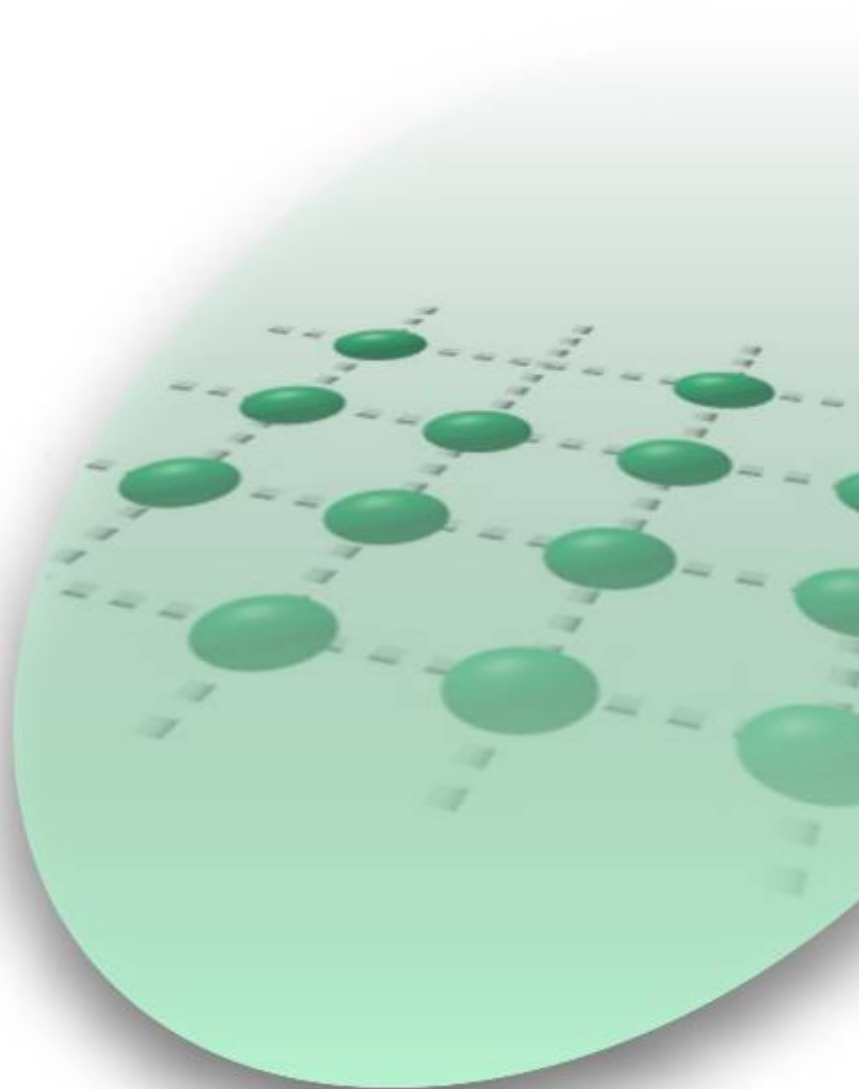
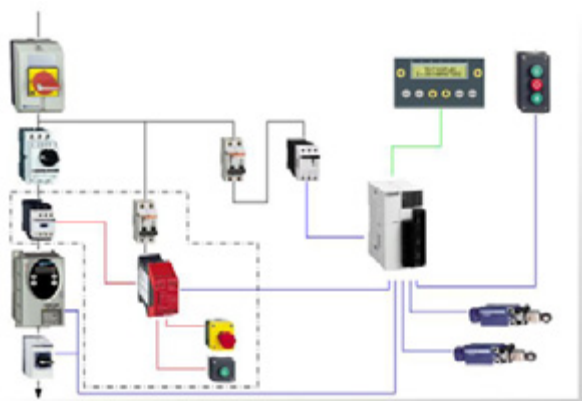


Twido and Altivar Magelis XBT-N200 and Preventa with Osiswitch *System User Guide* [source code]



33003843.00

Merlin Gerin
Square D
Telemecanique

Schneider
 **Electric**
Building a New Electric World

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Introduction

This document is intended to provide a quick introduction to the described System. It is **not** intended to replace any specific product documentation. On the contrary, it offers additional information to the product documentation, for installing, configuring and starting up the system.

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.

Abbreviations

Word / Expression	Signification
AC	Alternating Current
Advantys	SE product name for a family of I/O modules
Altivar (ATV)	SE product name for a family of VSDs
CANopen	Name for a communications machine bus system
CB	Circuit Breaker
CoDeSys	Hardware-independent IEC 61131-3 programming software
ConneXium	SE product name for a Family of Transparent Factory devices
DC	Direct Current
EDS	Electronic Data Sheet
E-OFF, E-STOP	Emergency Off switch
Harmony	SE product name for a family of switches and indicators
HMI	Human Machine Interface
I/O	Input/Output
ICIA (ICLA)	SE product name for a compact drive
Lexium/Lexium05/LXM	SE product name for a family of servo-drives
Magelis	SE product name for a family of HMI-Devices
MB - SL	SE name for a serial Modbus communications protocol
Micro	SE product name for a middle range family of PLCs
NIM	SE product name for a Network Interface Module
PC	Personal Computer
Phaseo	SE product name for a family of power supplies
PLC	Programmable Logic Computer
Powersuite	An SE software product for configuring ALTIVAR drives
Premium	SE product name for a middle range family of PLCs
Preventa	SE product name for a family of safety devices
PS1131 (CoDeSys)	SE Product name for PLC programming software with CoDeSys
PS	Power Supply
SE	Schneider Electric
Sycon	SE product name of a Field bus programming software
Telefast	SE product name for a series of distributed I/O devices
Tesys U	SE product name for a decentralised I/O System
Twido	SE product name of a middle range family of PLCs
TwidoSoft	SE product name for a PLC programming software
Unity (Pro)	SE product name for a PLC programming software
Vijeo Designer	An SE software product for programming Magelis HMI devices
VSD	Variable Speed Drive
WxHxD	Dimensions : Width, Height and Depth
XBT-L1000	An SE software product for programming Magelis HMI devices

Application Source Code

Introduction

Examples of the source code used to attain the system function as described in this document can be downloaded from our „Village“ website under [this](#) link.

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
AIW	Configuration File	Advantys
CNF	Configuration File	Sycon
CO	CANopen definitions file	Sycon
CSV	Comma Separated Values, Spreadsheet	Twidosoft
CTX		Unity
DCF	Device Configuration File	Advantys
DIB	Device Independent Bitmap	Sycon
DOC	Document file	Microsoft Word
DOP	Project File	Magelis XBTL
EDS	Electronic Data Sheet – Device Definition	Industrial standard
FEF	Export file	PL7
GSD	EDS file (Geraete Stamm Datei)	Profibus
ISL	Island file, project file	Advantys
PB	Profibus definitions file	Sycon
PDF	Portable Document Format - document	Adobe Acrobat
PS2	Export file	Powersuite export file
RTF	Rich Text File - document	Microsoft Word
STU	Project file	Unity studio
STX	Project file	PL7
TLX	Project file	Twinline control tool
TWD	Project file	TwidoSoft
VDZ	Project file	Vijeo Designer
XEF	Export file	Unity Pro
ZM2	Project File	Zeliosoft

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:

Industry

- Small automated machine or plant components.
- Remote automation systems used to supplement large and medium-sized machines.

Buildings/Services

- Goods elevators, e.g., for use in cafeterias or hospitals.
- Climate management in greenhouses.

Application	Description	Image
Freight or goods elevators	This application is used in the implementation of goods elevators, which are for example, used in canteens and hospitals.	
Greenhouses	This application is used to open/close greenhouse windows and shutters to regulate the climate in the greenhouse.	

System

Introduction

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

Architecture

General

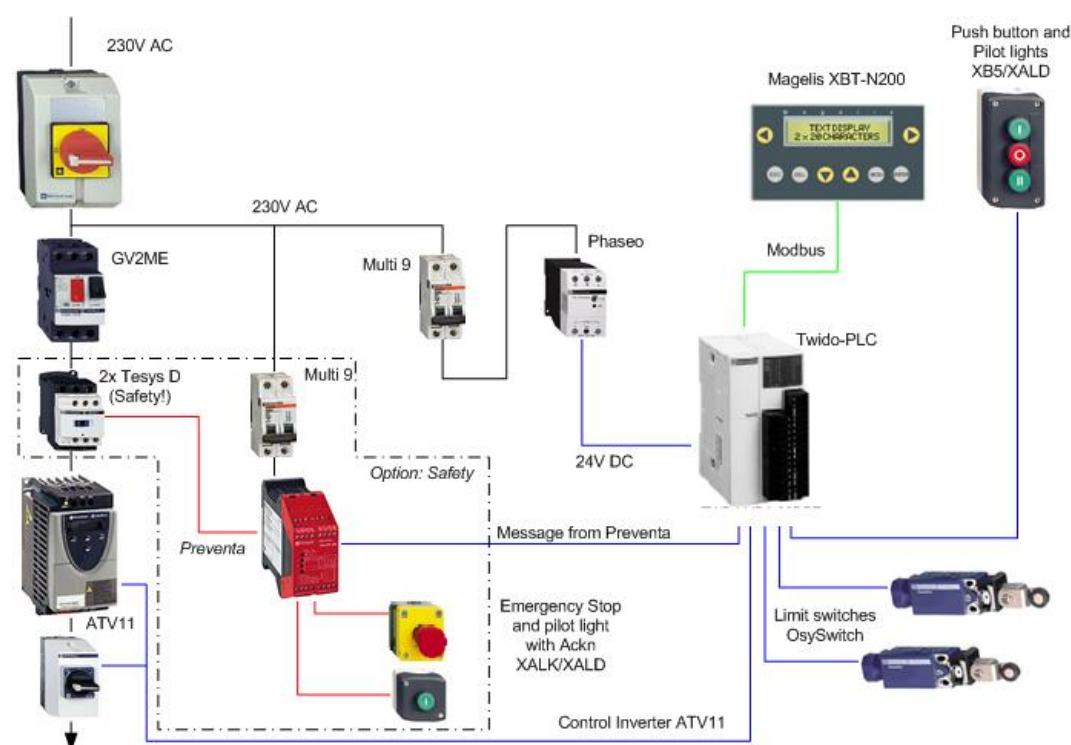
The control section of this application consists of a PLC, which can be controlled via push buttons or a Magelis panel. The load section is implemented using an Altivar VSD, which also controls changes of direction, and an additional lockable maintenance switch, which is located between the drive and the motor.

In this case, an emergency stop switch is used to initiate shut down and ensure the (optional) safety. The emergency stop switch activates a Preventa analyzing unit and, in the event of an emergency, shuts down the redundant conductors before the drive (safety category 3).

The system also has two limit switches, which limit the motor's path of travel.

An additional sensor, which can be used to implement approximate position control via the pulse rate, can be included as an option.

Layout



Components**Hardware:**

- Vario VCD master switch (with red and yellow knob)
- Vario VBF master switch (as maintenance switch with black knob)
- GV2ME motor circuit breaker
- Altivar ATV11 variable speed drive
- XALK locking-type emergency stop switch with rotary unlocking (tamper-proof)
- Phaseo ABL7 power supply unit
- TWIDO modular PLC
- Magelis XBT-N200 compact operator terminal
- XB5 selector switches, push buttons and indicator lamps, from the Harmony Style 5 range
- XCK OsiSwitch roller limit switches
- Standard AC motor

Software:

- Twidosoft 3.2
 - PowerSuite 1.5 (option)
 - Magelis XBT-L 1000 V4.42
-

Quantities of components

Only one unit is needed per system component to fulfill the requirements of the specified task (with the exception of roller limit switches, contactors and buttons/indicator lamps).
A detailed list of the required components, including quantities and part numbers, can be found in the Appendix to this SMD (System Manual Document).

Degree of Protection

Not all of the components used within this configuration have been designed to withstand the full range of environmental conditions in the field. These components will, therefore, require additional protection and are only suitable for installation in a control cabinet. For information about which components are suitable for direct installation on site, please refer to the list provided in the Appendix (column headed "In the field, on site", which also indicates the relevant IP protection class).

Technical data

Supply voltage	230 V AC
Total supply output	~ 3.5 kW
Motor output	≤ 0.75 kW
Motor brake	No
Connector cross-section	3x 2.5mm ² (L, N, PE)
Safety category	Cat. 3 (optional)

Safety notice

In this application example, Category 3 (according to EN 954-1) has been selected for the purpose of ensuring safety. The issue of whether a safety category (1-4) is to be adopted and, if so, which one, will be determined by the system's design and the overall extent to which this system represents a hazard to people and machinery. Safety category 3, based on EN 954-1, is the second highest category there is.

Size/Dimensions

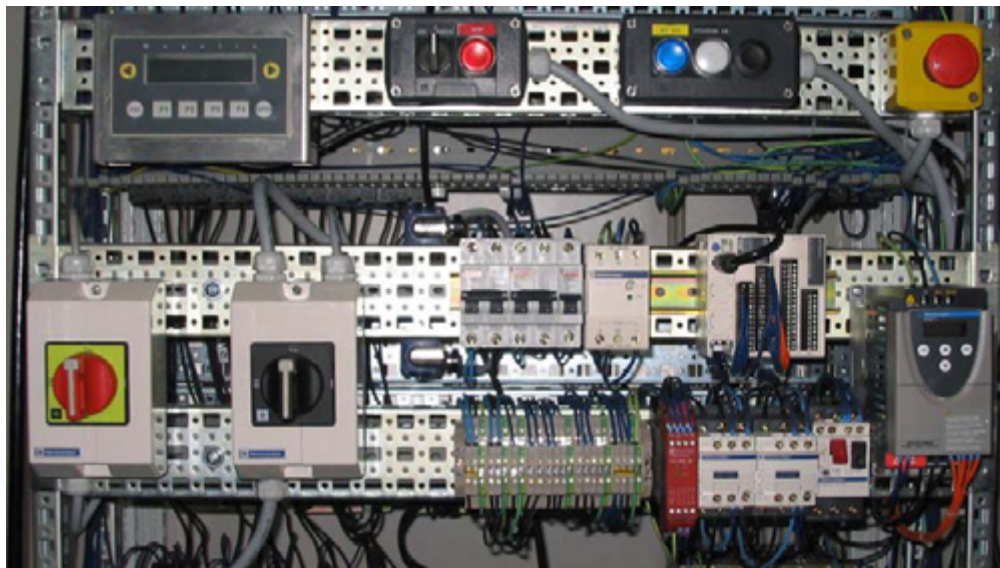
The compact dimensions of the devices used, e.g., the PLC and PS, mean that the components can be installed in a small control cabinet with the following external dimensions: 350 x 350 x 210 mm (WxHxD).
Furthermore, the display elements used to indicate a "group error" and "no protection" can be built into the door of the control cabinet along with the system master switch and emergency stop master switch.

Installation

Introduction

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

Assembly



Notes

This application was configured to control the amount of light and climate control in a greenhouse.

The components and I/O points listed below represent a cross-section of the components and signals that are the essential minimum for control and display purposes and a select number of optional inputs and outputs which can be used in conjunction with most typical applications (safety/maintenance switches).

This document does not claim to be comprehensive and **does not absolve users** of their duty to check the safety requirements of their equipment and to ensure compliance with the relevant national or international rules and regulations in this respect.

Safety category 3, which is suggested here as one possible option, is not necessarily required or adequate for every application. A risk analysis normally defines the safety category to be used. A risk analysis, in accordance with the national and/or international standards and regulations in force, must be drawn up and verified for each individual system.

PLC wiring

Twido PLC inputs	Description
DC In 0	Not used, reserved for high-speed counters
DC In 1	Not used, reserved for high-speed counters
DC In 2	Open selector switch
DC In 3	Close selector switch
DC In 4	Stop button
DC In 5	Limit switch open
DC In 6	Limit switch closed
DC In 7	Motor circuit breaker OK
DC In 8	Variable speed drive OK (RC terminal)
DC In 9	Maintenance switch OK (option)
DC In 10	Safety present (option)
DC In 11	Spare

Twido PLC outputs	Description
Trans. Out Q0	PLC ON (24 V)
Trans. Out Q1	Group fault (24 V)
Relay Out Q2	Input LI1 ATV11 (clockwise rotation, close)
Relay Out Q3	Input LI2 ATV11 (counterclockwise rotation, open)
Relay Out Q4	Input LI3 ATV11 (select bit 0, JOG frequency)
Relay Out Q5	Spare (24 V)
Relay Out Q6	Spare (24 V)
Relay Out Q7	Input LI3 ATV11 (select bit 1, JOG frequency)

Twido 24 V supply	Description
Com (inputs)	0 V DC reference voltage
-V	0 V DC reference voltage
Com (+)	+24 V DC
Com 1	+15 V DC (ATV11 potential)
Com 2	+24 V DC
Com 3	+15 V DC (ATV11 potential)

VSD control circuit wiring


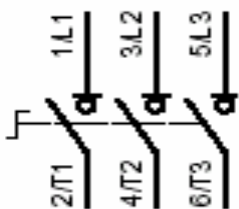

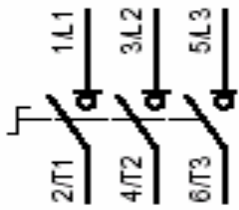

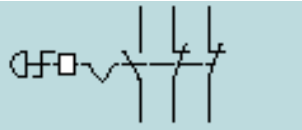
ATV11	Description
LI1	Twido relay Out Q2
LI2	Twido relay Out Q3
LI3	Twido relay Out Q4
LI4	Twido relay Out Q7
RA	+24 V DC
RC	Twido In 8
+15 V	Twido Com 1 and Com 3

Hardware

General


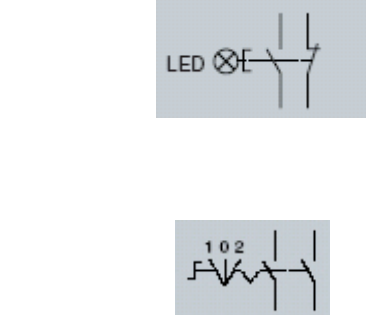

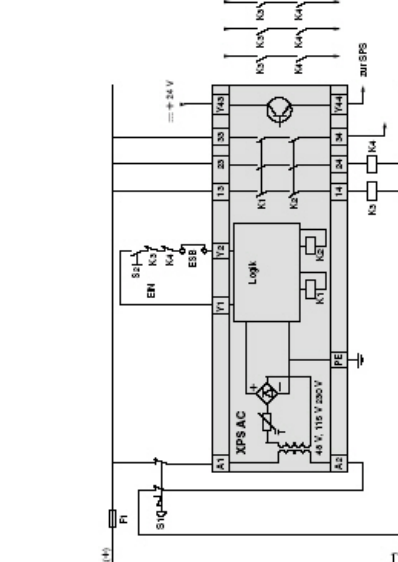

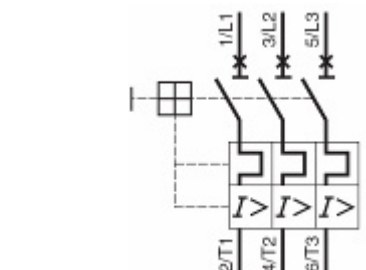

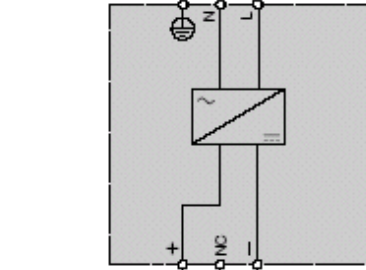
- The components designed for installation in a control cabinet, i.e., Twido PLC, Phaseo power supply unit, emergency stop switching device, line circuit breaker, contactors and motor circuit breaker, can be snapped onto a 35 mm top-hat rail.
- The Altivar variable speed drive can also be installed in a control cabinet, but requires an adapter bracket.
- Emergency stop, master and maintenance switches are designed for backplane assembly in the field; all switches can also be installed directly in a control cabinet (e.g., on control cabinet door) without their enclosing housings.
- There are two options available for mounting XB5 push buttons and indicator lamps:
 1. option: Using a 22 mm hole drilled into the front door of the control cabinet in the appropriate position.
 2. option: Using an XALD housing, which can house up to 5 push buttons or indicator lamps. This XALD is designed for backplane assembly or direct wall mounting.
- 230 V AC wiring between mains switch, emergency stop switch and relay, 24 V supply (primary), as well as motor circuit breaker, load relay and VSD.
- 24 V DC wiring between power supply unit, PLC, push buttons, indicator lamps and VSD control circuit.
- Drive wiring via relay contacts with potential voltage from the drive (neither 24 V DC nor 230/400 V AC).

Components

Mains switch VCF-02GE (red/yellow switch)		
Maintenance switch VBF-02GE (black switch)		
EMERGENCY STOP switch XALK178G		


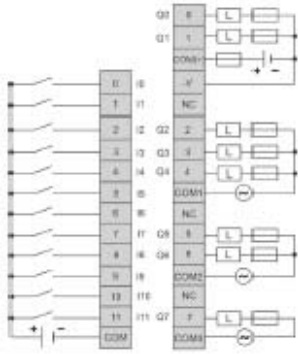

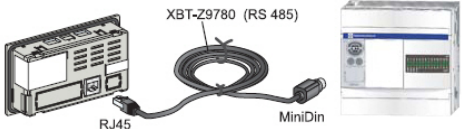

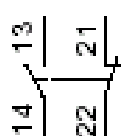

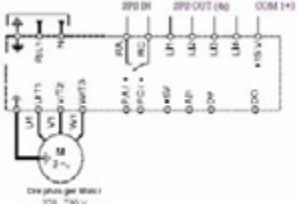
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Components
Contd.

<p>Harmony Style 5 selector and push button switch with indicator lamp</p> <p>XB5</p>		
<p>EMERGENCY STOP fault relay</p> <p>XPS AC3721</p>		
<p>Motor circuit breaker</p> <p>Circuit breaker GV2-ME16</p>		
<p>Phaseo power supply unit</p> <p>ABL7CEM24012</p>		

Continued on next page

Components
Contd.

<p>Twido PLC</p> <p>TWDLMDA 20DRT</p>	 <p>TWDLMDA 20DRT</p>	
<p>Magelis operator terminal</p> <p>XBT-N200</p>		
<p>Osyris roller limit switch</p> <p>XCD2118P16</p>		
<p>Altivar ATV11 variable speed drive</p> <p>ATV11PU18M2E</p>		

Software

General

Software is primarily used for programming the Twido, including creating the configuration for communication and assigning inputs and outputs. The **Twidosoft** programming tool is used for programming.

The HMI application on the Magelis operator terminal is configured using **XBT-L1000** software.

The Altivar 11 variable speed drive can be parameterized using the front operator panel. However, the **PowerSuite** software is a more user-friendly option and can be used for configuring the drive, saving data and quickly restoring existing data/configurations for maintenance purposes.

Powersuite can be used to optimize the parameters online.

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

- Windows 2000 *or*
- Windows XP

The software tools have the following default install paths:

- | | |
|--------------|---|
| • Twidosoft | <i>C:\Program Files\Schneider Electric\TwidoSoft</i> |
| • XBT-L1000 | <i>C:\Program Files\Schneider Electric\XBT-L1000</i> |
| • PowerSuite | <i>C:\Program Files\Schneider Electric\PowerSuite</i> |



TwidoSoft V3.2



XBT-L1000 V4.42



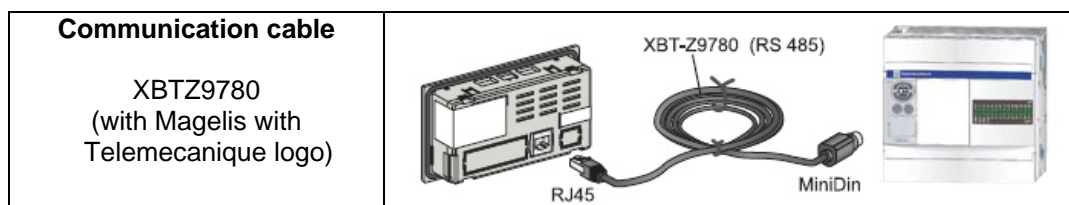
PowerSuite V1.5

Communication

General

A Modbus connection is used to exchange data between the Magelis terminal and the Twido PLC. The XBTZ9780 communication cable shown below is needed to connect these two devices. The software driver required for Modbus communication is already contained in the software packages for the Magelis panel and the Twido.

Magelis



Special Note for older Magelis XBT-N200

If you are using a Magelis XBT-N200 terminal **without the Telemecanique logo** (new model) on the front the connection cable to the Twido is **different** from the type shown above.

If your Magelis **DOES NOT** have the Telemecanique logo on the front you must use the cable **XBTZ978** (without a zero!).

If your Magelis has the Telemecanique logo on the front you must use the cable **XBT-Z9780** instead.

The detailed component list in this document refers to the newer XBT-N200 with the Telemecanique logo on the front.

Implementation

Introduction

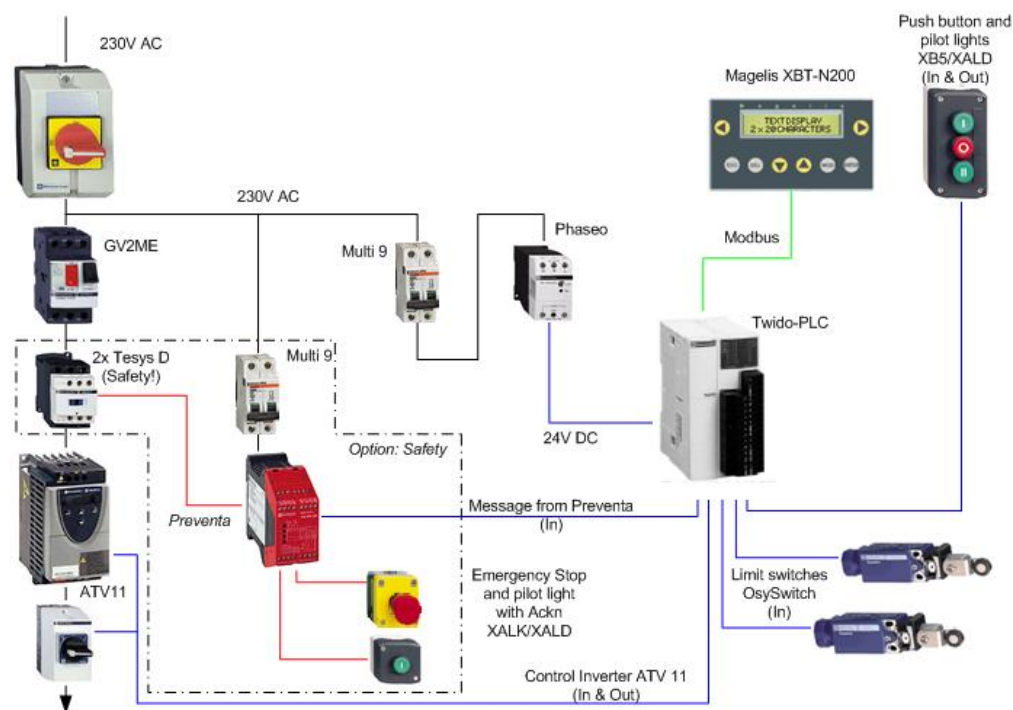
The implementation chapter describes all the steps necessary to initialise, to configure, to program and start-up the system to achieve the application functions as listed below.

Function

Functional description

1. All the conditions required to clear the group error lamp must be met, i.e., motor circuit breaker and maintenance switch switched on and safety circuit on. The group error message disappears and the Magelis panel is visible on the main screen.
 2. The motor can only be controlled in the “open”/“close” direction if the associated limit switch has not been pressed and no errors are pending.
 3. Push buttons: The selection for opening and closing can be activated via the selector switch. Invoking the motion function starts motion in the selected direction. Motion can be stopped by pressing the stop button, selecting the opposite direction or reaching the limit switch. It will also stop if an error occurs. Although operation is always possible via the push button housing, when this function is used, motion is always made at the lowest speed (1).
 4. Motion can also be activated by entering a “1” in the “open” or “close” parameter, as appropriate. Motion control via the Magelis panel is ignored if the push button housing selector switch is not in the centre position (priority circuit). Entering “0” in the parameter stops the drive, just as if the hardware stop button had been pressed.
 5. Speed pre-selection: The speed for the variable speed drive can be pre-defined via the Magelis terminal. A number from 0 to 3 can be entered (0 = lowest speed). The default setting is 0 and will also return to default when an error occurs.
 6. Faults: Faults are displayed as group errors via a fault indicator lamp or as individual fault messages on the Magelis panel.
-

Layout

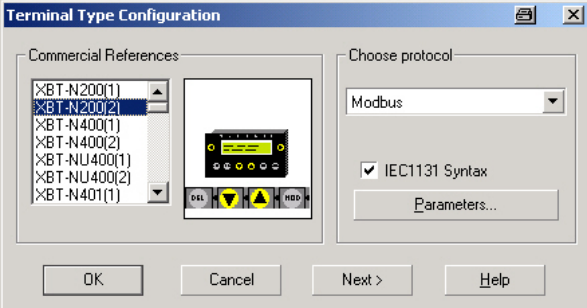
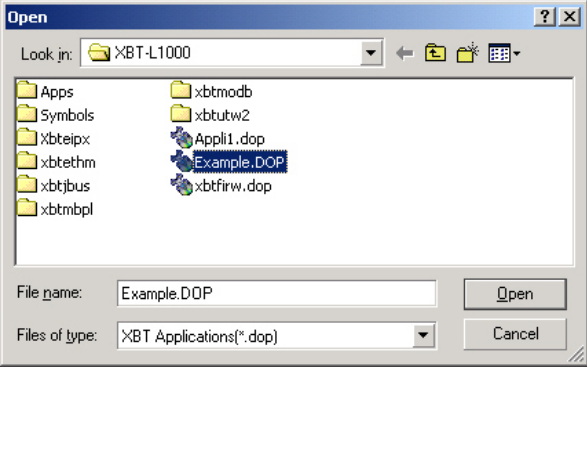


HMI

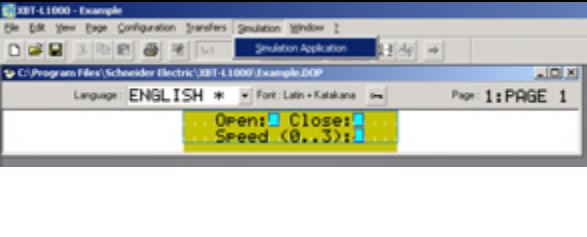
Introduction

This application features a compact Magelis XBT-N200 HMI, which is interfaced with the PLC via the Modbus protocol. To configure the Magelis, XBT-L1000 software is used. The procedure is explained in the following pages.

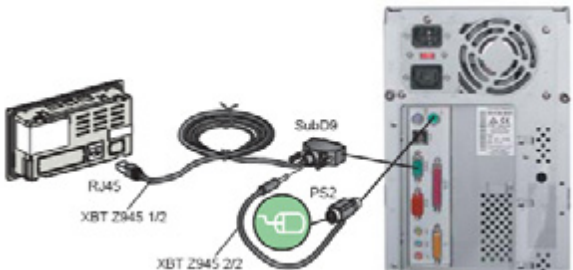
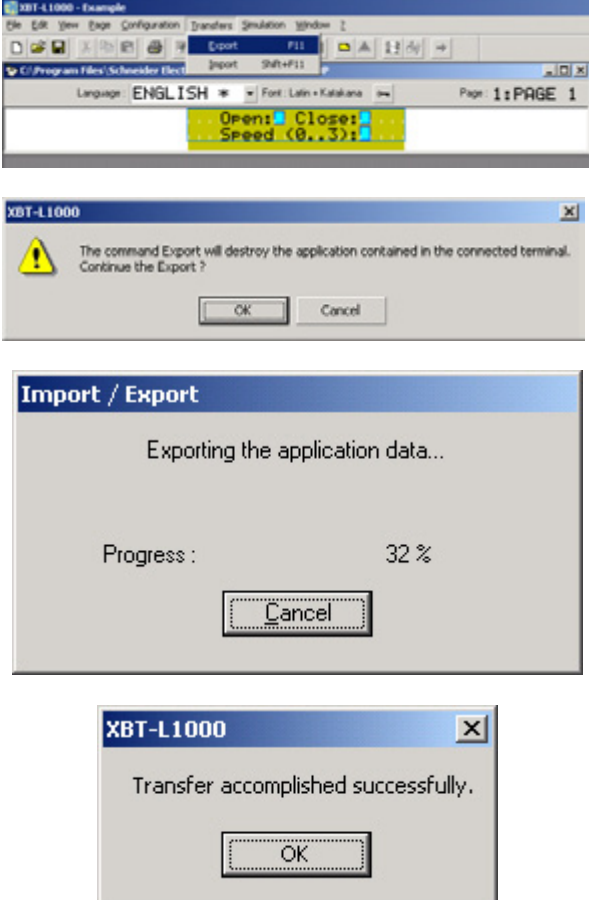
Programming/ Configuration

1	<p>When the XBT-L1000 program starts up, the configuration screen for creating a new application appears. Click Cancel to exit this dialog.</p>	 <p>The 'Terminal Type Configuration' dialog box is shown. It has a 'Commercial References' list on the left containing various XBT models. In the center is a small image of the XBT-N200 HMI. On the right, under 'Choose protocol', 'Modbus' is selected. There is a checkbox for 'IEC1131 Syntax' which is checked, and a 'Parameters...' button. At the bottom are 'OK', 'Cancel', 'Next >', and 'Help' buttons.</p>
2	<p>Select File->Open to go to the default path <i>C:\Program Files\Schneider Electric\XBT-L1000\Apps.</i></p> <p>This is where the Example.dop application should be stored.</p> <p>One of the HMI configured screens will appear when terminal programming is invoked.</p>	 <p>The 'Open' file dialog box is shown. The 'Look in' field shows 'XBT-L1000'. The file list contains folders like 'Apps', 'Symbols', 'xbtmodb', 'xbutw2' and files like 'Appli1.dop', 'Example.DOP', and 'xbtfirw.dop'. 'Example.DOP' is selected. The 'File name' field contains 'Example.DOP'. The 'Files of type' dropdown is set to 'XBT Applications (*.dop)'. 'Open' and 'Cancel' buttons are at the bottom right.</p>

Simulation

1	<p>The behaviour of the terminal can be simulated by selecting Simulation from the menu bar, followed by Simulation Application.</p>	 <p>The 'XBT-L1000 - Example' simulation window is shown. It has a menu bar with 'File', 'Edit', 'View', 'Page', 'Configuration', 'Transfers', 'Simulation', and 'Window'. Below the menu bar is a toolbar. The main area shows a simulation of the HMI screen with the text 'Open: Close: Speed <0..3>'. The status bar at the bottom indicates 'Language: ENGLISH', 'Font: Latin + Katakana', and 'Page 1: PAGE 1'.</p>
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Transferring a program

1	<p>In order to transfer the program from the PC to the terminal, the two must be connected to one another via the XBT-Z945 communication cable. The add-on-cable (XBT-Z945 2/2) between the SUB-D9 connector and the mouse adaptor is needed because the cable delivers also the power supply for the terminal.</p>	
2	<p>The application is transferred to the Magelis terminal by selecting Transfers from the menu bar, followed by Export.</p> <p>Before the download begins, a message appears, which you should confirm with OK.</p> <p>Two other windows will follow; the first informs you of the progress of the download and the second tells you that the transfer has been completed successfully.</p> <p>Confirm the action by pressing the OK button.</p>	
3	<p>You can now disconnect the programming cable from the Magelis terminal and re-insert the communication cable used for the link to the Twido. If the PLC is active, a "Connection in progress" message will appear on the panel shortly after the connection is made. This message disappears once the bus connection has been established successfully and the application is then displayed.</p>	

PLC

Introduction

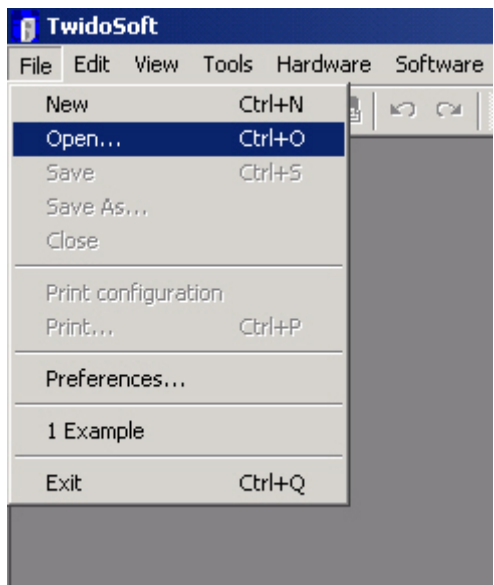
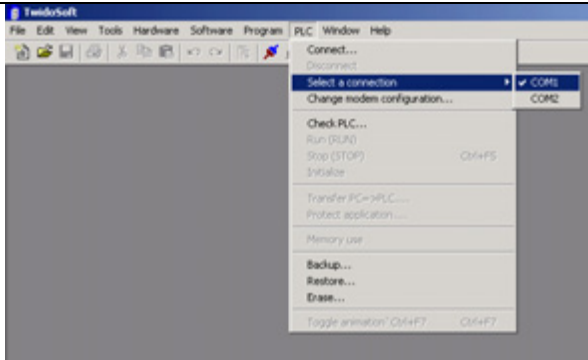
The PLC chapter describes how to initialize, parameterize and load the program to the PLC in order to implement the functional description described above. The PLC program is created with Twidosoft.

Pre-conditions

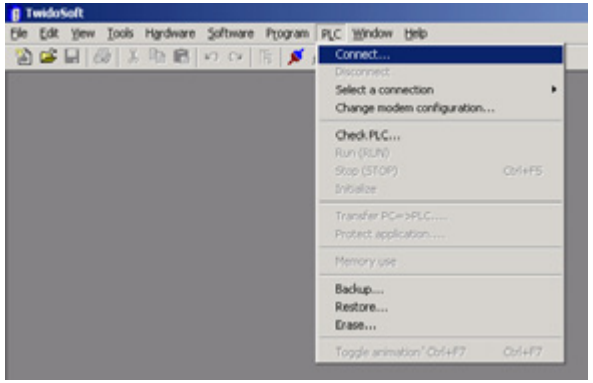

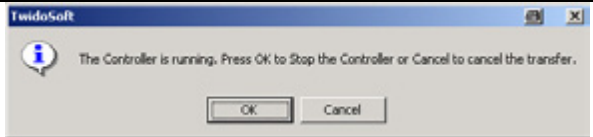
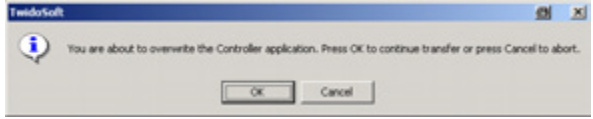
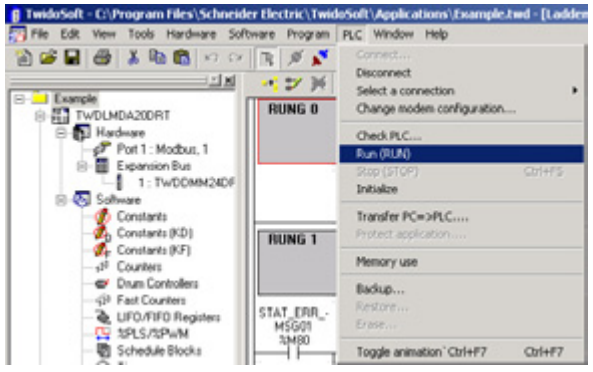
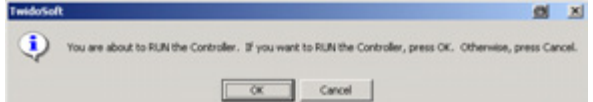
The following conditions must be met in order to carry out the steps described below:

- The Twidosoft programming tool is installed on your PC
- The "Example.twd" Twidosoft project is available in the default directory that has been set up (C:\Program Files\Schneider Electric\TwidoSoft\Applications)
- The Twido PLC is switched on and supplied with power
- The PLC and the PC are linked to one another via the PC <> Twido programming cable (TSXPCX1031).

Setting up communication

1	<p>Once the Twido programming software has been launched, start by calling up the "Example.twd" PLC program.</p> <p>To do this, select:</p> <p>File->Open</p> <p>The "Application" default directory in which the file should be located is displayed.</p>	 <p>The screenshot shows the TwidoSoft application window with the 'File' menu open. The 'Open...' option is highlighted, and its keyboard shortcut 'Ctrl+O' is displayed. Other menu items visible include 'New (Ctrl+N)', 'Save (Ctrl+S)', 'Save As...', 'Close', 'Print configuration', 'Print... (Ctrl+P)', 'Preferences...', '1 Example', and 'Exit (Ctrl+Q)'.</p>
2	<p>Once the program has been loaded, communication with the PLC must be set up. Select the</p> <p>PLC->Select a connection</p> <p>menu items to reach the selection dialog for the port being used; in this case, COM1.</p>	 <p>The screenshot shows the TwidoSoft application window with the 'PLC' menu open. The 'Select a connection' option is highlighted, and a sub-menu is visible showing 'COM1' and 'COM2'. Other menu items visible include 'Connect...', 'Disconnect', 'Change modem configuration...', 'Check PLC...', 'Run (RUN)', 'Stop (STOP)', 'Initialize', 'Transfer PC->PLC...', 'Protect application...', 'Memory use', 'Backup...', 'Restore...', 'Erase...', and 'Toggle animation'.</p>

Transferring and running a program

1	<p>In order to transfer the program, the PLC and the PC must remain connected to one another via the communication cable.</p> <p>Once this has been carried out, select</p> <p>PLC->Connect</p> <p>from the menu, in order to create an online connection to the PLC so that you can download the program.</p>	
2	<p>Before a program is downloaded to the PLC for the first time, Twidosoft informs you that the program and the PLC content are different. In this case, click on PC-> Controller to transfer the program to the PLC.</p>	
3	<p>If an application is already on the controller and running, Twidosoft asks you if it may stop the PLC and overwrite the existing application. Press OK to stop the controller and download the application.</p>	
4	<p>Now click on OK to overwrite the existing application in the controller.</p>	
5	<p>When the transfer is completely finished the controller needs to be started.</p> <p>Select</p> <p>PLC->Run</p> <p>or click on the run icon in the toolbar.</p>	
6	<p>To confirm the run action on the controller please click the OK button.</p>	

Data exchange

Introduction

In this chapter, the individual points between which data is transferred via a bus system, (e.g., Modbus, Modbus Plus or TCP/IP) and that are not linked to digital or analog hardware interfaces, are listed.

This list defines:

- The devices concerned in each case
- The direction of transfer
- The symbolic name *and*
- The direct bus address on the device concerned.

Reading and writing the data direction

Device 1 XBT-N200 (Modbus master)		Device 2 Twido (Modbus slave)	
Address	Designation	Address	Designation
%MW0:X0	Open	%MW0:X0	RMT_CMD_OPEN
%MW0:X1	Close	%MW0:X1	RMT_CMD_CLOSE
%MW1	Speed	%MW1	RMT_SPEED

Data direction (device 1 reads from device 2)

Device 1 XBT-N200 (Modbus master)		Device 2 Twido (Modbus slave)	
Address	Designation	Address	Designation
%MW101=2	Safety not OK	%M80	ERR_STAT_MESS01
%MW101=3	Motor protection off	%M81	ERR_STAT_MESS02
%MW101=4	Variable speed drive error	%M82	ERR_STAT_MESS03
%MW101=5	Maintenance switch off	%M83	ERR_STAT_MESS04
%MW101=6	Limit switch error	%M84	ERR_STAT_MESS05
%MW101=7	Spare error	%M85	ERR_STAT_MESS06

Devices

Introduction

This chapter describes the steps required to initialise and configure the devices to attain the described system function.


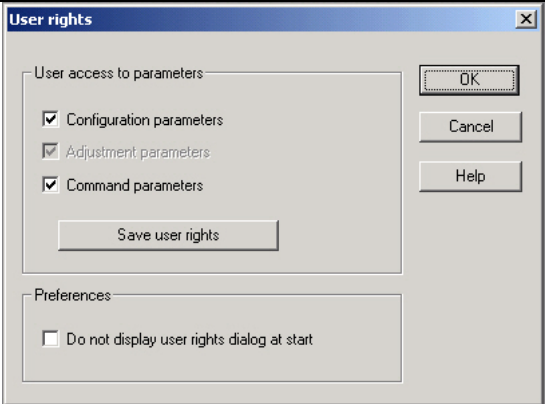

PowerSuite software is used to initialize and parameterize the devices.

General

The ATV11 parameters can be entered via the front panel on the device itself. However, using PowerSuite allows you to:

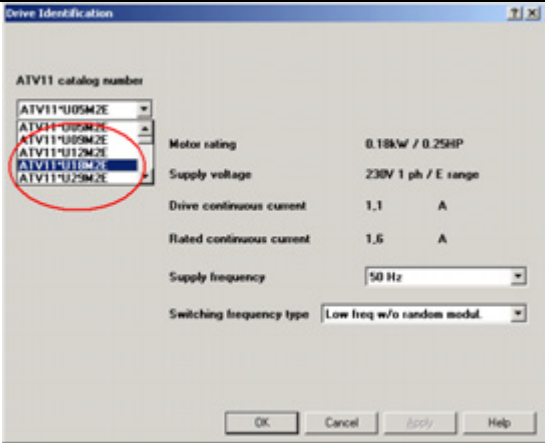


- save the data on your PC
- print out the documentation *and*
- optimize the parameters online.

Configuration

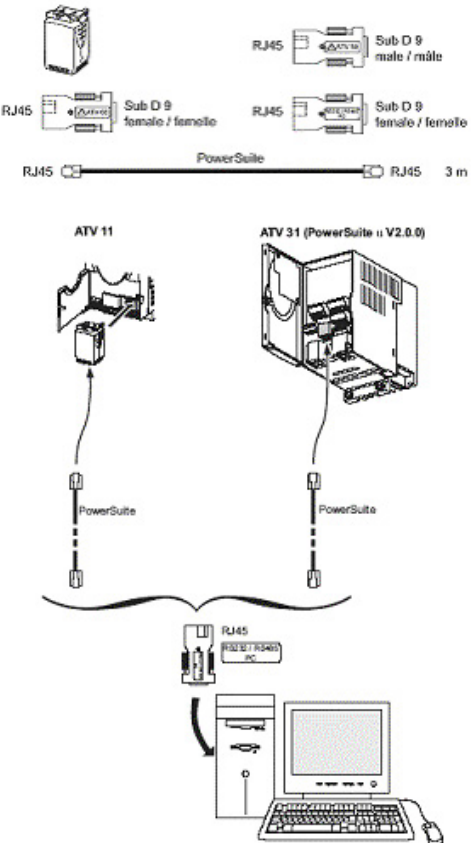

1	<p>The window opposite appears once the program has started up.</p> <p>Once you have read the warning message, advance to the next screen using the shortcut Alt+F.</p>	
2	<p>The next dialog allows you to define general user rights. You do not have to make any changes in this dialog.</p> <p>Proceed to the selection of the type of VSD by clicking OK.</p>	
3	<p>Select the device type in this window. In this example, we select ATV 11.</p>	

Continued on next page

Configuration Contd.

4	<p>The models available in the ATV11 series are displayed in the drop-down list on the left of the dialog (circled in red). Select the appropriate variable speed drive by clicking on its part number.</p> <p>The values assigned to the device are displayed on the right-hand side; only the frequency should be set here in accordance with the actual conditions. Next, select Apply and OK in order to transfer the configuration.</p>	
5	<p>Here you could make further settings; however, in this example we use the default values.</p>	
6	<p>Once this procedure has been completed, you can store the parameters on the PC. Use the diskette icon in the toolbar (or the corresponding menu item).</p>	

Transferring parameters

1	<p>Check the connection between the PC and the Altivar.</p>	
2	<p>You can now transfer the parameters to the ATV by selecting:</p> <p>Link->Transfer File</p> <p>and then</p> <p>PC to device.</p>	

Appendix

Detailed components list

Hardware components

Item	No.	Description	Part no.	Rev./Vers.
1.1	1	Master switch	VCF02GE	V3.2
1.2	1	Emergency stop switch housing	XALK178G	
1.3	1	Preventa emergency stop relay, cat. 3	XPSAC3721	
1.4	2	Contactor, 9 A, 24 V DC operated, 3-pole, AC3, 1x NO + 1x NC	LC1D09BD	
1.5	1	2-button push button housing, empty	XALD02	
1.6	1	Selector switch, 3 positions, locking-type	XB5AD33	
1.7	1	Label holder 30x40 "forward-0-back"	ZBY2384	
1.8	1	Illuminated button red, flat	ZB5AW343	
1.9	1	Auxiliary switch module with red LED + 1 auxiliary switch (1x NO)	ZB5AW0B42	
1.10	1	Label holder 30x40 "stop"	ZBY2304	
1.11	1	3-button push button housing empty	XALD03	
1.12	1	Illuminated button blue, flat	ZB5AW363	
1.13	1	Auxiliary switch module with blue LED + 1 auxiliary switch (1x NO)	ZB5AW0B61	
1.14	1	Label holder 30x40 "emergency stop"	ZBY2330	
1.15	1	Indicator lamp white, flat	XB5AVB1	
1.16	1	Label holder 30x40 "on"	ZBY2311	
1.17	2	Position switch Universal (final positions)	XCKP2118P16	
1.18	2	Miniature circuit breaker C60N 1P 2A C	23726	
1.19	1	Miniature circuit breaker C60N 1P+N 1A C	24183	
1.20	1	Phaseo power supply 24 V DC/1.2 A	ABL7CEM24012	
1.21	1	Twido PLC modular device with 20 I/Os	TWDLMDA20DRT	
1.22	1	XBT-N Magelis compact operator terminal	XBTN-200	
1.23	1	Magelis/PLC connection cable	XBTZ9780	
1.24	1	Motor circuit breaker, 9 to 14 A, adjustable	GV2ME16	
1.25	1	Maintenance switch	VBF02GE	
1.26	1	Auxiliary contact block for maintenance switch	VZ7	
1.27	1	Altivar ATV11 variable speed drive	ATV11PU18M2E	

Software components

Item	No.	Description	Part no.	Rev./Vers.
2.1	1	Twidosoft programming software incl. cable	TWDSPU1001V10M	3.2
2.2	1	Twidosoft programming software	TWDSPU1002V10M	3.2
2.3	1	Twido programming cable	TSXPCX1031	4.42
2.4	1	Magelis configuration software (complete version)	XBTL-1000	
2.5	1	Magelis programming cable	XBTZ945	1.5
2.6	1	PowerSuite parameterization software	VW3A8104	
2.7	1	Altivar set of connection accessories	VW3A8106	

Component protection classes

**Recommended
installation
locations/
Protection class**

Components	In the field, on site IP 55/IP 65	Front IP 65	Control Cabinet IP 20
Master and maintenance switch	X		
Emergency stop switch housing	X		
Contactor, 9 A, 24 V DC operated, 3-pole AC 3, 1x NO + 1x NC			X
2-button/3-button push button housing, empty	X		
Selector switch, 3 positions		X	
Illuminated buttons, all colors, flat		X	
Auxiliary switch module with LED + 1 auxiliary switch (1x NO), all colors			X
Label holder 30x40, all texts	X		
Position switch Universal	X		
Miniature circuit breaker, all types and ratings			X
Motor protection switch, all types and ratings			X
Phaseo power supply 24 V DC/1.2 A			X
Preventa emergency stop relay			
Twido PLC			X
Magelis XBT-N200		X	

Characteristics for the complete system

General

The data listed below relates to the system and its features as described and specified in this document. The values represented are determined by, for example,:

- The number of I/O points
- The number of bus nodes (if present)
- The number of instructions/operations
- Memory usage

Scan time and cycle time

A cycle time of 2 ms was not exceeded with the present configuration including the required application code. The memory usage of the Twido PLC specified and used in this document was 18% for system/configuration data and 2% for the logic component.

Trials with additional integrated extension modules (a digital I/O module with 16 inputs and 8 relay outputs as well as an analog module with 1 output and 2 inputs, which was used as the I/O level for 2 PID controllers) showed that the cycle time could increase to a maximum of 6 ms. When using these two additional extension modules, memory usage for system data rose to 22% but, as expected, memory usage of the logic component did not change.

Component Features

Twido PLC



The PLC used in this example comprises the power base of a Twido modular PLC and a programming set comprising software and a programming cable (TWDLMDA20DRT + TWDSPU1001V10M):

- 24 V DC
- 12 digital inputs
- 8 digital relay outputs
 - Can be extended up to a maximum of 7 modules (analog and communication modules are also possible)

3 programming languages:

- Ladder Language (LD)
- Instruction List (IL)
- Sequential Function Chart/Grafcet (SFC)

Predefined functions:

- Drum controller
- High-speed counter up to 5 kHz
- Very high-speed counter up to 20 kHz
- Frequency meter 1 to 20 kHz
- Register areas for LIFO/FIFO execution
- PWM/PCS output
- External PLC start
- PID controller

Phaseo power supply unit

ABL7CEM24012



- 100 to 240 V AC/24 V DC
 - 1.2 A secondary
 - Short-circuit-proof
-

Altivar VSD**ATV11 HU18M2E**

- 0.75 kW, 230 V AC, single-phase
- Integrated class B EMC filter
- Temperature range: -10 to + 50°C
- Speed range from 1 to 20 (0 to 200 Hz)
- Speed control with flow vector check
- Protection of drive and motor
- Compact design, side-by-side installation also possible on a top-hat rail

**Circuit
breaker****GV2ME16**

- 9 to 14 A
 - Thermal and magnetic (170 A) activation
 - Lockable
-

Contact

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