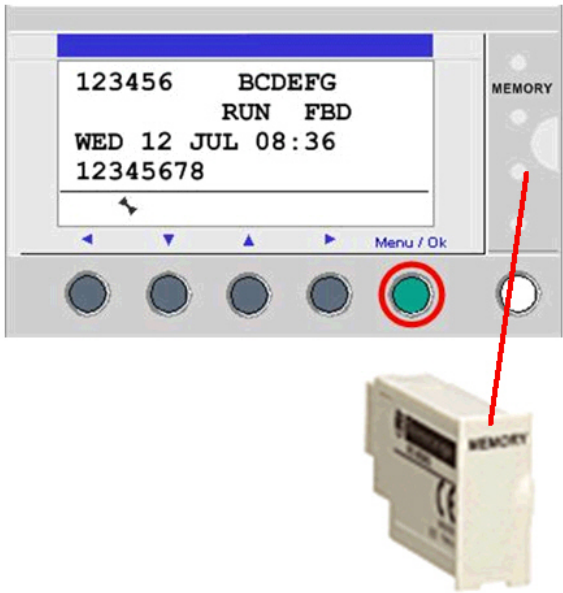
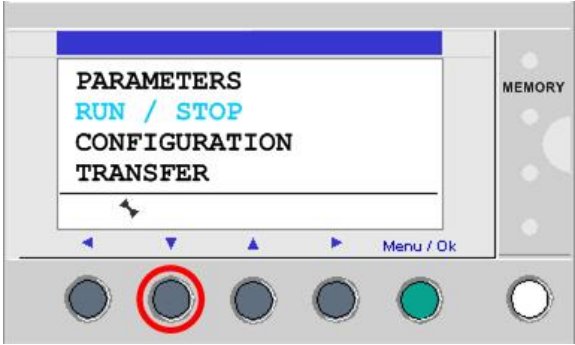
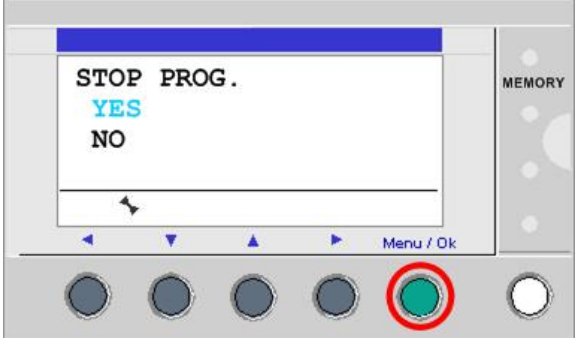
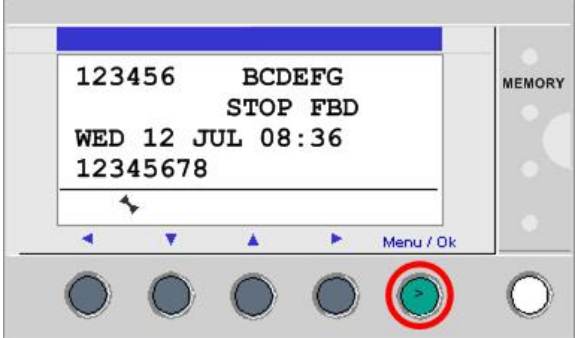
4	A progress bar now indicates the progress of the download.	
5	When the download is complete, you are shown this message.	
6	Once the firmware download is finished you are shown the write options dialog In this dialog you can input a password to protect the contents of the Zelio and also define the start mode once the download is finished. To continue with the download click on OK.	
7	If there is an existing program in the module, you are shown this message. Click on Yes to erase the program in the module.	
8	During the download you are shown a progress bar.	

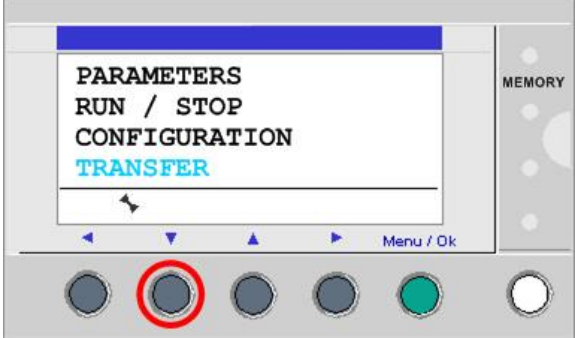
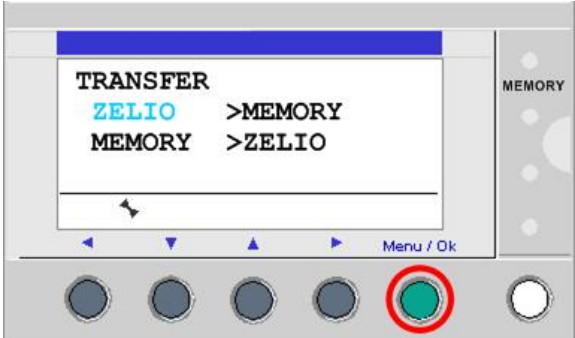
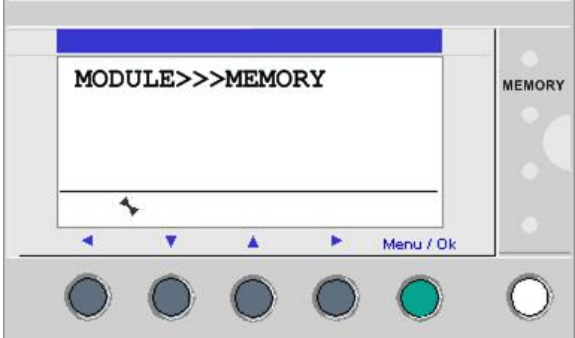
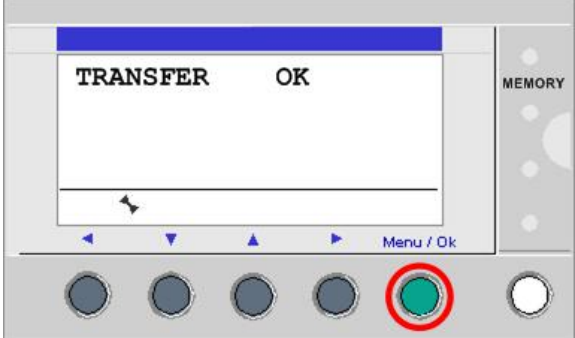
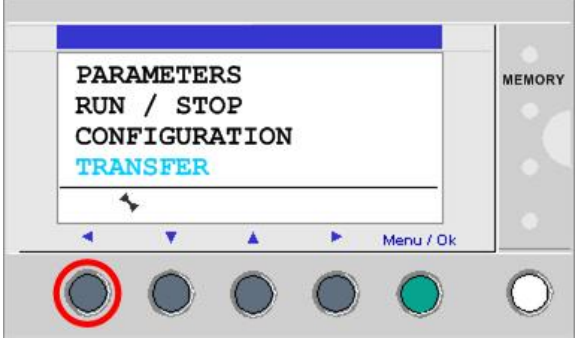
9	When the download is complete, you are shown this message.	
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Starting the Zelio

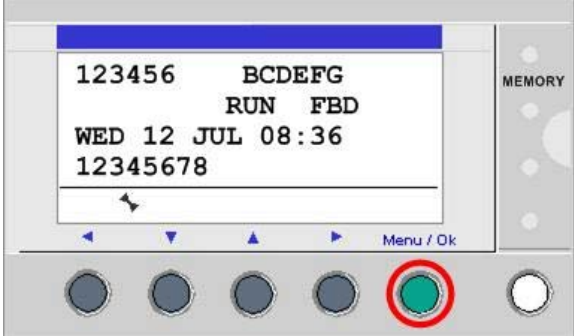
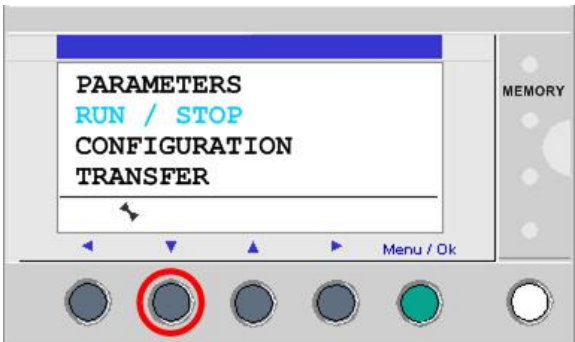
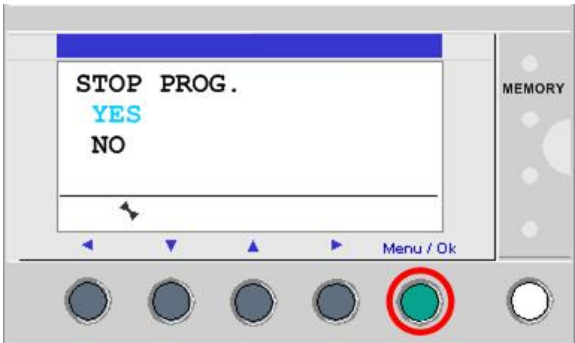
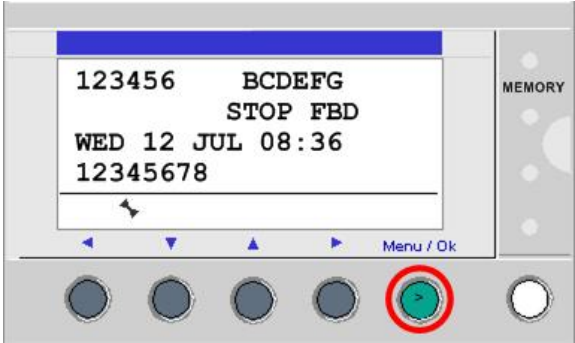
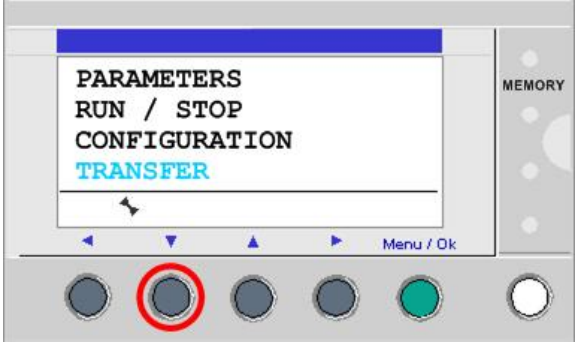
1	Before starting the Zelio, please read the notification relating to your system and check that all personnel are clear of the equipment to be operated.	
2	After downloading, the Zelio will not require a RUN command to start the program if you selected the mode: RUN Module Otherwise, to start the program select: Transfer->RUN Module	

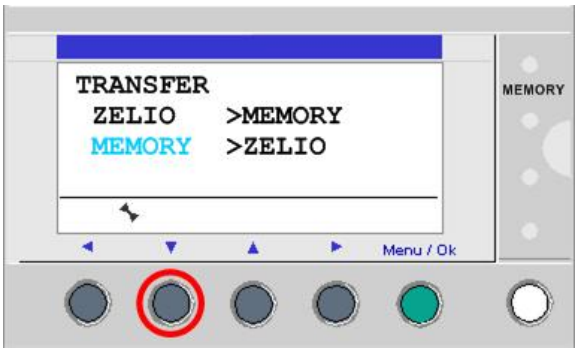
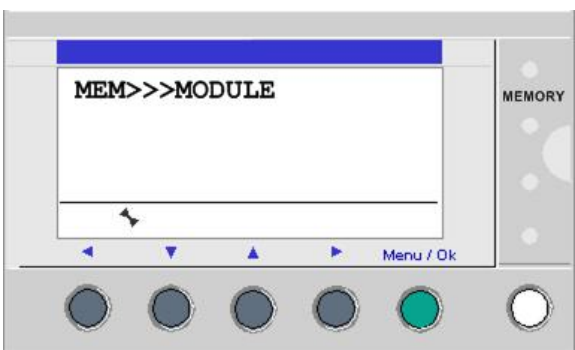
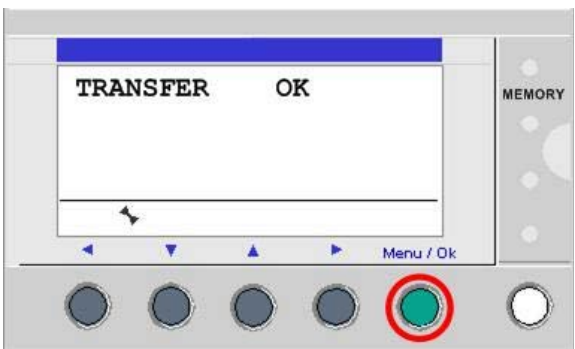
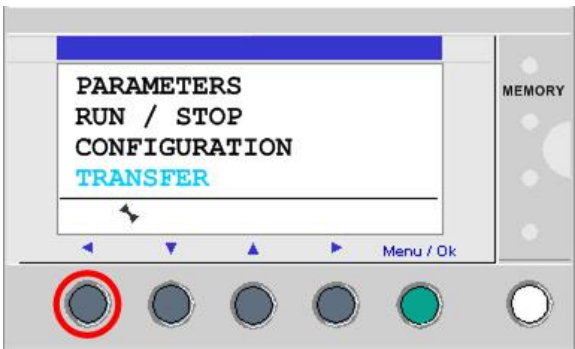
Copying the program from the Zelio to EEPROM module

1	In order to make a copy of the application it must be valid and executable. Remove the connector cover to the right of the display (the connector may be connected to the PC. If so, remove the cable) Insert the EEPROM memory module SR2MEM02. If the Zelio is already in STOP (the image shows RUN) mode proceed to step 4, otherwise press the button Menu/Ok.	
2	You should now see the main menu. Use the buttons under the display to navigate through the menu. Light blue text indicates a blinking text. Navigate up or down the main menu using the up/down buttons until you reach the menu RUN / STOP. It will start to blink. Now press the Menu/Ok button to select it.	
3	You can now stop the Zelio by selecting YES and pressing the Menu/OK button.	
4	The actual status of the Zelio is shown in the display It should now show STOP. Press Menu/Ok to return to the main menu.	

5	Scroll down the menu to Transfer and select it with the Menu/Ok button.	
6	The display now lists 2 functions indicating in which direction data can be moved. To copy the application to the EEPROM memory module, position on the first function ZELIO >MEMORY and select it with the Menu/Ok button.	
7	During the transfer the display indicates what function is being performed.	
8	When the transfer is successfully finished the display informs you of the status with TRANSFER OK Exit the function with Menu/Ok and return to the main menu.	
9	You can now restart the Zelio using the function RUN / STOP or exit the menu with the left button.	

Loading a program from EEPROM

1	To load a program from the EEPROM memory module SR2MEM02, the Zelio must be in STOP mode and you must have a valid program on an EEPROM memory module that has been inserted into the memory connection (to the right of the Zelio display) of the Zelio. To access the Zelio main menu press the Menu/Ok button.	
2	With the button up/down select RUN/STOP to stop the Zelio if it is not already in STOP mode If the zelio is already in STOP mode proceed with step 4.	
3	Select YES and press Menu/Ok to stop the Zelio.	
4	When stopped the actual mode STOP is shown on the display Press the Menu/Ok button to return to the main menu.	
5	Scroll down the menu by pressing the down button to highlight the option TRANSFER and select it with the Menu/Ok button.	

6	Press the down button again to highlight the function MEMORY >ZELIO Then press Menu/Ok to copy the program from the EEPROM memory module into the Zelio	
7	During the transfer the display indicates which function is being carried out.	
8	When the transfer is complete the display informs you with TRANSFER OK Exit the function and return to the main menu with the Menu/Ok button.	
9	Select RUN/STOP to restart the Zelio OR exit the main menu with the left button.	

HMI

Introduction

This application does not feature a HMI display unit.

The HMI in this example application is represented by lights and illuminated switches which provide both alarm and control functions.

Devices

Introduction	This chapter describes the steps required to initialize and configure the different devices required to attain the described system function.
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General	Altivar 12 drives are configured by using the local control panel on the device itself. Alternatively they can be configured by using the software SoMove Lite.
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Note	If this is not a new drive you should re-establish the factory settings. If you need instructions on how to do this, please read the drive documentation.
-------------	---

Be sure that the controller is in STOP state before parameterizing the drives.

Altivar 12

Introduction

The ATV12 parameters can be entered or modified via the local control panel on the front of the device itself or by using the software SoMove Lite.

The advantages of using the SoMove Lite software are:

- The data can be stored on the PC
- Documentation can be printed *and*
- The tool supports online optimization of the parameters.

Note

If this is not a new drive you should re-establish the factory settings. If you need instructions on how to do this, please read the drive documentation.

The Jog dial that is a part of the local control panel can be used for navigation by turning it clockwise or counter-clockwise. Pressing the jog dial enables the user to make a selection or confirm information.

Procedure

Setting up the ATV12 is done as follows:

- Configuration using the local control panel
- Change mode
- Input the nominal motor values
- Thermal current setting
- Current limitation
- Speed settings
- I/O-settings
- Configuring ATV12 with SoMove Lite
- Download the configuration
- Store customer parameter set on ATV12

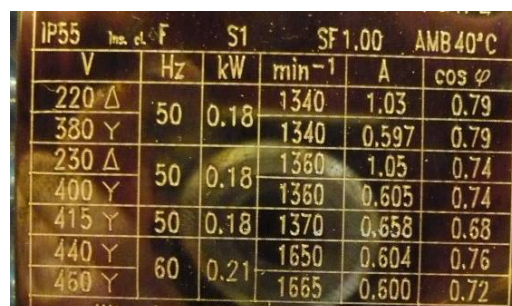
Preparation for commissioning

To speed up the commissioning, first make a note of the motor data found on the motor type labels (see example on the right) This data includes:

- **Nominal voltage**
- **Nominal power**
- **Nominal frequency**
- **Power factor $\cos \varphi$**

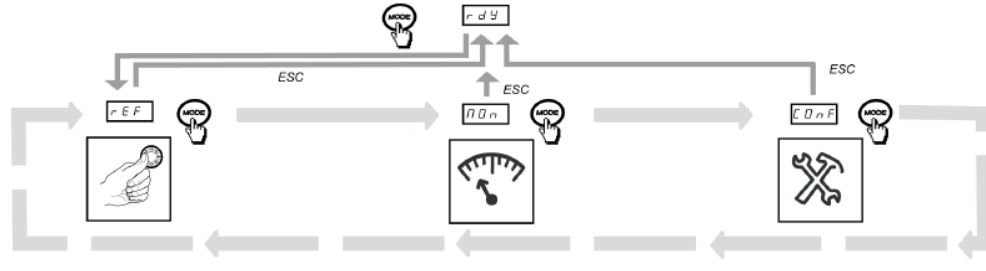
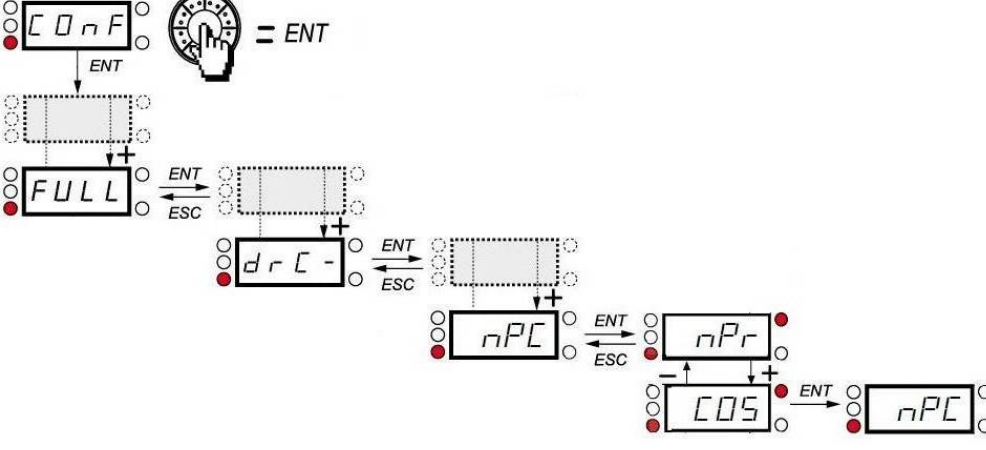
Note:

Be sure that the controller is in STOP state before parameterizing the drives.



IP55		Ins. cl. F	S1	SF1.00	AMB 40°C
V	Hz	kW	min ⁻¹	A	cos φ
220 Δ	50	0.18	1340	1.03	0.79
380 Y			1340	0.597	0.79
230 Δ	50	0.18	1360	1.05	0.74
400 Y			1360	0.605	0.74
415 Y	50	0.18	1370	0.658	0.68
440 Y	60	0.21	1650	0.604	0.76
460 Y			1665	0.600	0.72

Configuration using the local control panel

1	The menus shown here are only those that are required to be used for this architecture. See the ATV12 user manual for a full description. On first start-up of the VSD the display shows bFr and indicates that the basic frequency of the motor needs to be entered. Press the ENT key and, using the jog dial, input the nominal frequency. The input range is 50 to 60 Hz. Confirm the input by pressing the ENT key. Now restart the VSD. The screen shows rdy.	
2	The display shows rdy, from here you can jump to the rEF, MOOn and CO nF – mode by pressing mode and turning the jog dial behind the front cover. To set parameters you must enter the CO nF –mode. 	
3	To access the CoS – menu for setting the cos phi – parameter, you have to switch from nPr (nominal power rating) to CoS. 	

Input the nominal motor values

4

Go to the menu **drC** (Drive control) and setup the drive parameters as given on the motor type label.

These are:

CoS – Rated motor cos phi

UnS – Rated motor voltage

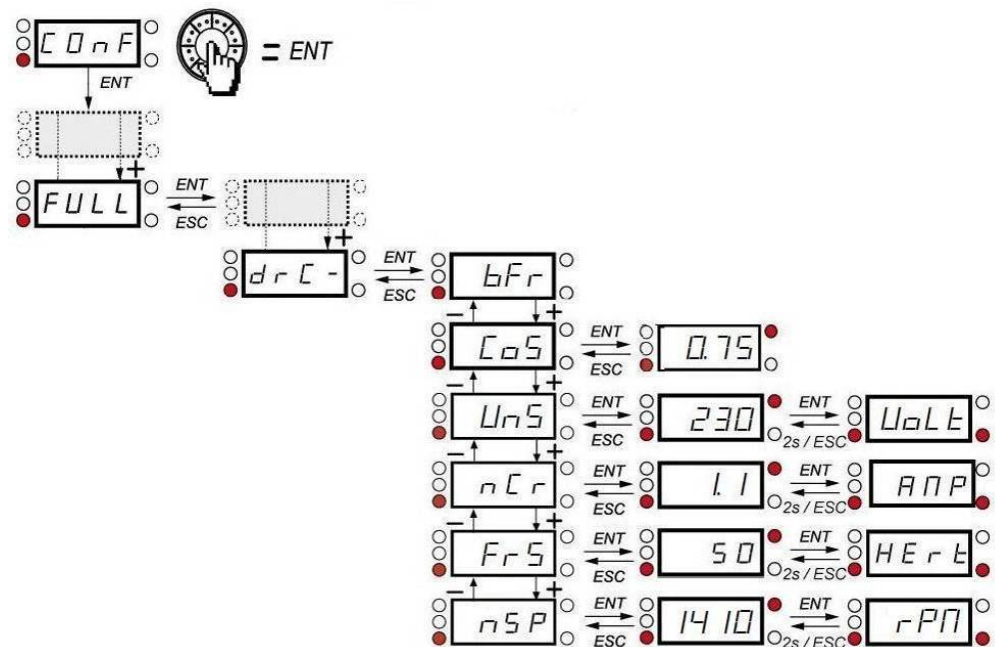
nCr – Rated motor current

FrS – Rated motor frequency

nSP – Rated motor speed

The parameter **UnS**, is the nominal voltage of the motor (factory setting: **230** Vac). Single phase drives accept a maximum of the mains voltage, so that here the value can only be reduced. Note that motors with a nominal voltage of 230/400 Vac require a **delta** connection.

The parameter **FrS** is the nominal frequency of the motor and can usually be left at the factory setting of 50 Hz.



Note:

These parameter values given in the following steps are for the machine described in this example only.

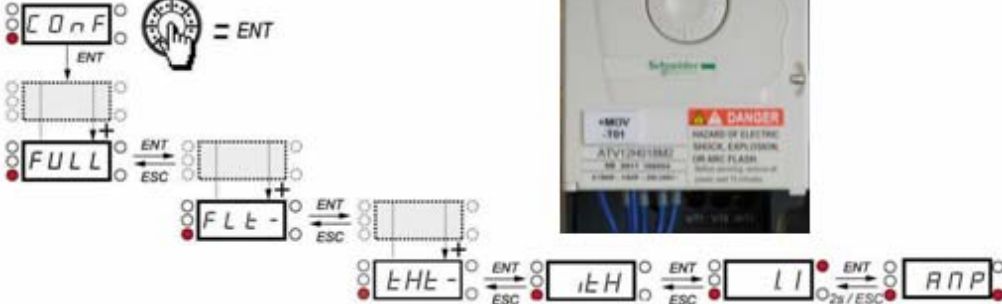
In all likelihood, you will need to adapt these parameters for your specific machine.

Thermal current setting

5

Go to **ItH** press the **ENT** key and input the nominal power value using the jog dial. The default value is 1.1 Amps.

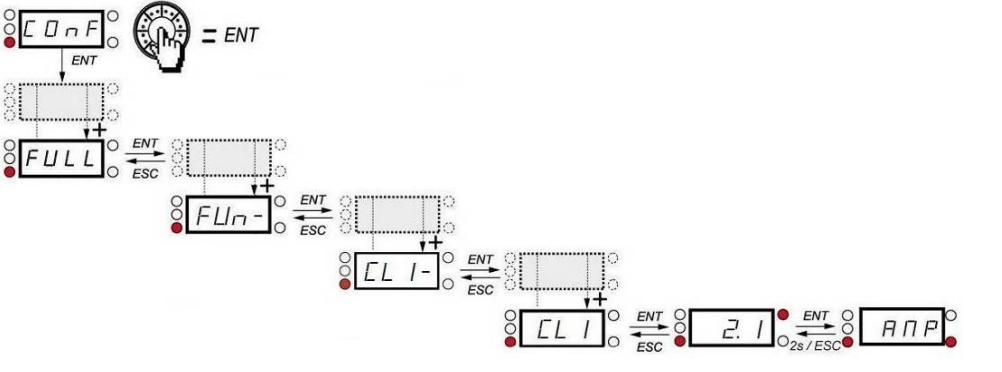
Confirm the input with **ENT**.



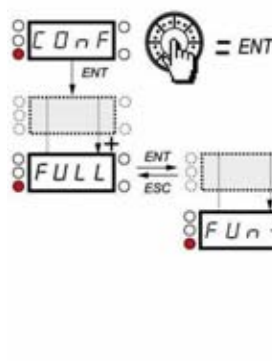
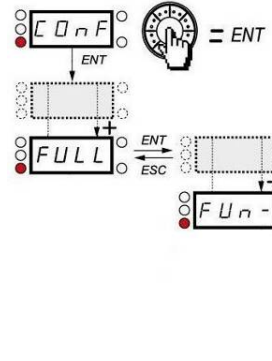
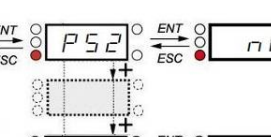
Current limitation

6

In the menu **CLI** you can define the maximum allowed power for the motor. This value should be higher than the nominal power rating to allow certain amount of overload.
(for example, $CLI = 1.25 * nCr$).



Speed settings

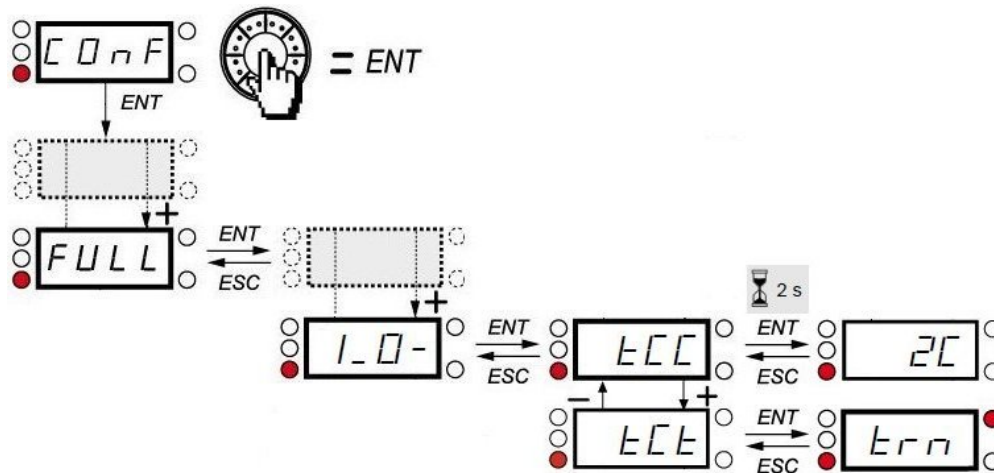
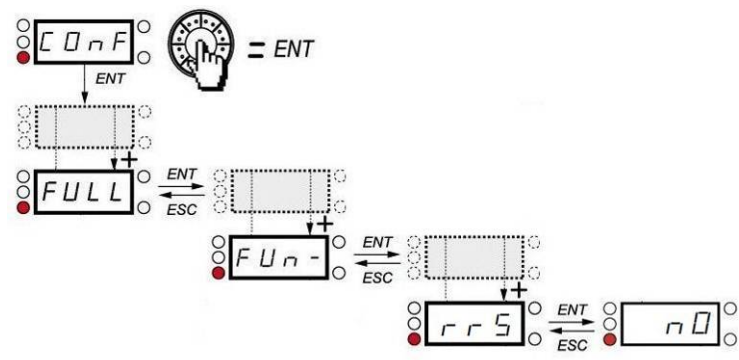
7	SPL (Speed limit menu) is the menu for the target frequency of the drive when a 24 Vdc signal is input to the ATV12 via digital input LI1 (FWD) or LI2 (REV). Go to the menu SPL. Now press ENT and go to LSP (low speed) to modify the minimum allowed speed value, the default value is 0.0 Hz. Use the jog dial to input a value of 5.0 Hz. Go to the next entry in the menu, HSP (High speed). Here you can input the maximum allowed speed value, the default value is 50 Hz and can be left as it is.  
8	Go to the menu PSS (preset speed menu). Now press ENT and go to PS2 (SetPoint Speed2) and select the Input LI3High. If this Input is high, the frequency value from the parameter SP2 (SPEED2) is selected as target frequency. Afterwards you can select the parameter SP2 (SPEED2). Press ENT and use the jog dial to input a value (for example, 35.0 Hz) for the setpoint Speed2.  

Configuration for PS2=SetPoint Speed2 (LI3High)

and

Setting for SPEED2 (SP2)

I/O-settings

9	In the menu I_O you can define options regarding the Inputs and Outputs of the ATV12. Go to tCC and leave the setting on 2C which means that the ATV12 can be driven by 2 wires. Then enter to tCt and check if it is set to trn (Transition mode). 
10	In the menu FUn (function) you can define application functions of the ATV12. Go to rrS (Reverse) and select the input LI2High. If this input is high, the drive runs in Reverse-mode. 
11	For the drive to operate with the new parameters, a power cycle (on, off, on) is required.

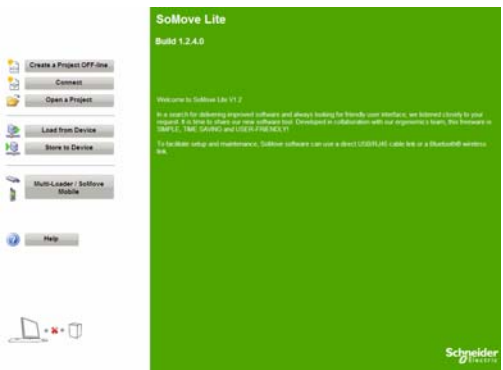
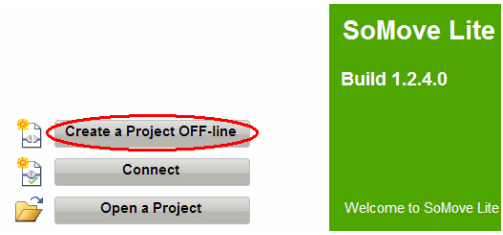
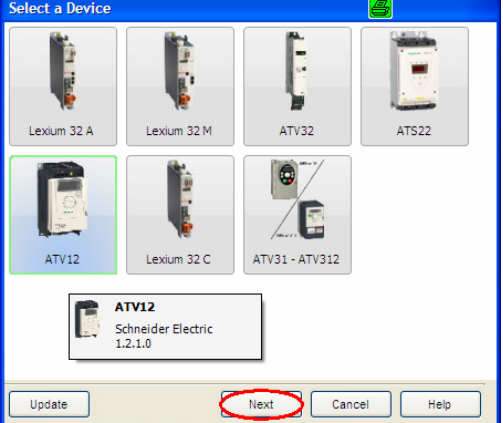
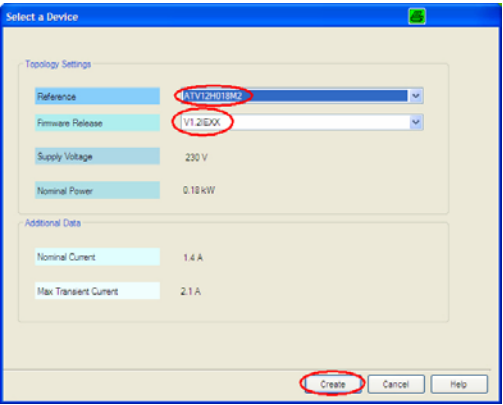
⚠ WARNING

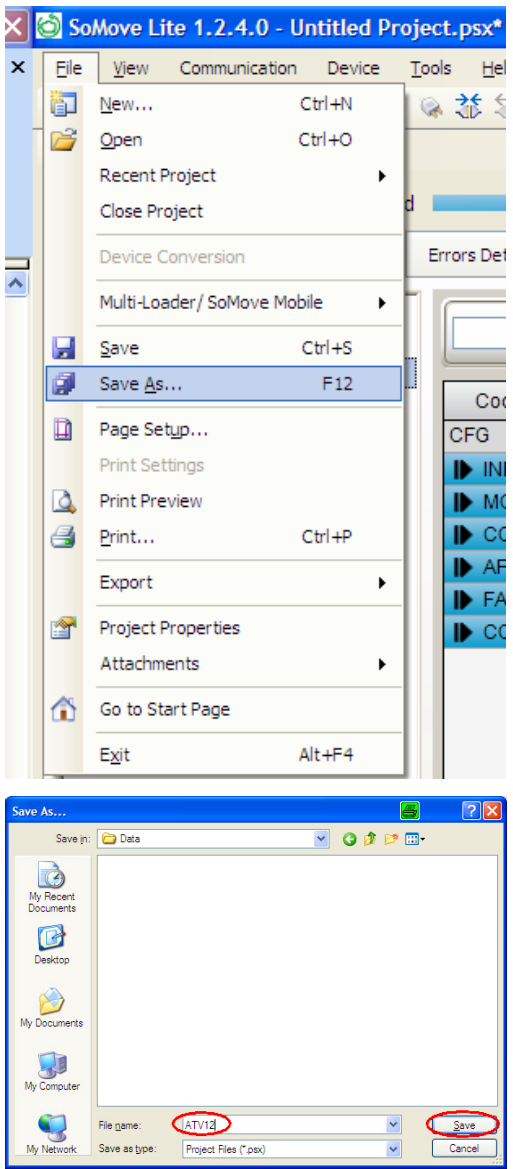
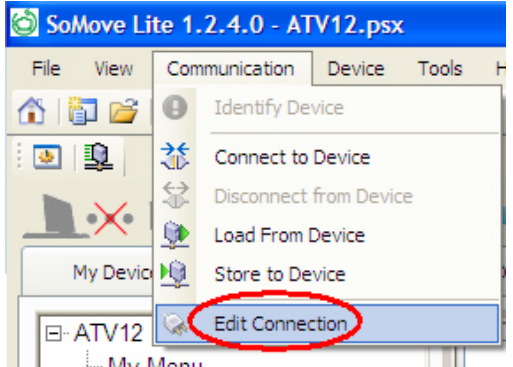
UNINTENDED EQUIPMENT OPERATION

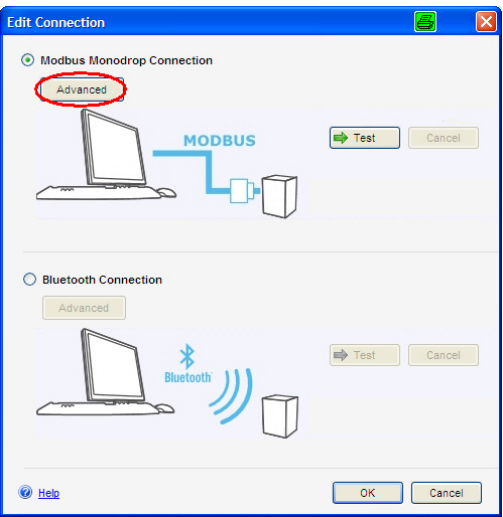
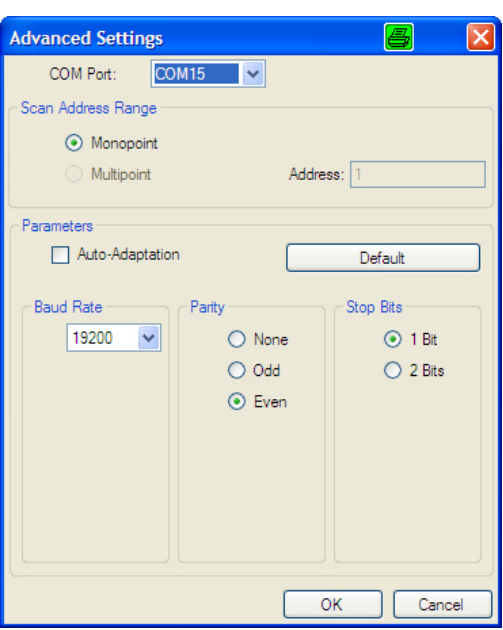
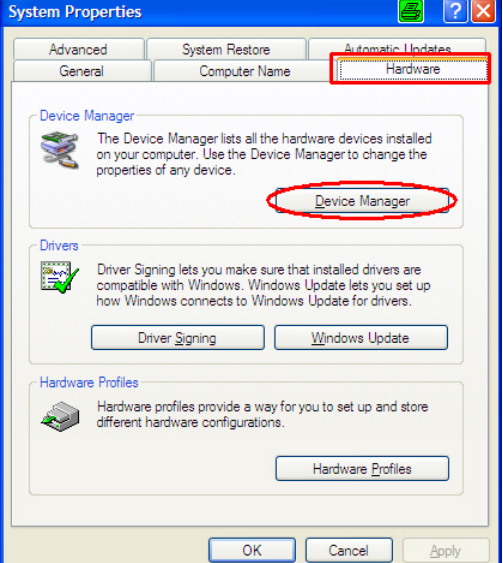
After making any configuration changes or adjustments, be sure to cycle power (remove and reapply power) on the drive.

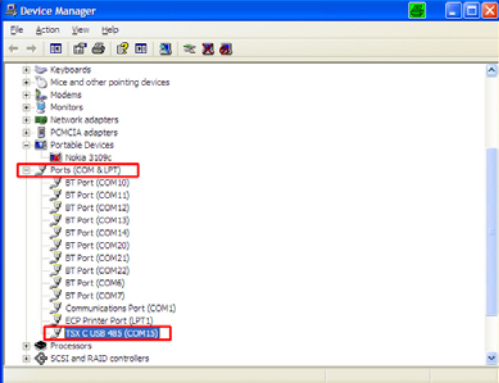
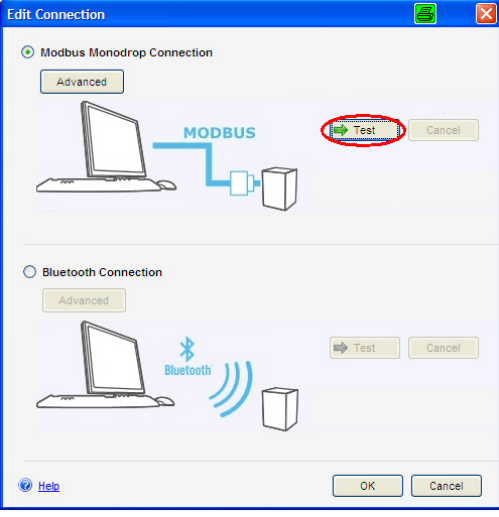
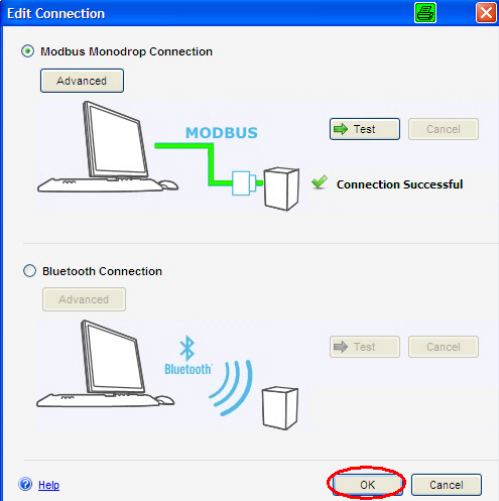
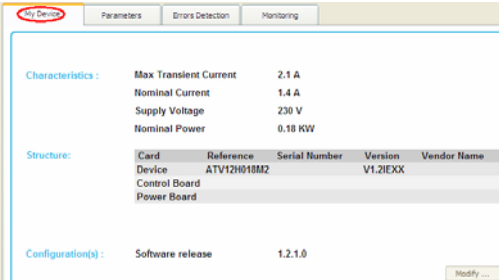
Failure to follow these instructions can cause death, serious injury or equipment damage.

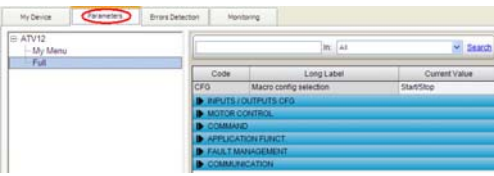
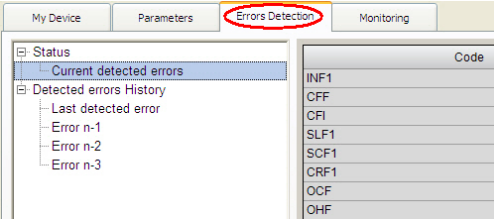
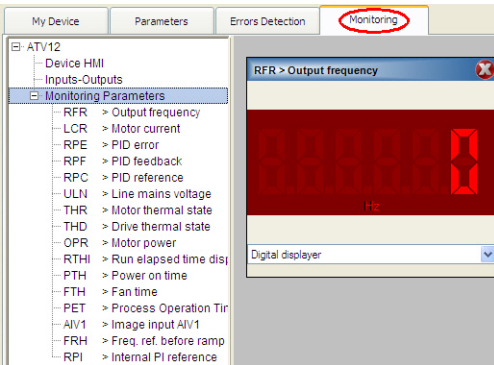
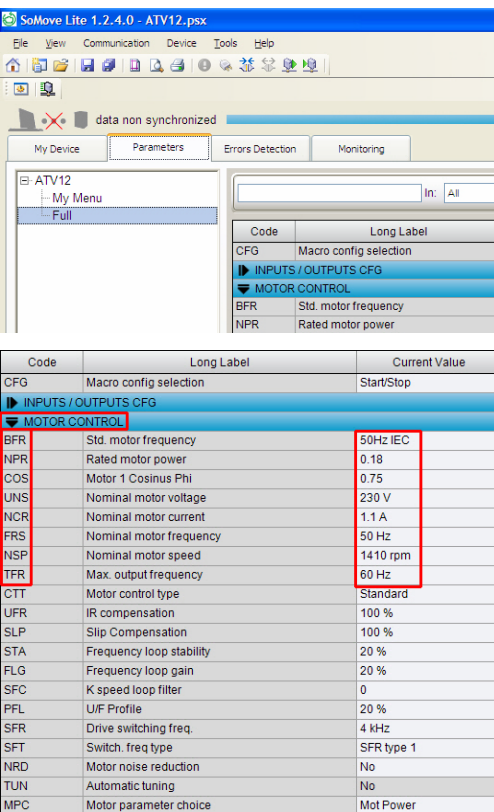
Configuring ATV12 with SoMove Lite

1	After starting SoMove Lite you will see the window as shown here on the right.	 The screenshot shows the SoMove Lite main window. On the left is a sidebar with buttons: 'Create a Project OFF-line', 'Connect', 'Open a Project', 'Load from Device', 'Store to Device', 'Multi-Loader / Software Module', and 'Help'. The main area has a green header with 'SoMove Lite Build 1.2.4.0' and a welcome message.
2	To create a new project, select Create a Project OFF-line .	 The screenshot shows the same main window as in step 1, but the 'Create a Project OFF-line' button in the sidebar is circled in red.
3	Select from the following Select a Device dialog the desired drive and continue with Next .	 The screenshot shows the 'Select a Device' dialog box. It displays a grid of device icons: Lexium 32 A, Lexium 32 M, ATV32, ATS22, ATV12 (highlighted with a green border), Lexium 32 C, and ATV31 - ATV312. Below the grid is a summary for 'ATV12 Schneider Electric 1.2.1.0'. At the bottom, the 'Next' button is circled in red.
4	In the Device dialog, select a Reference and the Firmware Release. In this example: Reference: ATV12H018M2 Firmware Release: V1.2IEXX The Version defines a set of functions. Additional information displayed: - Supply Voltage - Nominal Power - Nominal Current - Max Transient Current of the VSD. Continue with Create.	 The screenshot shows the 'Select a Device' dialog box with configuration details. Under 'Topology Settings', 'Reference' is set to 'ATV12H018M2' and 'Firmware Release' is set to 'V1.2IEXX', both circled in red. Other settings include 'Supply Voltage: 230 V' and 'Nominal Power: 0.18 kW'. Under 'Additional Data', 'Nominal Current' is '1.4 A' and 'Max Transient Current' is '2.1 A'. At the bottom, the 'Create' button is circled in red.

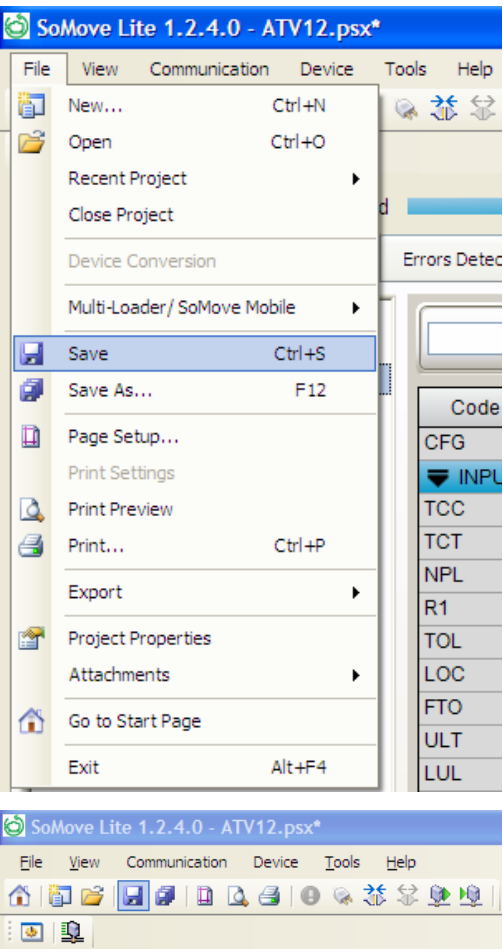
5	To save the project, use File->Save As... Insert the File name (here ATV12) and continue with Save	 The screenshot shows the 'File' menu in SoMove Lite 1.2.4.0. The 'Save As...' option is highlighted with a blue selection bar. Below the menu, the 'Save As...' dialog box is open. The 'File name' field contains 'ATV12', and the 'Save' button is highlighted with a red circle. The 'Save as type' is set to 'Project Files (*.psx)'.
6	Select: Communication->Edit Connection to go to the connection dialog.	 The screenshot shows the 'Communication' menu in SoMove Lite 1.2.4.0. The 'Edit Connection' option is highlighted with a red circle. The menu also includes options like 'Identify Device', 'Connect to Device', 'Disconnect from Device', 'Load From Device', and 'Store to Device'.

7	Select Advanced to check and edit the connection settings.	
8	Select the appropriate COM Port, here COM15 is used. Baud Rate: 19200 Parity: Even Stop Bits: 1 Continue with OK. Note: If you don't know which COM port is assigned to the TCSMCNAM3M002P USB cable continue with step 9. If you already know the COM port go directly to step 11.	
9	The cable TCSNCNAM3M00P is a USB cable and is linked by Windows to a virtual COM port. To identify the right COM port you need to open the System Properties dialog by clicking on Windows key + Pause button. Open up the Hardware tab and click on Device Manager.	

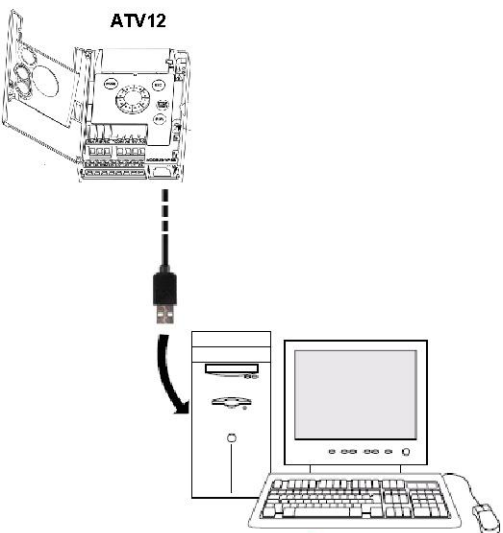
10	In the Device Manager click on Ports (COM & LPT). The cable is listed with the alias name TSX C USB 485 with the corresponding port in brackets. In this case the port COM15 is assigned to it.	
11	You can also perform a test of the connection by clicking on Test. Continue with OK.	
12	If the connection was successfully tested you will get the confirmation inside the screen with a green hook. Close this dialog box by clicking OK.	
13	The main window of SoMove consists of four tabs. The first tab is MyDevice, which includes the basic information about the device used.	

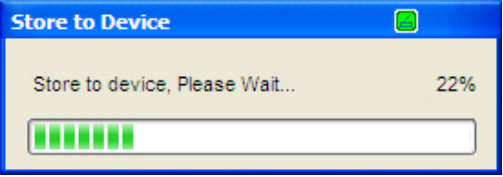
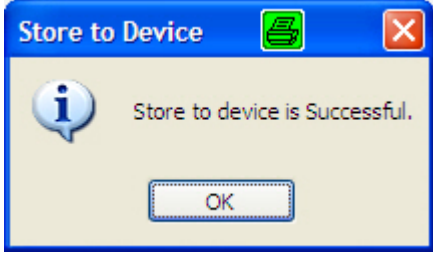
14	The second tab Parameters shows a table of all adjustable parameters.																																																																									
15	On the third tab Errors Detection you can see current detected faults.																																																																									
16	The tab Monitoring is used to monitor the parameter values of the VSD. Click on the parameter to be observed and then click again on the plane on the right hand side.																																																																									
17	On the Parameters tab, select MOTOR CONTROL. Leave the value for BFR at 50Hz. Insert your motor values as found on the name plate of the motor. Note: These parameters are for the machine described in this example only. In all likelihood, you will need to adapt these parameters for your specific machine.	 <table border="1"> <thead> <tr> <th>Code</th> <th>Long Label</th> <th>Current Value</th> </tr> </thead> <tbody> <tr> <td>CFG</td> <td>Macro config selection</td> <td>Start/Stop</td> </tr> <tr> <td colspan="3">▶ INPUTS / OUTPUTS CFG</td> </tr> <tr> <td>▼</td> <td>MOTOR CONTROL</td> <td></td> </tr> <tr> <td>BFR</td> <td>Std. motor frequency</td> <td>50Hz IEC</td> </tr> <tr> <td>NPR</td> <td>Rated motor power</td> <td>0.18</td> </tr> <tr> <td>COS</td> <td>Motor 1 Cosinus Phi</td> <td>0.75</td> </tr> <tr> <td>UNS</td> <td>Nominal motor voltage</td> <td>230 V</td> </tr> <tr> <td>NCR</td> <td>Nominal motor current</td> <td>1.1 A</td> </tr> <tr> <td>FRS</td> <td>Nominal motor frequency</td> <td>50 Hz</td> </tr> <tr> <td>NSP</td> <td>Nominal motor speed</td> <td>1410 rpm</td> </tr> <tr> <td>TFR</td> <td>Max. output frequency</td> <td>60 Hz</td> </tr> <tr> <td>CTT</td> <td>Motor control type</td> <td>Standard</td> </tr> <tr> <td>UFR</td> <td>IR compensation</td> <td>100 %</td> </tr> <tr> <td>SLP</td> <td>Slip Compensation</td> <td>100 %</td> </tr> <tr> <td>STA</td> <td>Frequency loop stability</td> <td>20 %</td> </tr> <tr> <td>FLG</td> <td>Frequency loop gain</td> <td>20 %</td> </tr> <tr> <td>SFC</td> <td>K speed loop filter</td> <td>0</td> </tr> <tr> <td>PFL</td> <td>U/F Profile</td> <td>20 %</td> </tr> <tr> <td>SFR</td> <td>Drive switching freq.</td> <td>4 kHz</td> </tr> <tr> <td>SFT</td> <td>Switch. freq type</td> <td>SFR type 1</td> </tr> <tr> <td>NRD</td> <td>Motor noise reduction</td> <td>No</td> </tr> <tr> <td>TUN</td> <td>Automatic tuning</td> <td>No</td> </tr> <tr> <td>MPC</td> <td>Motor parameter choice</td> <td>Mot Power</td> </tr> </tbody> </table>	Code	Long Label	Current Value	CFG	Macro config selection	Start/Stop	▶ INPUTS / OUTPUTS CFG			▼	MOTOR CONTROL		BFR	Std. motor frequency	50Hz IEC	NPR	Rated motor power	0.18	COS	Motor 1 Cosinus Phi	0.75	UNS	Nominal motor voltage	230 V	NCR	Nominal motor current	1.1 A	FRS	Nominal motor frequency	50 Hz	NSP	Nominal motor speed	1410 rpm	TFR	Max. output frequency	60 Hz	CTT	Motor control type	Standard	UFR	IR compensation	100 %	SLP	Slip Compensation	100 %	STA	Frequency loop stability	20 %	FLG	Frequency loop gain	20 %	SFC	K speed loop filter	0	PFL	U/F Profile	20 %	SFR	Drive switching freq.	4 kHz	SFT	Switch. freq type	SFR type 1	NRD	Motor noise reduction	No	TUN	Automatic tuning	No	MPC	Motor parameter choice	Mot Power
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19	Select: APPLICATION FUNCT. Set RRS to LI2 high → RAMP Change ACC & DEC to 0.1s → PRESET SPEEDS Set the input for PS2 to LI3 high The preset speeds can be selected by setting the appropriate inputs of the drive. Change SP2 to 35 Hz. This is the target frequency of the drive when a 24 Vdc signal is input to the ATV12 via digital input LI1 (FWD) or LI2 (REV) AND LI3 (SPEED2). → SPEED LOOP Set LSP to 5 Hz. This is the target frequency of the drive when a 24 Vdc signal is input to the ATV12 via digital input LI1 (FWD) or LI2 (REV).	<table border="1"> <thead> <tr> <th colspan="3">▼ APPLICATION FUNCT.</th> </tr> </thead> <tbody> <tr><td>RRS</td><td>Reverse input assignment</td><td>LI2 high</td></tr> <tr><td>JOG</td><td>Jog assignment</td><td>No</td></tr> <tr><td>JPF</td><td>Skip frequency</td><td>0 Hz</td></tr> <tr> <th colspan="3">▼ RAMP</th> </tr> <tr><td>ACC</td><td>Acceleration ramp time</td><td>0.1 s</td></tr> <tr><td>DEC</td><td>Deceleration ramp time</td><td>0.1 s</td></tr> <tr><td>RPT</td><td>Type of reference ramp</td><td>Linear</td></tr> <tr><td>RPS</td><td>Ramp switching input</td><td>No</td></tr> <tr><td>AC2</td><td>Acceleration 2 ramp time</td><td>5 s</td></tr> <tr><td>DE2</td><td>Deceleration 2 ramp time</td><td>5 s</td></tr> <tr><td>BRA</td><td>Decel ramp adaptation</td><td>Yes</td></tr> <tr> <th colspan="3">▼ PRESET SPEEDS</th> </tr> <tr><td>PS2</td><td>2 preset speeds assign.</td><td>LI3 high</td></tr> <tr><td>PS4</td><td>4 preset speeds assign.</td><td>No</td></tr> <tr><td>PS8</td><td>8 preset speeds assign.</td><td>No</td></tr> <tr><td>SP2</td><td>Preset speed 2</td><td>35 Hz</td></tr> <tr><td>SP3</td><td>Preset speed 3</td><td>15 Hz</td></tr> <tr><td>SP4</td><td>Preset speed 4</td><td>20 Hz</td></tr> <tr><td>SP5</td><td>Preset speed 5</td><td>25 Hz</td></tr> <tr><td>SP6</td><td>Preset speed 6</td><td>30 Hz</td></tr> <tr><td>SP7</td><td>Preset speed 7</td><td>35 Hz</td></tr> <tr><td>SP8</td><td>Preset speed 8</td><td>40 Hz</td></tr> <tr> <th colspan="3">▶ PID REGULATOR</th> </tr> <tr> <th colspan="3">▶ 2nd CURRENT LIMIT.</th> </tr> <tr> <th colspan="3">▼ SPEED LOOP</th> </tr> <tr><td>LSP</td><td>Low speed</td><td>5 Hz</td></tr> <tr><td>TLS</td><td>Low speed time out</td><td>No</td></tr> <tr><td>HSP</td><td>High Speed</td><td>50 Hz</td></tr> </tbody> </table>	▼ APPLICATION FUNCT.			RRS	Reverse input assignment	LI2 high	JOG	Jog assignment	No	JPF	Skip frequency	0 Hz	▼ RAMP			ACC	Acceleration ramp time	0.1 s	DEC	Deceleration ramp time	0.1 s	RPT	Type of reference ramp	Linear	RPS	Ramp switching input	No	AC2	Acceleration 2 ramp time	5 s	DE2	Deceleration 2 ramp time	5 s	BRA	Decel ramp adaptation	Yes	▼ PRESET SPEEDS			PS2	2 preset speeds assign.	LI3 high	PS4	4 preset speeds assign.	No	PS8	8 preset speeds assign.	No	SP2	Preset speed 2	35 Hz	SP3	Preset speed 3	15 Hz	SP4	Preset speed 4	20 Hz	SP5	Preset speed 5	25 Hz	SP6	Preset speed 6	30 Hz	SP7	Preset speed 7	35 Hz	SP8	Preset speed 8	40 Hz	▶ PID REGULATOR			▶ 2nd CURRENT LIMIT.			▼ SPEED LOOP			LSP	Low speed	5 Hz	TLS	Low speed time out	No	HSP	High Speed	50 Hz
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AC2	Acceleration 2 ramp time	5 s																																																																																							
DE2	Deceleration 2 ramp time	5 s																																																																																							
BRA	Decel ramp adaptation	Yes																																																																																							
▼ PRESET SPEEDS																																																																																									
PS2	2 preset speeds assign.	LI3 high																																																																																							
PS4	4 preset speeds assign.	No																																																																																							
PS8	8 preset speeds assign.	No																																																																																							
SP2	Preset speed 2	35 Hz																																																																																							
SP3	Preset speed 3	15 Hz																																																																																							
SP4	Preset speed 4	20 Hz																																																																																							
SP5	Preset speed 5	25 Hz																																																																																							
SP6	Preset speed 6	30 Hz																																																																																							
SP7	Preset speed 7	35 Hz																																																																																							
SP8	Preset speed 8	40 Hz																																																																																							
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▶ 2nd CURRENT LIMIT.																																																																																									
▼ SPEED LOOP																																																																																									
LSP	Low speed	5 Hz																																																																																							
TLS	Low speed time out	No																																																																																							
HSP	High Speed	50 Hz																																																																																							
20	Select: INPUTS / OUTPUTS CFG Set TCC to 2 wire. Set TCT to Transition.	<table border="1"> <thead> <tr> <th colspan="3">▼ INPUTS / OUTPUTS CFG</th> </tr> </thead> <tbody> <tr><td>TCC</td><td>2 / 3 wire control</td><td>2 wire</td></tr> <tr><td>TCT</td><td>Type of 2 wire control</td><td>Transition</td></tr> <tr><td>NPL</td><td>LI Active at</td><td>POS</td></tr> <tr><td>R1</td><td>Relay output 1 assignment</td><td>No drive fit</td></tr> <tr><td>TOL</td><td>Overload Time Detect.</td><td>0 s</td></tr> <tr><td>LOC</td><td>Ovld Threshold Detection</td><td>90 %</td></tr> <tr><td>FTO</td><td>Ovld time Before Restart</td><td>0 min</td></tr> <tr><td>ULT</td><td>Underid T. Delay Detect.</td><td>0 s</td></tr> <tr><td>LUL</td><td>Unld.Thr. at O speed</td><td>60 %</td></tr> <tr><td>FTU</td><td>Unld Time Before Restart</td><td>0 min</td></tr> <tr><td>FTD</td><td>Motor freq. threshold</td><td>50 Hz</td></tr> <tr><td>CTD</td><td>Motor current detection</td><td>1.4 A</td></tr> <tr><td>TTD</td><td>Motor thermal threshold</td><td>100 %</td></tr> </tbody> </table>	▼ INPUTS / OUTPUTS CFG			TCC	2 / 3 wire control	2 wire	TCT	Type of 2 wire control	Transition	NPL	LI Active at	POS	R1	Relay output 1 assignment	No drive fit	TOL	Overload Time Detect.	0 s	LOC	Ovld Threshold Detection	90 %	FTO	Ovld time Before Restart	0 min	ULT	Underid T. Delay Detect.	0 s	LUL	Unld.Thr. at O speed	60 %	FTU	Unld Time Before Restart	0 min	FTD	Motor freq. threshold	50 Hz	CTD	Motor current detection	1.4 A	TTD	Motor thermal threshold	100 %																																													
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21	Select: File->Save or use the icon in the toolbar, to save your configuration.	
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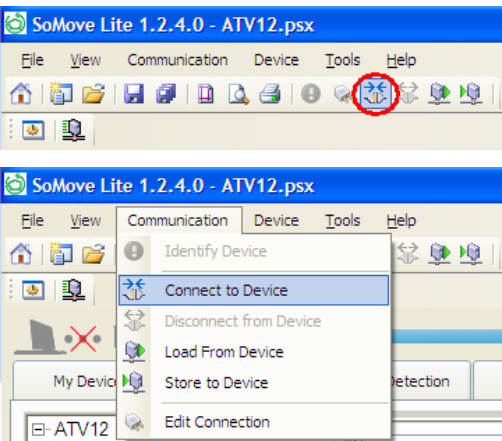
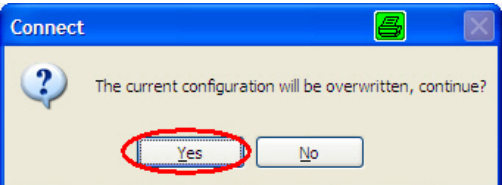
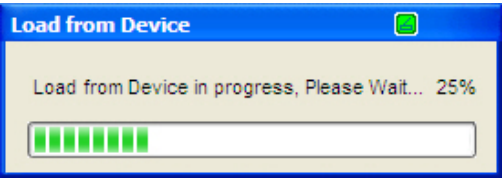
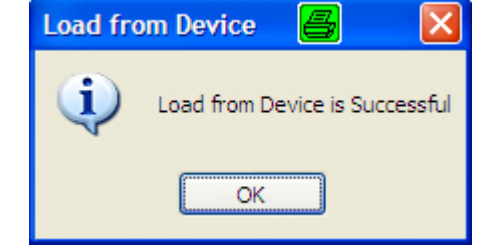
Download the Configuration

1	Check that the PC is connected to the Altivar drive. For this use the cable TCSMCNAM3M002P.	
2	To download the configuration to the drive click on the icon to the right of the tool bar	

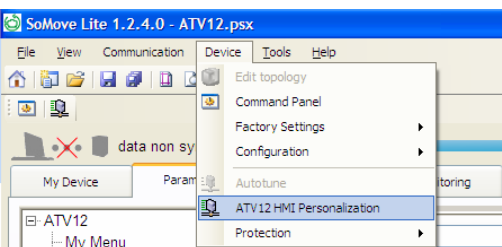
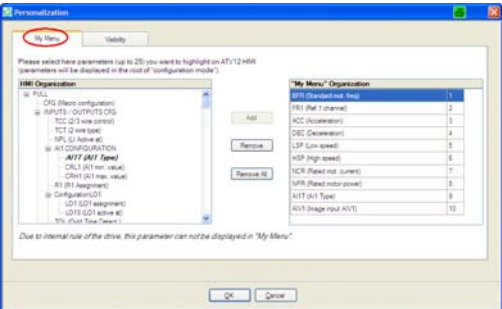
3	Before continuing, read the notification carefully and press the appropriate keys.	 DANGER UNINTENDED EQUIPMENT OPERATION A machine controlled by this software can be prone to unintended operation. This software is for set-up and commissioning purposes only. - Do not use this software for real time control of the devices. - The user must have a hardwired STOP device or disconnect switch to ensure it is possible to stop the equipment. - The user must ensure guards are in place so that unintended operation will not cause injury to personnel or damage to equipment. - The user must read and understand the help file for this Testing and Commissioning Software, and the device User Manuals, and know how to operate the equipment. - Check that any modification of the current device configuration is compatible with the wiring diagram used. - It is strongly recommended to: - Disable the screensaver. - Close the other applications. Failure to follow these instructions will result in death or serious injury. If you agree to follow these instructions, press 'Alt+F'. Cancel
4	A progress bar is displayed during the download.	 Store to Device Store to device, Please Wait... 22%
5	After the data transfer has been accomplished a message informs you about the successful download.	 Store to Device Store to device is Successful. OK
5	For the drive to operate with the new parameters, a power cycle (on, off, on) is required.	

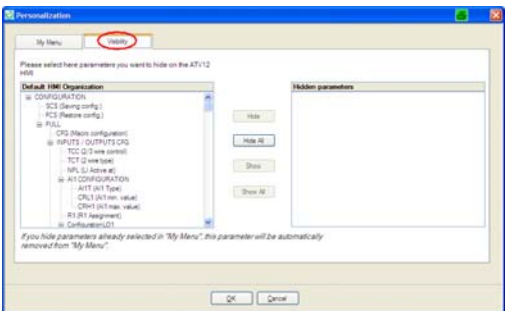
 WARNING
UNINTENDED EQUIPMENT OPERATION After making any configuration changes or adjustments, be sure to cycle power (remove and reapply power) on the drive. Failure to follow these instructions can cause death, serious injury or equipment damage.

Connect to device / upload the configuration

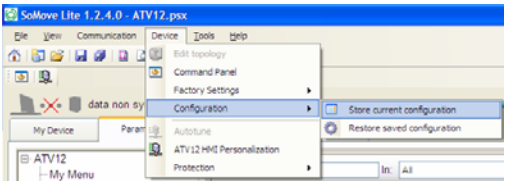
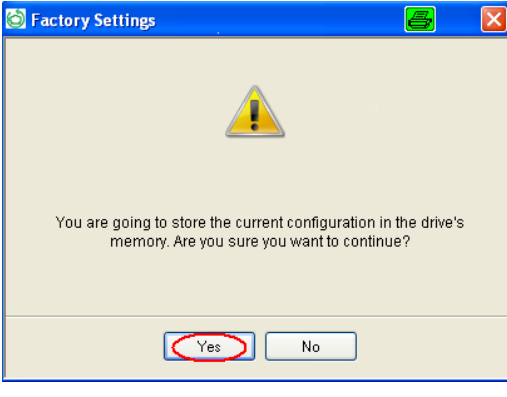
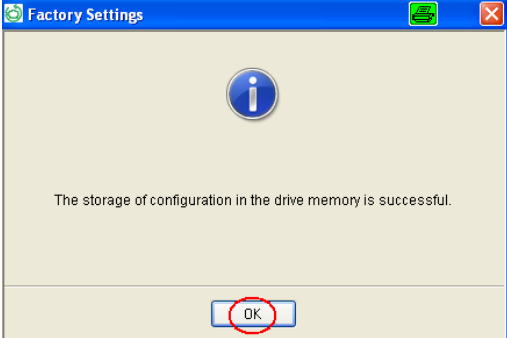
1	To connect to the device click on the appropriate icon in the toolbar or select: Communication -> Connect to Device	
2	To upload the configuration from the device to the PC confirm by clicking on Yes. Note: The configuration file in the PC will be overwritten.	
3	A progress bar is displayed during the upload.	
4	After the data transfer has been accomplished a message informs you about the successful upload.	

HMI Personalization

1	With SoMove you can configure the main menu of your ATV to make navigation easier. Select: Device -> ATV12 HMI Personalization	
2	Tab: MyMenu Here you can customize the main menu of the ATV12 by selecting the items to be shown.	

3	Tab: Visibility Here you can select the parameters which should not be shown on the ATV12 display.	
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Store current configuration on ATV12

1	To permanently store the downloaded configuration into the drive, select: Configuration -> Store current configuration	
2	In the following dialog screen you are asked to store the current configuration in the drive's memory. Confirm with Yes.	
3	After the configuration has been stored a message is being displayed. Close the dialog by clicking OK.	

Appendix

Detailed Component List

The following order list contains the major components of the Simple HW Zelio architecture.

Cabinet

Hardware-Components – Group 1: Cabinet (Circuitry, 24 Volt Supply, etc.)				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
1.1	1	Cabinet, 600 x 600 x 400mm	NSYS3D6640P	
1.2	1	Circuit breaker C60N 2 pole, 2 A, C	23747	
1.3	1	Filter fan, 230 Vac, 85 m³/h	NSYCVF85M230PF	
1.4	1	Outlet filter	NSYCAG125LPF	
1.5	1	Thermostat for fan, 0..60°C, 1 NO	NSYCCOTHO	
1.6	1	Circuit breaker C60N 2 pole, 3 A, D	24518	
1.7	1	Phaseo power supply, 24 Vdc – 1.2 A	ABL8MEM24012	
1.8	1	Motor circuit breaker, 2.5 A	GV2L07	
1.9	1	Plug-in Auxiliary contact for contactor, 1x NO, 1x NC	GVAE11	
1.10	1	Contactor, 9 A, 24 Vdc, 3 pole, AC3, 1 NO+1 NC (2 Contactors for reverse mode)	LC1D09BD	
1.11	2	Alarm lamp white, flat profile, 24 Vdc, LED, Indicator system on and power outage	XB5AVB1	

Master Switch

Components for Group 1: Master Switch				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
1.12	1	Disconnect switch Harmony Vario	VCD0	

Alternative TeSysU

Alternative – Components for Group 1 – instead of Items 1.8 ..1.10				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
1.13	1	TeSysU Basic Device for Reverse Mode	LU2B12BL	
1.14	1	TeSysU control Unit, 1.25..5 A	LUCA05BL	
1.15	1	TeSysU Function Module, incl. 2 Aux. switches	LUFN20	
1.16	2	TeSysU Aux. Contacts block	LUA1C20	

Emergency Stop

Hardware Components – Group 2: Emergency Stop in cabinet				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
2.1	1	Mushroom head red-yellow (Emergency Stop)	ZB5AS844	
2.2	1	Contact block for Emergency Stop Switch, 2 NC	XB5AZ141	
2.3	1	Emergency Stop label, red-yellow, 90 mm Diameter	ZBY8330	
2.4	1	External Emergency Stop switch housing	XALK178G	

Additional Functional Safety

Components for Group 2: additional functional safety				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
2.5	1	Contactor, 9 A, 24 Vdc operation, 3 pole, AC3, 1 NO+1 NC (2 Contactors for reverse mode)	LC1D09BD	
2.6	1	Illuminated button blue, flat profile, 24 Vdc, LED, Aux switch 1 NO / 1 NC	XB5AW36B5	

Zelio

Hardware components – Group 3: Control components				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
3.1	1	Zelio Logic Smart Relay Compact with 20 I/O, 24 Vdc Version	SR2B201BD	FW 4.03
3.2	1	Option: EEPROM Memory Module for storing the application	SR2MEM02	

Drive

Hardware components – Group 4: Drive components				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
4.1	1	Altivar 12 variable speed drive	ATV12H018M2	V1.2IE01

Field Installation

Hardware-Components – Group 5: Field devices				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
5.1	2	Limit switch Universal (2x End position)	XCKP2118P16	
5.2	1	Compact-Signal station, orange blink light, LED, 24 Vdc	XVBL1B5	

Option External switch Block

Optional Components for external switch housing				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
6.1	1	4-button push button housing, empty	XALD04	
6.2	2	Illuminated button green flat, 24 Vdc, LED, Aux Switch 1 NO / 1 NC	XB5AW33B5	
6.3	1	Illuminated button red flat, 24 Vdc, LED, Aux Switch 1 NO / 1 NC	XB5AW34B5	
6.4	1	3-position-switch	XB5AD33	

Software Components

Software-Components – Group 2				
Pos.	Qty.	Description	Part Number	Rev/ Vers.
7.1	1	Zelio Soft configuration software	SR2SFT01	4.4
7.2	1	Zelio Programming cable, USB	SR2USB01	
7.3	1	Option: Zelio Programming cable, 9-pin Sub D	SR2CBL01	
7.4	1	SoMove Lite, available by download from http://www.schneider-electric.com	web download	V1.2.4.0
7.5	1	USB cable for SoMove Lite	TCSMCNAM3M002P	

Component Protection Classes

Location /
Protection
Class

Components	In the Field, On site			Cabinet		
				Front		inside
	IP54	IP65	IP67	IP55	IP65	IP20
Harmony E-Stop switch		X				X
Vario Disconnect Switch VCD0					X	X
TeSysD Contactor LC1D						X
TeSys GV2L Motor Circuit breaker						X
TeSysU Motor Starter Combination						X
Altivar 12 variable speed drive						X
Phaseo ABL8 Power Supply						X
Harmony Emergency Stop switch XPSAC						X
Zelio Logic Smart Relay						X
Illuminated switches, series Harmony, with housing		IP66				
Harmony Compact tower light XVB		X				
OsiSense limit switch XCK			X			
Filter and fan				IP40		
Fan thermostat						X

Component Features

Components

Zelio Logic Smart Relay Compact – SR2PACK2BD (package includes software and hardware, plus programming cable SR2USB01):

- 24 Vdc
- 12 digital inputs incl. 6 analog inputs with 8 bit resolution
- 8 digital relay outputs with 8 amp power
- Status of I/O in Display
- Timer and Counter variables adjustable via display

Front operator panel for Ladder and FBD programming (**no PC required**); also possible via PC using Zelio Soft software.



Zelio Logic Software SR2SFT01

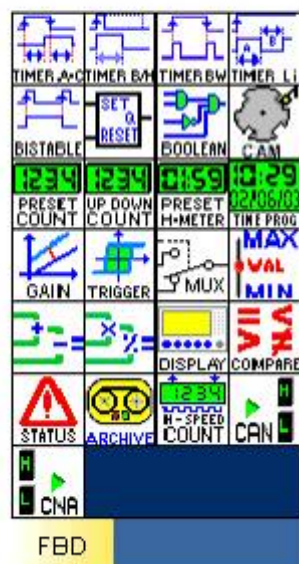
Zelio software functions – LADDER:

- User-friendly “free input” mode: LADDER or FBD (electrical symbols)
- 120 lines for control tasks
- 5 contacts + 1 memory per program line

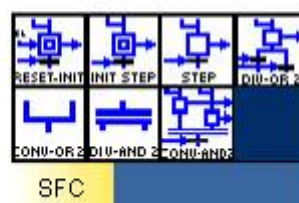
	16 text function blocks		28 auxiliary relays
	16 timers		8 counter comparators
	16 up/down counter		LCD screen with programmable back lighting
	1 fast counter		automatic 1 hour clock change: summer/winter
	16 analogue Comparators		diversity of coil functions: with memory (set/reset), remote switch, contactor,
	8 clocks		

Zelio software functions – Function Block Diagram/FBD:

The following figure shows the Standard Functions function bar :



The following figure shows the SFC function bar:



The following figure shows the [Logic Functions](#) bar:



The following figure shows the [inputs](#) function bar :



The following figure shows the [Outputs](#) function bar:



Phaseo Power Supply ABL8MEM24012

- 100..240 Vac / 24 Vdc
- 1.2 A secondary
- Short-circuit-proof



Altivar Variable Speed Drive ATV12 H018M2

- 0.18 kW, 230 Vac single phase
- Integrated EMC Filter
- Temperature range: - 10..+ 50°C
- Speed range 1 to 20 (0.5...400 Hz)
- Speed control using Flow Vector Control
- Drive and motor protections
- Compact profile, In-row mounting on a DIN rail



Motor starter combination TeSysU: LU2B12BL+ LUCA05BL

- Motor output up to 1.5 kW
- Reversing contactor control with elect. and mech. interlock
- Tripping current, adjustable within the range 1.25...5 A
- Trip feedback via auxiliary contacts
- Optional activation of a brake using auxiliary contacts
- Compact dimensions
- Minimum wiring requirements



TeSys Motor circuit breaker

- Motor circuit breaker
- Isolating switch: GV2L07
- 33.5 A magnetic activation



TeSysD Contactor LC1D09BD

- Rated current 9 A, AC3
 - 1x NO contact
 - 1x NC contact
 - 24 Vdc control voltage incl. suppressor circuit
-



Contact

Homepage	http://www.schneider-electric.com
As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.	
