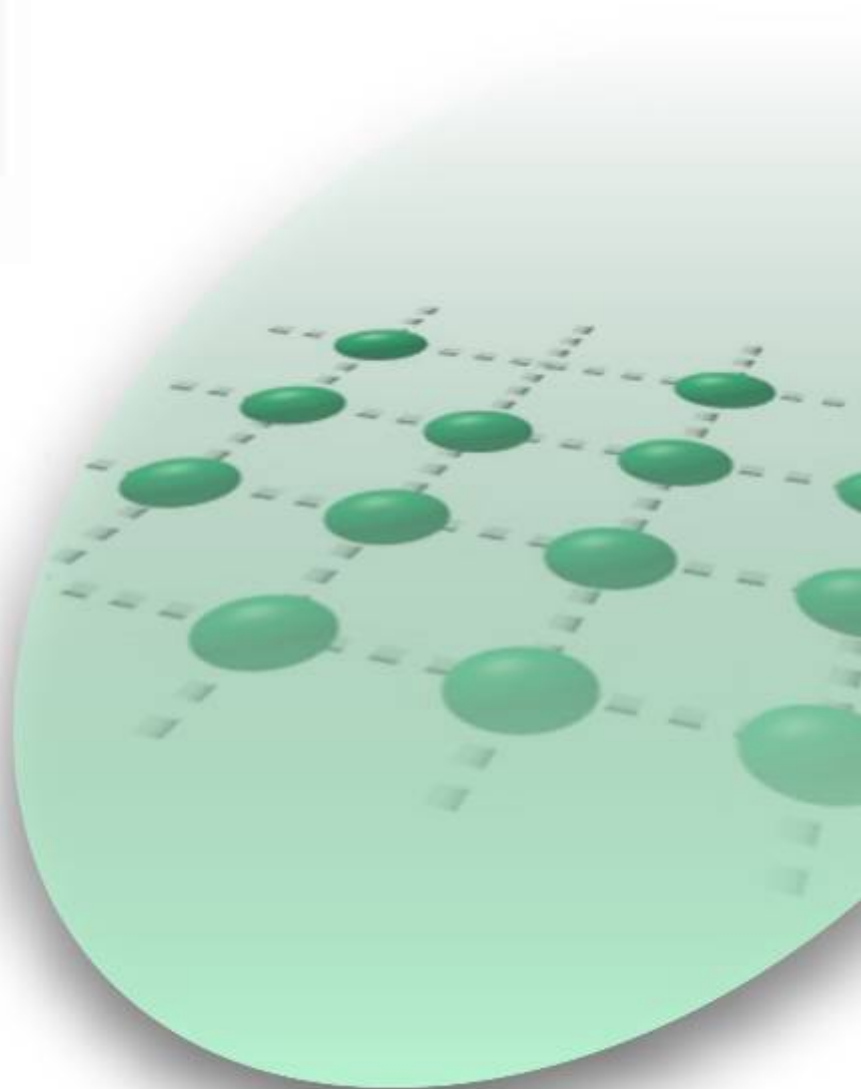


Modicon Micro, TwinLine Magelis and Advantys *System Manual Document* *Inclusive Example Source Code*



Merlin Gerin
Square D
Telemecanique

Schneider
 **Electric**
Building a New Electric World

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Introduction

The System Manual Document is intended to be a “Quickstart Manual for a System”. It is **not** intended to replace any product documentation. Instead, it delivers all the information, in addition to the product documentation, to install, parameterise and start-up the **system** outlined.

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

Abbreviations

Word / Expression	Signification
PLC	Programmable Logic Computer
HMI	Human Machine Interface
TLC	Twin Line Controller - Drive Controller, Positioning Controller
PC	Personal Computer
AC	Alternating Current
DC	Direct Current
PS	Power Supply
I/O	In/Output
CB	Circuit Breaker
EDS	Electronic Data Sheet
PL7PRO	Is the Product name of a Schneider Electric PLC Programming software
Vijeo-Designer	Schneider Electric product name for HMI Visualisation software
TLCT	Berger Lahr product name for TLC Drive software
SyCon	name of a Schneider product for communications software
Micro	Is the Product name of a Schneider Electric PLC
Advantys STB	Is the Product name of a Schneider Electric I/O-Platform (Small Terminal Block)
Phaseo	Is the Product name of a Schneider Electric power supply
Magelis	Is the product name of a Schneider Electric HMI Device
Twin Line	Is the product name of a BergerLahr family of drive controllers

Application Example - Source Code

Introduction

The attached file(s) contain example code, that is related to the above described system function.
Using Adobe Acrobat Reader V6.0 you are able to click on the Icon below and extract the file to your PC.



Typical Applications

Introduction

Here you will find a list of the typical applications where this system/subsystem can be applied:

Industrial

- Small to middle sized automated machines
- Decentralised automated systems serving as components to large or middle sized machines

Machines

- Packaging
- Specialised machines
- Conveying; Moving

Application	Description	Example
Packing machines	For the packaging industry, used for labeling, packing, filling and paletting of goods. .	
Specialised Machines	For economical operation of special machines used in mounting, finishing, cutting etc. (e.g. food preparation, automatic assembly, woodworking)	
Conveyor System	For use in sorting systems e.g. "pick and place".	

System

Introduction

The system chapter describes the architecture, the components, the dimension and the amount of components used within this system.

Architecture

General

The system consists of a mid range PLC controlling two drive controllers each with a servomotor and a decentralised I/O platform. Control of the drives is via a full graphics touch screen. The field bus is CANopen, the HMI control panel is connected via Modbus. For safety, an emergency stop mains switch is provided.

Layout



Components

Hardware:

- Phaseo Power Supply (PS)
- TSX Micro (PLC)
- Advantys STB (I/O)
- Twin Line (TLC)
- Magelis XBT-G (HMI)
- Vario mains switch (CB)
- Servomotor (SERVO)

Software:

- PL7PRO V4.4 (PLC)
- Vijeo-Designer V4.1 (HMI)
- TL Control Tool (TLC)
- Advantys Configurations Tool (I/O)
- SyCon (CANopen)

Amount of Components

For this application, except for the Twin Line and servomotors, only one of each component is required.

Dimensions

The reduced size of the PLC, the power supply and the Twinline TLC, permit the use of a compact housing of the size 700x500x300 mm (B,H,T). The HMI unit can be built into the front door of the housing. The servo motors and de-centralized I/O island (Advantys STB) are installed on the machine.

Installation

Introduction

This chapter describes the steps necessary to set up the hardware and configure the software for the described application.

Layout



Function: PLC Programm / HMI Controls

The user can control two twinline controllers using the full graphics touchpanel of the Magelis HMI. Address 80 is used for CANopen and 81 for the Twinline.

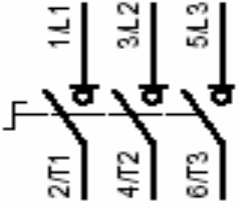
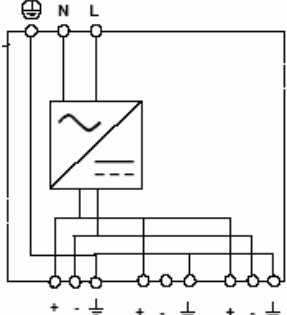
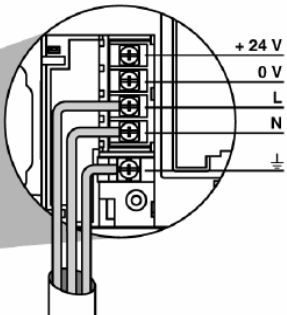
After switching on, using the „Power Up“ button on the Magelis the Twinline goes into „RUN“ mode. There are 2 modes, Automatic and Manual. Selecting Automatic by pressing the „AUTO“ button, causes the Twinline to start a speed ramp.

Manual mode allows the user access to the state machines of the two drives. In manual mode, the user can manually start and stop the drives, change the speed and change the direction of rotation.

Hardware

General

- All components, except for the power supply and HMI are designed for fixing to the rear wall of a housing.
- The power supply requires a DIN rail for mounting.
- The HMI requires a cut-out in the housing door and can be fixed in place with pressure mounted spring clips
- The remote I/O island is installed in a separate housing on the machine.
- The servo motor can be fixed directly to the machine with a metal flange.
- Use M5*18mm bolts and screws and 35mm DIN railing for the mountings.
- 230VAC Cabling connects the mains switch, the power supply and the TLC.
- 24VDC Cabling connects the Power Supply , the PLC, the HMI and the control circuit of the TLC.

Mains Switch VCF-02GE		
Power Supply ABL7RE2403		ABL-7RE●●●●● 
PLC Micro TSX3722101		

Drive Controller Twin Line TLC532FHIFACAN



• Mains und Motor connection

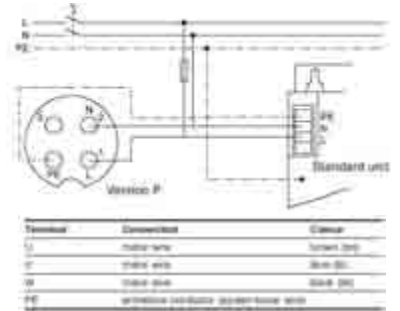
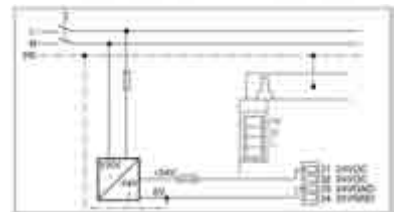


Fig. 4.3 Motor cable connection to unit



Fig. 4.4 Motor cable connection to motor (motor plug from 110V available)



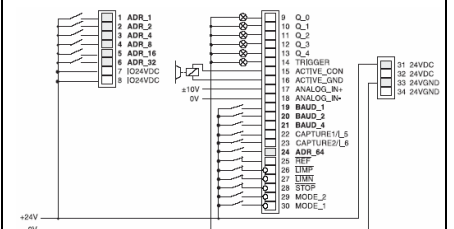
• Signal Inputs for the Fieldbus–Addressing

Conditions:

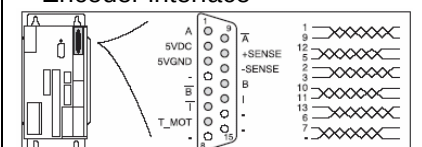
Parameter :

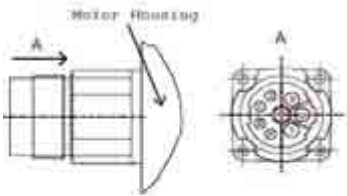
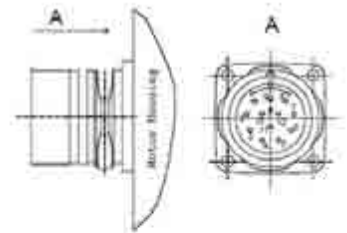
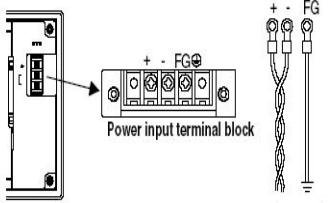
„Settings IO_mode“ = 0

The device addresses and transfer speed can be defined via the input signals after activating the positioning.



• Encoder interface



AC – Synchronous Servomotor SER3683L5SSOAOO		 <table><tr><th>PIN</th><th>Assignment</th></tr><tr><td>1</td><td>U</td></tr><tr><td>2</td><td>Earth</td></tr><tr><td>3</td><td>W</td></tr><tr><td>4</td><td>V</td></tr><tr><td>A</td><td>Brake Not assigned</td></tr><tr><td>B</td><td>Brake Not assigned</td></tr><tr><td>C</td><td>Not assigned</td></tr><tr><td>D</td><td>Not assigned</td></tr></table>	PIN	Assignment	1	U	2	Earth	3	W	4	V	A	Brake Not assigned	B	Brake Not assigned	C	Not assigned	D	Not assigned								
PIN	Assignment																											
1	U																											
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4	V																											
A	Brake Not assigned																											
B	Brake Not assigned																											
C	Not assigned																											
D	Not assigned																											
Motor cable TLACPAAA0031		 <table><tr><th>PIN</th><th>Assignment</th></tr><tr><td>1</td><td>Temperature sensor</td></tr><tr><td>2</td><td>Temperature sensor</td></tr><tr><td>3</td><td>Not assigned</td></tr><tr><td>4</td><td>REF SIN</td></tr><tr><td>5</td><td>REF COS</td></tr><tr><td>6</td><td>Data + RS485</td></tr><tr><td>7</td><td>Data - RS 485</td></tr><tr><td>8</td><td>+ SIN</td></tr><tr><td>9</td><td>+ COS</td></tr><tr><td>10</td><td>Us 7-12 V</td></tr><tr><td>11</td><td>GND</td></tr><tr><td>12</td><td>Not assigned</td></tr></table>	PIN	Assignment	1	Temperature sensor	2	Temperature sensor	3	Not assigned	4	REF SIN	5	REF COS	6	Data + RS485	7	Data - RS 485	8	+ SIN	9	+ COS	10	Us 7-12 V	11	GND	12	Not assigned
PIN	Assignment																											
1	Temperature sensor																											
2	Temperature sensor																											
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5	REF COS																											
6	Data + RS485																											
7	Data - RS 485																											
8	+ SIN																											
9	+ COS																											
10	Us 7-12 V																											
11	GND																											
12	Not assigned																											
Feedback Cable TLACFABA0031																												
HMI Magelis XBT-G2330																												

Software

General

Both the software for the Micro PLC and the full graphics Magelis touch screen must all be installed before you can use them.

For this your PC requires an installed Microsoft Windows operating system, either Windows2000 or WindowsXP.

To start the install, insert the appropriate CD into your CD or DVD drive. The CD starts up automatically, if you have activated the „Autostart“ function in the windows operating system. If you encounter difficulties consult the installation description of the individual product you are installing.

The default installation paths on your PC hard drive are:

- PL7PRO \PL7\
- Advantys Configurations Tool \Programme\Schneider Electric\Advantys
- Vijeo-Designer \Programme\Schneider Electric\Vijeo-Designer
- SyCon \Programme\Schneider\SyCon
- TL Control Tool \Berger Lahr\TL Control Tool



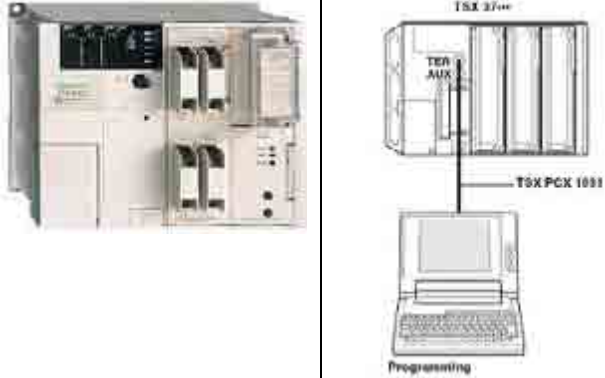
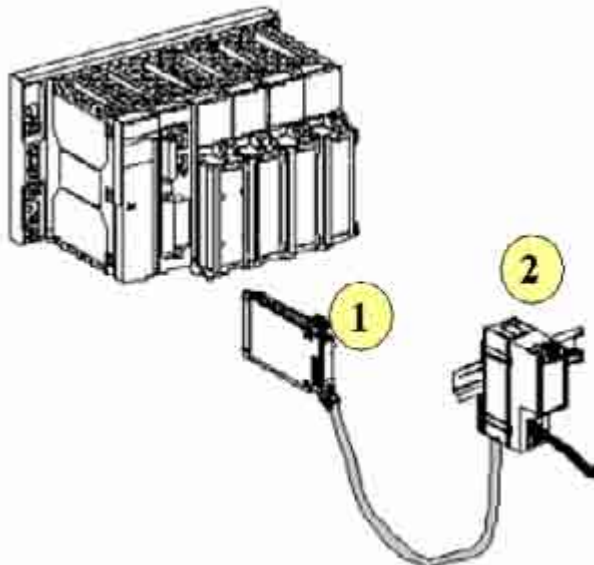
Communication

General

The communication between the PLC Micro, the two Twin Line drive controllers and The Advantys STB I/O Island is implemented with a CANopen machine bus.

Communication between the PLC and the full graphics touchpanel Magelis (HMI) is established using Modbus RTU protocol.

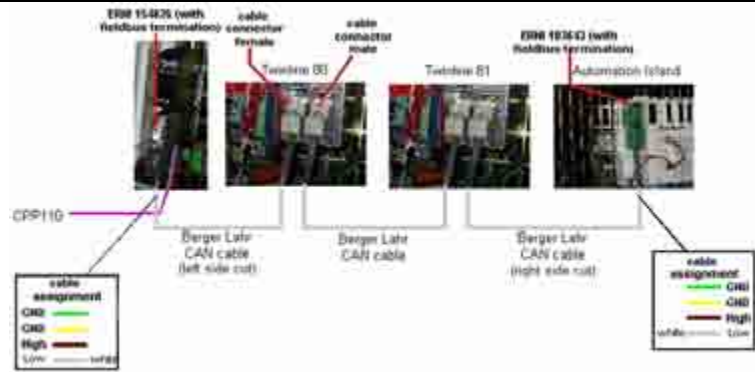
The transfer is performed by 2 separate modbus channels on the PLC. Channel 0 of the PLC is configured as Modbus RTU (master) for the HMI (Slave) and channel 1 is configured as Canopen Master for the two Twin Lines (Slave). Channel one is implemented with the PCMCIA card.

PLC Micro TSX3722101 Connecting the COM serial interface on the PC or the HMI with the PLC Micro via: • TER Socket for PC/HMI • Connector Cable TSX PCX 1031	
For the 2nd. CANopen Channel on the micro you need the following: • TSX CPP 110 Card in the PCMCIA Slot of the PLC (1) • The TAP is fixed to a DIN rail (2)	

CANopen Wiring

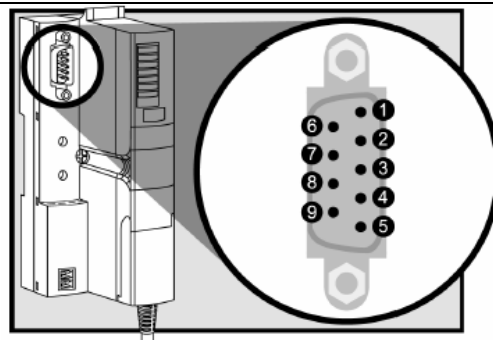
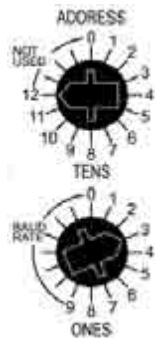
- PLC
- Twin Line
- Advantys STB

Hint: The CANopen Bus Must be closed at both ends with an end resistor (120 Ohm). These are integrated into the connectors.



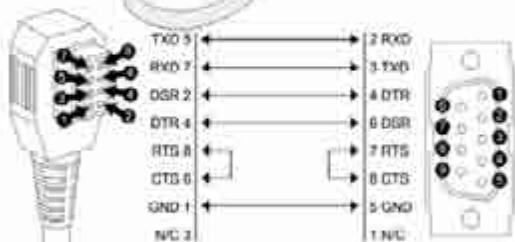
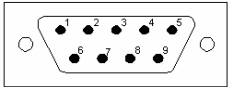
Advantys STB CANopen Connection

Use the dials to set up the transmission speed (500 kBaud) and Address 18.



Pin	Signal	Description
1	Unused	Reserved
2	CAN_L	CAN-low bus line
3	CAN_GND	CAN ground
4	Unused	Reserved
5	CAN_SHLD	optional CAN shield
6	GND	optional ground
7	CAN_H	CAN-high bus line
8	Unused	Reserved
9	Unused	Reserved

Note: Pin numbers correspond to callouts in the figure above.

Advantys STB Programming Cable STB XCA 4002	   TXD transmit data RXD receive data DSR data set ready DTR data terminal ready RTS request to send CTS clear to send GND ground reference N/C not connected												
CANopen – Plug 103643 (incl. end-resistor for connection to TSXCPP110 TAP and Advantys) 	Male (pins)  Female (sockets)  <table><tr><th>Pin N°</th><th>Signal</th><th>Description</th></tr><tr><td>2</td><td>CAN_L</td><td>CAN_L bus Line</td></tr><tr><td>3</td><td>CAN_GND</td><td>CAN ground</td></tr><tr><td>7</td><td>CAN_H</td><td>CAN_H bus Line</td></tr></table> Shield (to the connector)  Can L (to pin 2) Can H (to pin 7) Can GND (to pin 3) Not connected	Pin N°	Signal	Description	2	CAN_L	CAN_L bus Line	3	CAN_GND	CAN ground	7	CAN_H	CAN_H bus Line
Pin N°	Signal	Description											
2	CAN_L	CAN_L bus Line											
3	CAN_GND	CAN ground											
7	CAN_H	CAN_H bus Line											

HMI Magelis XBT-G2330 COM1: XBTZG915 TOOL : XBTZG968 +XBTZG999 XBTZG999 Adapter	DC- Power Cable Programming Cable from PC to HMI Communicationscable from PLC to HMI, incl. adaptee Internal Signal wiring	(1) not available on XBT-G2110/2120/2220/4320 (2) not available on XBT-G2110 (3) not available on XBT-G2110/2120/2130/2220/2330/4320 <table> <tr> <th colspan="4">DSUB (25-polig)</th><th colspan="4">DSUB 25 (Socket)</th></tr> <tr> <td>1</td><td>FG</td><td>RS232C</td><td>0</td><td>1</td><td>PG</td><td></td><td></td></tr> <tr> <td>2</td><td>SD</td><td>RS232C</td><td>0</td><td>2</td><td>TXC</td><td></td><td></td></tr> <tr> <td>3</td><td>RQ</td><td>RS232C</td><td>1</td><td>3</td><td>RAC</td><td></td><td></td></tr> <tr> <td>4</td><td>RS</td><td>RS232C</td><td>0</td><td>4</td><td>A</td><td></td><td></td></tr> <tr> <td>5</td><td>CS</td><td>RS232C</td><td>1</td><td>5</td><td>B</td><td></td><td></td></tr> <tr> <td>6</td><td>SS</td><td>RS232C</td><td>0</td><td>6</td><td>A</td><td></td><td></td></tr> <tr> <td>7</td><td>SG</td><td>RS232C</td><td>0</td><td>7</td><td>V Iso</td><td></td><td></td></tr> <tr> <td>8</td><td>CH</td><td>RS232C</td><td>0</td><td>8</td><td>CUM V0</td><td></td><td></td></tr> <tr> <td>9</td><td>TRMX</td><td>RS32</td><td>1</td><td>9</td><td></td><td></td><td></td></tr> <tr> <td>10</td><td>RDA</td><td>RS32</td><td>1</td><td>10</td><td></td><td></td><td></td></tr> <tr> <td>11</td><td>SMA</td><td>RS32</td><td>0</td><td>11</td><td></td><td></td><td></td></tr> <tr> <td>12</td><td>IN</td><td></td><td></td><td>12</td><td>REG</td><td></td><td></td></tr> <tr> <td>13</td><td>INC</td><td></td><td></td><td>13</td><td>CONF</td><td></td><td></td></tr> <tr> <td>14</td><td>CVL</td><td></td><td></td><td>14</td><td>BP</td><td></td><td></td></tr> <tr> <td>15</td><td>SDB</td><td>RS485/422</td><td>0</td><td>15</td><td>B1</td><td></td><td></td></tr> <tr> <td>16</td><td>NDB</td><td>RS485/422</td><td>1</td><td>16</td><td>B2</td><td></td><td></td></tr> <tr> <td>17</td><td>RI</td><td>RS232C</td><td>0</td><td>17</td><td>B3</td><td></td><td></td></tr> <tr> <td>18</td><td>CSB</td><td>RS485/422</td><td>1</td><td>18</td><td>B</td><td></td><td></td></tr> <tr> <td>19</td><td>LGB</td><td>RS485/422</td><td>0</td><td>19</td><td>BA</td><td></td><td></td></tr> <tr> <td>20</td><td>ER</td><td>RS232C</td><td>0</td><td>20</td><td></td><td></td><td></td></tr> <tr> <td>21</td><td>CSA</td><td>RS485/422</td><td>1</td><td>21</td><td>E.V Iso</td><td></td><td></td></tr> <tr> <td>22</td><td>LGA</td><td>RS485/422</td><td>0</td><td>22</td><td></td><td></td><td></td></tr> <tr> <td>23</td><td>NC</td><td></td><td></td><td>23</td><td></td><td></td><td></td></tr> <tr> <td>24</td><td>NC</td><td></td><td></td><td>24</td><td>PAR</td><td></td><td></td></tr> <tr> <td>25</td><td>NC</td><td></td><td></td><td>25</td><td></td><td></td><td></td></tr> </table>	DSUB (25-polig)				DSUB 25 (Socket)				1	FG	RS232C	0	1	PG			2	SD	RS232C	0	2	TXC			3	RQ	RS232C	1	3	RAC			4	RS	RS232C	0	4	A			5	CS	RS232C	1	5	B			6	SS	RS232C	0	6	A			7	SG	RS232C	0	7	V Iso			8	CH	RS232C	0	8	CUM V0			9	TRMX	RS32	1	9				10	RDA	RS32	1	10				11	SMA	RS32	0	11				12	IN			12	REG			13	INC			13	CONF			14	CVL			14	BP			15	SDB	RS485/422	0	15	B1			16	NDB	RS485/422	1	16	B2			17	RI	RS232C	0	17	B3			18	CSB	RS485/422	1	18	B			19	LGB	RS485/422	0	19	BA			20	ER	RS232C	0	20				21	CSA	RS485/422	1	21	E.V Iso			22	LGA	RS485/422	0	22				23	NC			23				24	NC			24	PAR			25	NC			25			
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Motor Controller Twin Line TLC532FHIFACAN CAN-C Interface Module The CAN_C Module has a Sub-D plug and socket, both 9-polig.																																																																																																																																																																																																																		

plug and socket interface Connections for CANopen machine bus Module	<table><tr><th>Pin</th><th>Signal</th><th>Colour^{††}</th><th>Pin</th><th>Explanation</th><th>IO</th></tr><tr><td>1</td><td>—</td><td>—</td><td>1</td><td>not assigned</td><td>—</td></tr><tr><td>6</td><td>—</td><td>—</td><td>1</td><td>ground</td><td>—</td></tr><tr><td>2</td><td>CAN_LV+</td><td>white</td><td>2</td><td>Data line, twisted</td><td>IO</td></tr><tr><td>3</td><td>CAN_LV-</td><td>brown</td><td>3</td><td>Data line</td><td>IO</td></tr><tr><td>5</td><td>—</td><td>—</td><td>3</td><td>ground</td><td>—</td></tr><tr><td>6</td><td>—</td><td>—</td><td>5</td><td>not assigned</td><td>—</td></tr><tr><td>8</td><td>—</td><td>—</td><td>—</td><td>not assigned</td><td>—</td></tr><tr><td>9</td><td>—</td><td>—</td><td>—</td><td>not assigned</td><td>—</td></tr><tr><td>10</td><td>—</td><td>—</td><td>—</td><td>not assigned</td><td>—</td></tr><tr><td>11</td><td>—</td><td>—</td><td>—</td><td>not assigned</td><td>—</td></tr></table> ^{††} Colour should refer to the cable colours as an accessory - the colour used refers to the CAN guidelines. I guarantee that the colours do not match the Twisted-pair specification.	Pin	Signal	Colour ^{††}	Pin	Explanation	IO	1	—	—	1	not assigned	—	6	—	—	1	ground	—	2	CAN_LV+	white	2	Data line, twisted	IO	3	CAN_LV-	brown	3	Data line	IO	5	—	—	3	ground	—	6	—	—	5	not assigned	—	8	—	—	—	not assigned	—	9	—	—	—	not assigned	—	10	—	—	—	not assigned	—	11	—	—	—	not assigned	—
Pin	Signal	Colour ^{††}	Pin	Explanation	IO																																																														
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11	—	—	—	not assigned	—																																																														
Cable Specification	For units with a hood, the cable must be led downwards from the point of connection • Screened Cable • Minimum cross section of signal wires : 0.14 mm² • Twisted-pair lines • Screen grounded at both ends • Maximum length dependant on number of devices, the baud rate and the signal times. The higher the baud rates, the shorter the bus cable has to be. Guide values: ➔ 40m with 1MBit/sec ➔ 500m with 100kBits/sec ➔ 100m with 500kBits/sec ➔ 500m with 125kBit/sec																																																																		

Implementation

Introduction

The implementation chapter describes all the steps necessary to initialise, to parameterise, to program and to start-up the system.

Function

Functional description PLC Program / HMI Display

1. After switching on the mains, the Twinline drive controllers can be put into “run” mode by pressing the “Power Up” key, for 2 seconds, on the Magelis screen.
2. After “Power Up” the controller is in manual mode. In this mode, the user has access to the state machine of the two drive controllers. The drive controllers can be manually stopped and started. The speed and direction of the drive controllers can be adjusted.
3. The drive controllers must first be stopped to switch to automatic mode. Automatic mode can be selected on the Magelis touch screen with the key “AUTO”. This starts a speed regulation program, raising the speed from zero to 600rpm in 1 minute. The speed remains constant for 10 minutes and then is reduced to –600 rpm over a period of 2 minutes. After another 10 second period the speed is reduced to zero over a 1 minute period. After a 10 second wait, the program is re-started.

In the case of errors, an error number is displayed on the Magelis touch screen. The user should refer to the user manual for an explanation of the error..



Procedure

In order to implement the system in the shortest possible time it is recommended that you proceed in the following order:

- Configure the I/O platform with the Advantys Config Tool
- Configure CANopen with the SyCon Tool
- Create the application program with PL7PRO
- Create the HMI displays with Vijeo Designer
- Configure Twin Line for CANopen and the Servomotor

This procedure ensures that the configuration data can now be either imported or manually input without conflicting definitions.

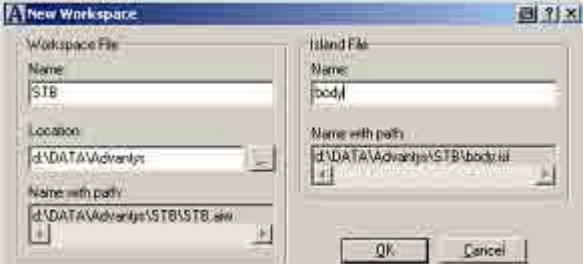
I/O Platform

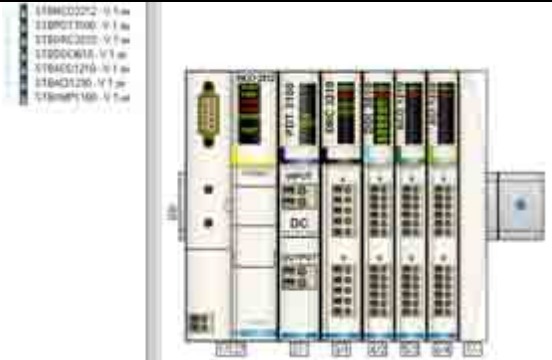
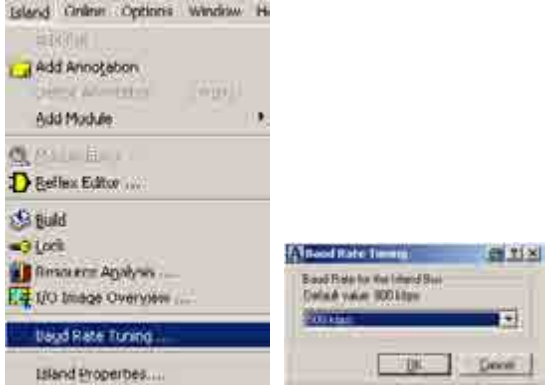
Introduction

This section describes the configuration of the Advantys I/O platform using the Advantys configuration software.

It is suggested you proceed as follows:

- Create a new project (**New Workspace**)
- Configure the hardware (network interface, power and I/O modules)
- Configure CANopen communication (Baudrate)
- Create EDS file (Electronic Data Sheet)
- Canopen 2.690

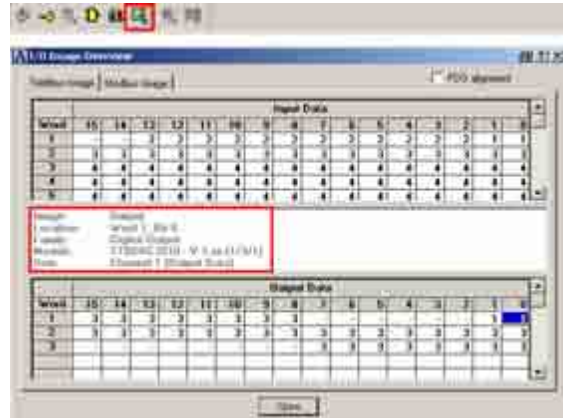
After starting up the Advantys configuration software, a new workspace must be created.	
In the new workspace dialog, you must provide a path, a Workspace-Name and an Island-Name..	
Configure the hardware (Networkinterface, Power Supply and I/O modules) Then choose the network interface for CANopen STB NCO 2212	
Now add the other modules: STB PDT 3100 STB DRC 3210 STB DDI3610 STB ACO 1210 STB ACI 1230 Not forgetting the bus terminal. STB XMP 1100	

The screen should now show:	
Configure the CANopen Communication (Baudrate) Via the menu bar you can set the bus speed. Here, 500 kbps is used, as with the Lexium05 and later in the PLC.	
Create an EDS file Next, create the EDS file. Use the menu file then export. The filename and folder can be chosen as required. Note the file type (EDS) is obligatory for future use and development. You can configure the I/O using the SYCON EDS files instead of the Advantys configuration software, however this requires extensive knowledge of CANopen and is not part of this document.	

Using the menu **Island** and then **I/O Image Overview** (or use the  icon in the toolbar) you can assign the I/O to memory.

Click on the data to get a detailed description in the description window...

Or simply print the project. The printout shows the details too.

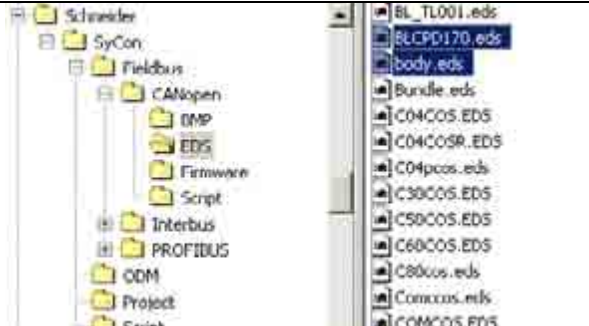


CANopen

Introduction

This section shows you how to use the SYCON software to configure the CANopen bus.

- Preparation of the EDS files
- Starting the SYCON software
- Create a new configuration
- Selecting the field bus type
- Fieldbus master definition
- Create the Fieldbus nodes
- Connect to the fieldbus devices
- Define the bus parameters
- Configure the nodes
- Overview of the CANopen bus
- Create the CANopen configuration file for PL7
- Import the configuration of the CANopen master into PL7

Create EDS files Before starting the SYCON software, you must copy the Lexium05 and Advantys EDS files into the EDS folder.	
Start the SyCon Software	
Create a new configuration	
Select the Fieldbus type SYCON is used to describe the CANopen configuration. It contains all the information that the PLC programming software will require later. After starting SYCON, a new project is created.	

Select the Field bus Master

Use the menu **insert** and **master..** to open the **insert master** dialog.

Select **TSX CPP 110** and **add** it to the **selected devices** list. You may change the account and description.



Create a field bus node

Insert a Node using the menu bar **Insert** and **Node...**

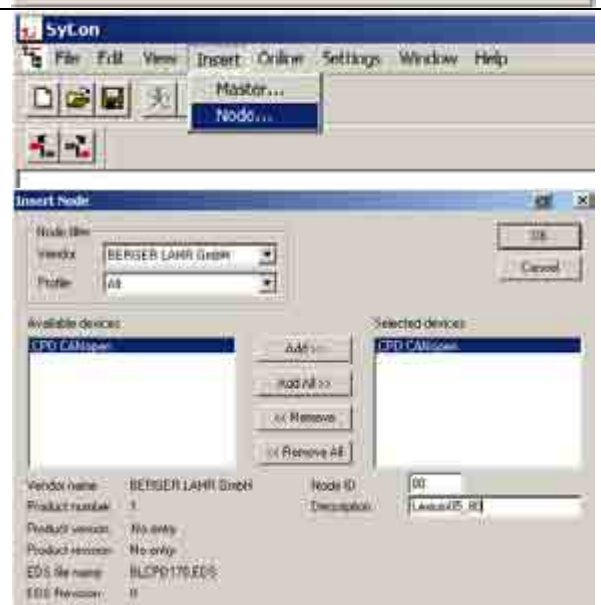
And give the position.

After inputting the **Node ID** and **description**, select the **vendor** and click on **add** to add it to the list of **selected devices**

Add the node IDs.

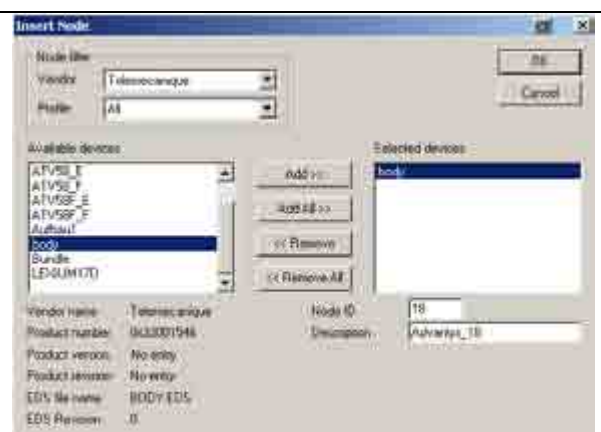
Here the Node IDs 80 and 81 are used. See configuring the Twinline.

Now do the same for the second Twinline.



Connect the field bus device

The next node is the Advantys (Address 18).



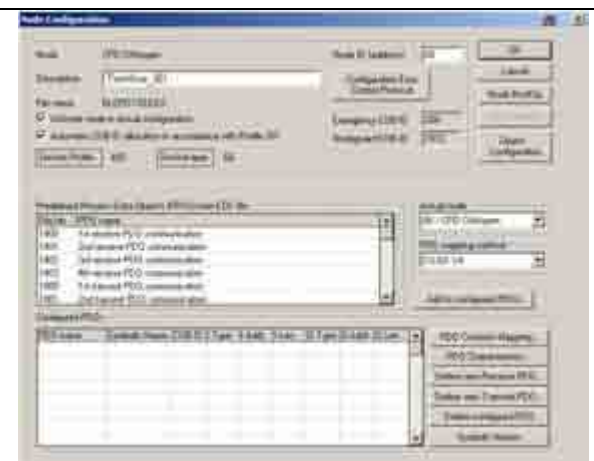
Next, set the baud rate.

For this, select the master Using the menus **Settings**, then **Bus Parameter...** When the Bus Parameter dialog opens, select 500kBits/s as **Baudrate** for the communication speed and click on **OK**.

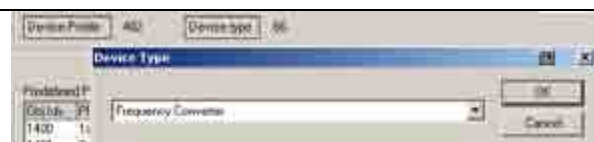


Node Configuration

A doubleclick on the first Twinline node opens the dialog for the **node configuration**. A list of the PDOs is displayed. For our application the 3rd. PDO is required. This PDO is the parameter for the speed control.



First, set the **device type** to "Frequency Converter"

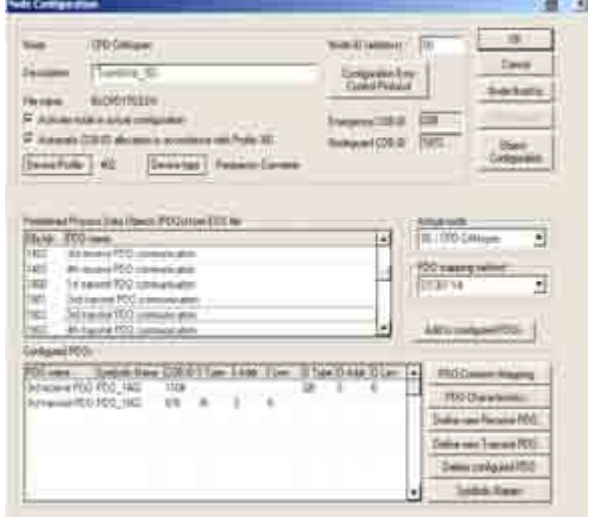
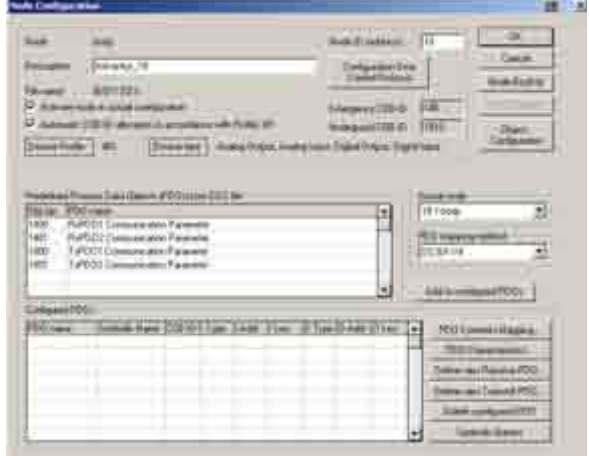


After a double click on

3rd receive PDO communication

the Node Receive dialog appears. Click **OK** to accept the setup.



After a doubleclick on 3rd transmit PDO communication the Node Transmit dialog appears, click OK and accept the setup.	
The Parameter setup for the first Twinline is now complete and the following window is displayed. Now repeat these steps for the second Twinline.	
After double clicking on the Advantys node, the node configuration appears. Select the PDOs one after the other. .	
PDOs: “RxPDO1 Comm...” “RxPDO2 Comm...” “TxPDO1 Comm...” have the setup as shown:	

PLC

Introduction

The PLC chapter describes the steps required for the initialisation, Configuration and the program logic required to fulfill the functions. The application program is produced using PL7Pro. PL7 requires no special function blocks for the programming, only standard functions are used.

To implement the PLC the following steps are required:

- Create a new project (name the project)
- Configure the software
- Configure the hardware (CPU and I/O modules)
- Configure the Modbus (RTU) communication
- Configure the CANopen communication
- Create new variables with symbolic names and text
- Create an application program section
- Create the application program
- An explanation of PL7 commands : an example
- Define the PLC address
- Connect to the PLC
- Download the application to the PLC

Create New Project

After starting PL7PRO, with **File->New**, create a new project and select the correct PLC type.



Software Configuration

Use the **Configuration** dialog to configure the number of system words required.



Hardware Configuration (CPU + I/O Modules)

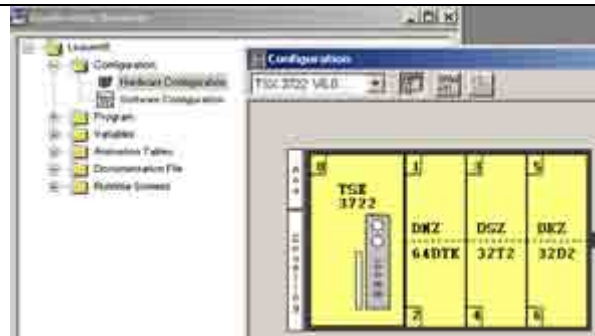
Using the application browser, open the hardware configuration. You should see the CPU type you already selected : **TSX3722**.



Configure the Hardware (CPU and I/O Modules)

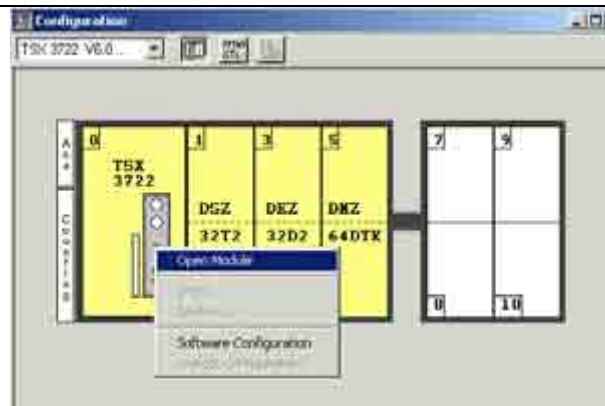
Right mouseclick on **Hardware Configuration** in the **application browser** and open the Hardware Configuration dialog. You will see the chosen PLC type already selected, CPU **TSX3722**.

Now configure the I/O modules. Use doubleclick to choose the modules required.



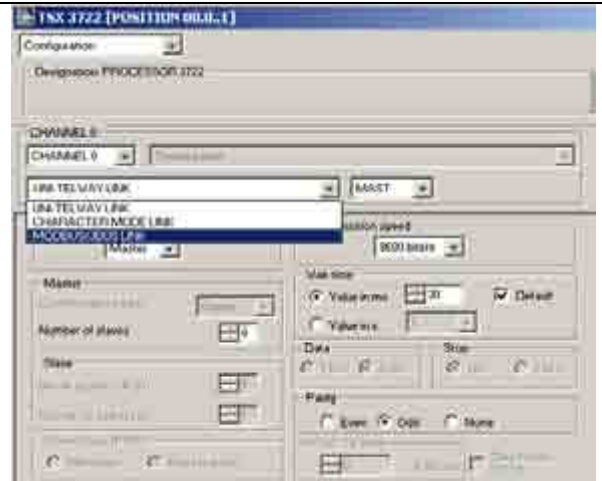
Configure the Modbus (RTU) communication

Right mouseclick on the COMM Module of the CPU and open the module.



Configure the Modbus Master

„Channel 0“ appears in the configuration dialog
This is the TER interface on the front of the CPU module.
Select the Modbus link for the HMI device and give it slave number „2“



Insert the following parameters:

Type: Slave (HMI is Master)
Slave Number : 2
Transmission Speed: 19200baud
Parity: even
Data: RTU (8bits)
Stop: 1 bit

The setup must correspond to the parameters for the HMI.



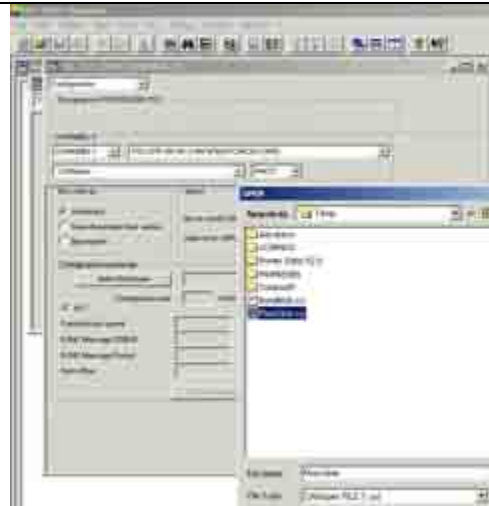
Configure the CANopen Master

For die CANopen connection with the Twinline we need a second channel, „CHANNEL 1“, implemented using the PCMCIA card (TSXCPC110)
The card is built into the PCMCIA slot on the the PLC and serves as the CANopen master to the Twinline

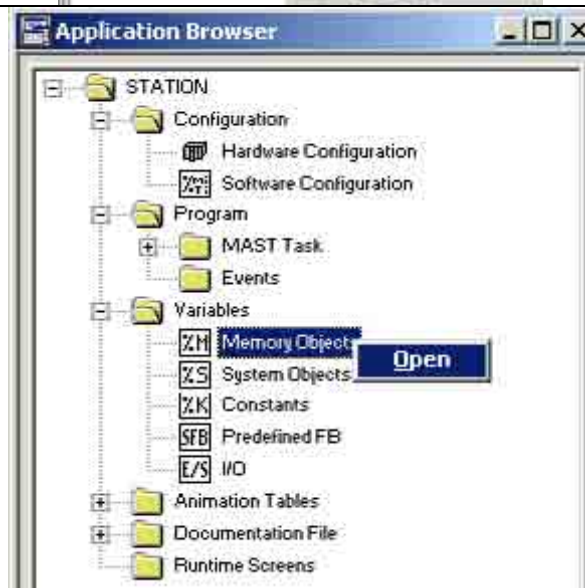
Transmission Speed: 500k Bit/s



Read the CANopen Master configuration file into PL7



Creation of new variables with symbolic names and text

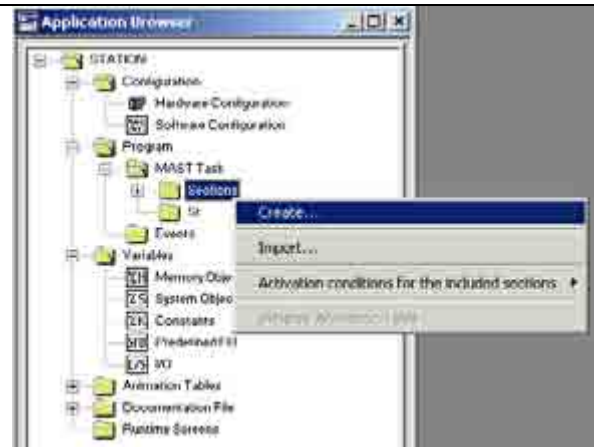


Example: %MW100 – Modbus Receive Word

Variables				
MEMORY		WORD	EMM448	
	Address	Type	Symbol	Comment
100	0x0000	WORD		
101	0x0002	WORD		
102	0x0004	WORD		
103	0x0006	WORD		
104	0x0008	WORD	hls_0_word_0	Module 0710 Emphasis word 0 with 000
105	0x000A	WORD		
106	0x000C	WORD		
107	0x000E	WORD		
108	0x0010	WORD		
109	0x0012	WORD		
110	0x0014	WORD		
111	0x0016	WORD		
112	0x0018	WORD		
113	0x001A	WORD		
114	0x001C	WORD		
115	0x001E	WORD		
116	0x0020	WORD		
117	0x0022	WORD		
118	0x0024	WORD		
119	0x0026	WORD		
120	0x0028	WORD		
121	0x002A	WORD		
122	0x002C	WORD		
123	0x002E	WORD		
124	0x0030	WORD		
125	0x0032	WORD		
126	0x0034	WORD		
127	0x0036	WORD		
128	0x0038	WORD		
129	0x003A	WORD		
130	0x003C	WORD		
131	0x003E	WORD		
132	0x0040	WORD		
133	0x0042	WORD		
134	0x0044	WORD		
135	0x0046	WORD		
136	0x0048	WORD		
137	0x004A	WORD		
138	0x004C	WORD		
139	0x004E	WORD		
140	0x0050	WORD		
141	0x0052	WORD		
142	0x0054	WORD		
143	0x0056	WORD		
144	0x0058	WORD		
145	0x005A	WORD		
146	0x005C	WORD		
147	0x005E	WORD		
148	0x0060	WORD		
149	0x0062	WORD		
150	0x0064	WORD		
151	0x0066	WORD		
152	0x0068	WORD		
153	0x006A	WORD		
154	0x006C	WORD		
155	0x006E	WORD		
156	0x0070	WORD		
157	0x0072	WORD		
158	0x0074	WORD		
159	0x0076	WORD		
160	0x0078	WORD		
161	0x007A	WORD		
162	0x007C	WORD		
163	0x007E	WORD		
164	0x0080	WORD		
165	0x0082	WORD		
166	0x0084	WORD		
167	0x0086	WORD		
168	0x0088	WORD		
169	0x008A	WORD		
170	0x008C	WORD		
171	0x008E	WORD		
172	0x0090	WORD		
173	0x0092	WORD		
174	0x0094	WORD		
175	0x0096	WORD		
176	0x0098	WORD		
177	0x009A	WORD		
178	0x009C	WORD		
179	0x009E	WORD		
180	0x00A0	WORD		
181	0x00A2	WORD		
182	0x00A4	WORD		
183	0x00A6	WORD		
184	0x00A8	WORD		
185	0x00AA	WORD		
186	0x00AC	WORD		
187	0x00AE	WORD		
188	0x00B0	WORD		
189	0x00B2	WORD		
190	0x00B4	WORD		
191	0x00B6	WORD		
192	0x00B8	WORD		
193	0x00BA	WORD		
194	0x00BC	WORD		
195	0x00BE	WORD		
196	0x00C0	WORD		
197	0x00C2	WORD		
198	0x00C4	WORD		
199	0x00C6	WORD		
200	0x00C8	WORD		
201	0x00CA	WORD		
202	0x00CC	WORD		
203	0x00CE	WORD		
204	0x00D0	WORD		
205	0x00D2	WORD		
206	0x00D4	WORD		
207	0x00D6	WORD		
208	0x00D8	WORD		
209	0x00DA	WORD		
210	0x00DC	WORD		
211	0x00DE	WORD		
212	0x00E0	WORD		
213	0x00E2	WORD		
214	0x00E4	WORD		
215	0x00E6	WORD		
216	0x00E8	WORD		
217	0x00EA	WORD		
218	0x00EC	WORD		
219	0x00EE	WORD		
220	0x00F0	WORD		
221	0x00F2	WORD		
222	0x00F4	WORD		
223	0x00F6	WORD		
224	0x00F8	WORD		
225	0x00FA	WORD		
226	0x00FC	WORD		
227	0x00FE	WORD		
228	0x0100	WORD		
229	0x0102	WORD		
230	0x0104	WORD		
231	0x0106	WORD		
232	0x0108	WORD		
233	0x010A	WORD		
234	0x010C	WORD		
235	0x010E	WORD		
236	0x0110	WORD		
237	0x0112	WORD		
238	0x0114	WORD		
239	0x0116	WORD		
240	0x0118	WORD		
241	0x011A	WORD		
242	0x011C	WORD		
243	0x011E	WORD		
244	0x0120	WORD		
245	0x0122	WORD		
246	0x0124	WORD		
247	0x0126	WORD		
248	0x0128	WORD		
249	0x012A	WORD		
250	0x012C	WORD		
251	0x012E	WORD		
252	0x0130	WORD		
253	0x0132	WORD		
254	0x0134	WORD		
255	0x0136	WORD		
256	0x0138	WORD		
257	0x013A	WORD		
258	0x013C	WORD		
259	0x013E	WORD		
260	0x0140	WORD		
261	0x0142	WORD		
262	0x0144	WORD		
263	0x0146	WORD		
264	0x0148	WORD		
265	0x014A	WORD		
266	0x014C	WORD		
267	0x014E	WORD		
268	0x0150	WORD		
269	0x0152	WORD		
270	0x0154	WORD		
271	0x0156	WORD		
272	0x0158	WORD		
273	0x015A	WORD		
274	0x015C	WORD		
275	0x015E	WORD		
276	0x0160	WORD		
277	0x0162	WORD		
278	0x0164	WORD		
279	0x0166	WORD		
280	0x0168	WORD		
281	0x016A	WORD		
282	0x016C	WORD		
283	0x016E	WORD		
284	0x0170	WORD		
285	0x0172	WORD		
286	0x0174	WORD		
287	0x0176	WORD		
288	0x0178	WORD		
289	0x017A	WORD		
290	0x017C	WORD		
291	0x017E	WORD		
292	0x0180	WORD		
293	0x0182	WORD		
294	0x0184	WORD		
295	0x0186	WORD		
296	0x0188	WORD		
297	0x018A	WORD		
298	0x018C	WORD		
299	0x018E	WORD		
300	0x0190	WORD		
301	0x0192	WORD		
302	0x0194	WORD		
303	0x0196	WORD		
304	0x0198	WORD		
305	0x019A	WORD		
306	0x019C	WORD		
307	0x019E	WORD		
308	0x01A0	WORD		
309	0x01A2	WORD		
310	0x01A4	WORD		
311	0x01A6	WORD		
312	0x01A8	WORD		
313	0x01AA	WORD		
314	0x01AC	WORD		
315	0x01AE	WORD		
316	0x01B0	WORD		
317	0x01B2	WORD		
318	0x01B4	WORD		
319	0x01B6	WORD		
320	0x01B8	WORD		
321	0x01BA	WORD		
322	0x01BC	WORD		
323	0x01BE	WORD		
324	0x01C0	WORD		
325	0x01C2	WORD		
326	0x01C4	WORD		
327	0x01C6	WORD		
328	0x01C8	WORD		
329	0x01CA	WORD		
330	0x01CC	WORD		
331	0x01CE	WORD		
332	0x01D0	WORD		
333	0x01D2	WORD		
334	0x01D4	WORD		
335	0x01D6	WORD		
336	0x01D8	WORD		
337	0x01DA	WORD		
338	0x01DC	WORD		
339	0x01DE	WORD		
340	0x01E0	WORD		
341	0x01E2	WORD		
342	0x01E4	WORD		
343	0x01E6	WORD		
344	0x01E8	WORD		
345	0x01EA	WORD		
346	0x01EC	WORD		
347	0x01EE	WORD		
348	0x01F0	WORD		
349	0x01F2	WORD		
350	0x01F4	WORD		
351	0x01F6	WORD		
352	0x01F8	WORD		
353	0x01FA	WORD		
354	0x01FC	WORD		
355	0x01FE	WORD		
356	0x0200	WORD		
357	0x0202	WORD		
358	0x0204	WORD		
359	0x0206	WORD		
360	0x0208	WORD		
361	0x020A	WORD		
362	0x020C	WORD		
363	0x020E	WORD		
364	0x0210	WORD		
365	0x0212	WORD		
366	0x0214	WORD		
367	0x0216	WORD		
368	0x0218	WORD		
369	0x021A	WORD		
370	0x021C	WORD		
371	0x021E	WORD		
372	0x0220	WORD		
373	0x0222	WORD		
374	0x0224	WORD		
375	0x0226	WORD		
376	0x0228	WORD		
377	0x022A	WORD		
378	0x022C	WORD		
379	0x022E	WORD		
380	0x0230	WORD		
381	0x0232	WORD		
382	0x0234	WORD		
383	0x0236	WORD		
384	0x0238	WORD		
385	0x023A	WORD		
386	0x023C	WORD		
387	0x023E	WORD		
388	0x0240	WORD		
389	0x0242	WORD		
390	0x0244	WORD		
391	0x0246	WORD		
392	0x0248	WORD		
393	0x024A	WORD		
394	0x024C	WORD		
395	0x024E	WORD		
396	0x0250	WORD		
397	0x0252	WORD		
398	0x0254	WORD		
399	0x0256	WORD		
400	0x0258	WORD		
401	0x025A	WORD		
402	0x025C	WORD		
403	0x025E	WORD		
404	0x0260	WORD		
405	0x0262	WORD		
406	0x0264	WORD		
407	0x0266	WORD		
408	0x0268	WORD		
409	0x026A	WORD		
410	0x026C	WORD		
411	0x026E	WORD		
412	0x0270	WORD		
413	0x0272	WORD		
414	0x0274	WORD		
415	0x0276	WORD		
416	0x0278	WORD		
417	0x027A	WORD		
418	0x027C	WORD		
419	0x027E	WORD		
420	0x0280	WORD		
421	0x0282	WORD		
422	0x0284	WORD		
423	0x0286	WORD		
424	0x0288	WORD		
425	0x028A	WORD		
426	0x028C	WORD		
427	0x028E	WORD		
428	0x0290	WORD		
429	0x0292	WORD		
430	0x0294	WORD		
431	0x0296	WORD		
432	0x0298	WORD		</

Creation of a section in the application program

Right mouse click on **Section** in the application browser opens a pop up menu. Select **Create..**



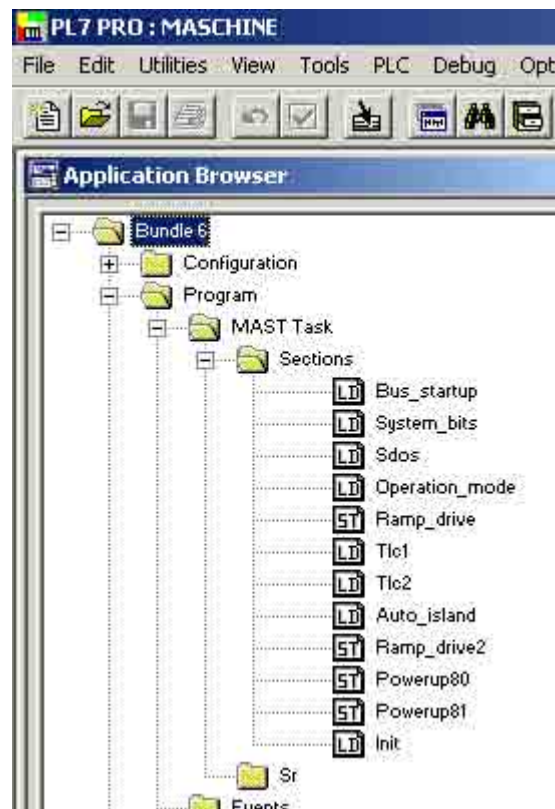
In the **Create** Dialog, input a name for the section and select the programming language you wish to use in that section:



- ST - Structured Text
- LD - Ladder Diagram
- IL - Instruction List

This application program example is written in ST and split into the following functions:

- (*init*)
- (*init manu*)
- (*mode auto/manu*)
- (*run/stop*)
- (*right/left*)
- (*mode auto*)
- (*mode manu*)
- (*read speed and status*)



Create the Application Program

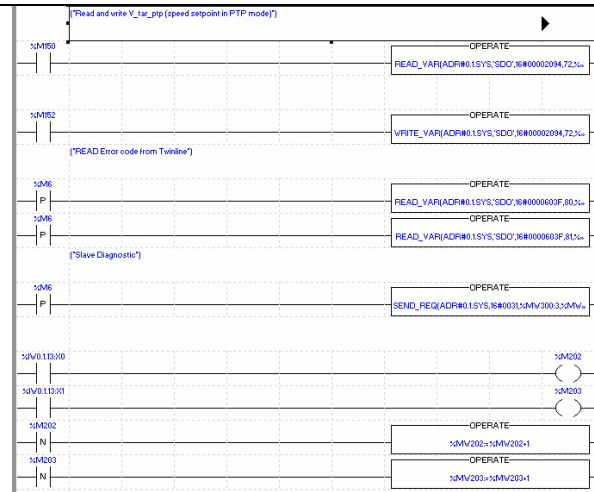
Here is an example of a PL7 section (*SDOs*)

PL7 –Commands: E.g.:

Read and Write the variable
V_tar_ptp (Nominal speed
value in point to point mode)

Read the variable with the
error codes in the Tinline

Read the CANopen Slave
Diagnostic



READ_VAR(ADR#0.1.SYS,'SDO',16#00002094,
72,%MW150:2,%MW500:4)

WRITE_VAR(ADR#0.1.SYS,'SDO',16#00002094,
72,%MW152:2,%MW504:4)

READ_VAR(ADR#0.1.SYS,'SDO',16#0000603F,
80,Error_code80:2,%MW508:4)

SEND_REQ(ADR#0.1.SYS,16#0031,%MW300:3
,%MW307:25,%MW303:4)

Explanation of PL7 commands: example - Write_Var command

List of rung references:

(1):WRITE_VAR(ADR#0.1.SYS,'SDO',16#00006060,80,%MW152:1,%MW504:4)

Function parameters:

WRITE_VAR(ADR#0.1.SYS,'SDO',16#00006060,80,%MW152:1,%MW504:4)

Assignment of standard objects

Parameters:	Variables:	Values:
Address	:	ADR#0.1.SYS
Type of Object	:	'SDO'
Object index (pf) and sub-index (PF)	:	16#00006060
Slave address	:	80
Data to Write	:	%MW152:1
Report	:	%MW504:4

CanOpen address of the Tinline is stored in the Slave Address. The first value is 80, the second 81.

%MW152 holds "03" (=Speed mode) and %MW507 (%MW504+3) holds the amount of data to be transferred (here 1).

With the adjusted memory location the same applies for the second TwinLine.

Explanation of PL7 Commands: Read_Var Command

List of rung references:

(1):READ_VAR(ADR#0.1.SYS,'SDO',16#0000603F,80,%MW154:2,%MW508:4)

(2):READ_VAR(ADR#0.1.SYS,'SDO',16#0000603F,81,%MW155:2,%MW512:4)

Function parameters:

READ_VAR(ADR#0.1.SYS,'SDO',16#0000603F,80,%MW154:2,%MW508:4)

Parameters:	Variables:	Values:
Address	:	: ADR#0.1.SYS
Type of Object	:	: 'SDO'
Object index (pf) and sub-index (PF)	:	: 16#0000603F
Slave address	:	: 80
Reception Zone	:	: %MW154:2
Report	:	: %MW508:4

READ_VAR(ADR#0.1.SYS,'SDO',16#0000603F,81,%MW155:2,%MW512:4)

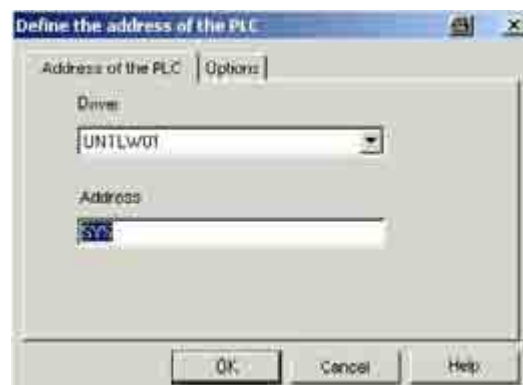
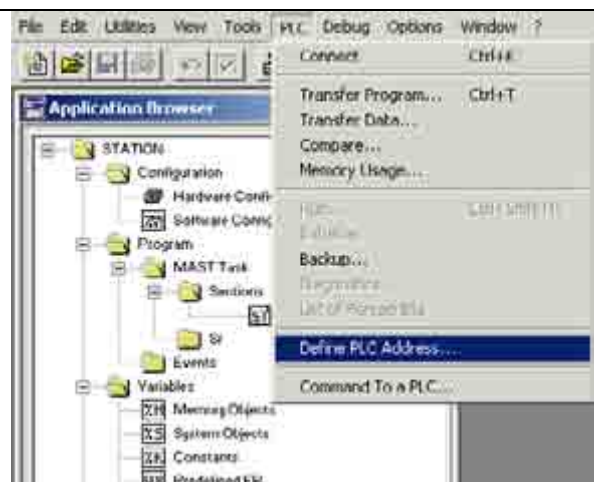
Parameters:	Variables:	Values:
Address	:	: ADR#0.1.SYS
Type of Object	:	: 'SDO'
Object index (pf) and sub-index (PF)	:	: 16#0000603F
Slave address	:	: 81
Reception Zone	:	: %MW155:2
Report	:	: %MW512:4

For the complete PLC example application source code, see the appendix to this document

In order to download the application program

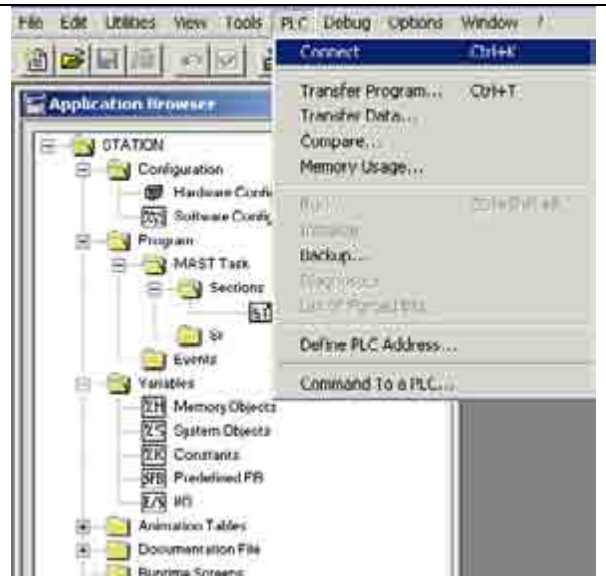
Define the PLC Address

SYS is the standard system address of the PLC.



Connect the PLC to the PC

For this use the programming cable TSXPCX1031 (PLC-TER socket, PC-COMx Interface SubD9)



Download the Application program to the PLC



HMI

Introduction

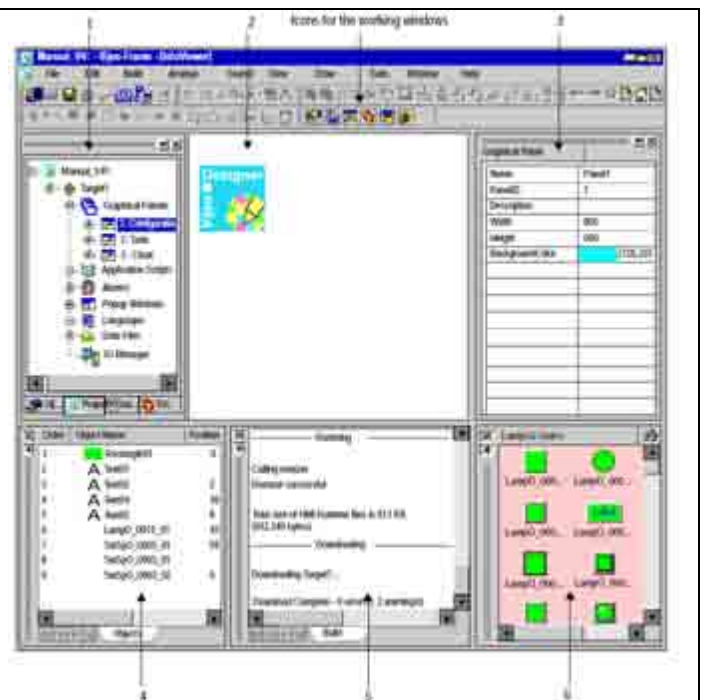
This section describes the steps needed to create the Magelis images. For this we use Vijeo Designer.

The Setup of the HMI is done as follows:

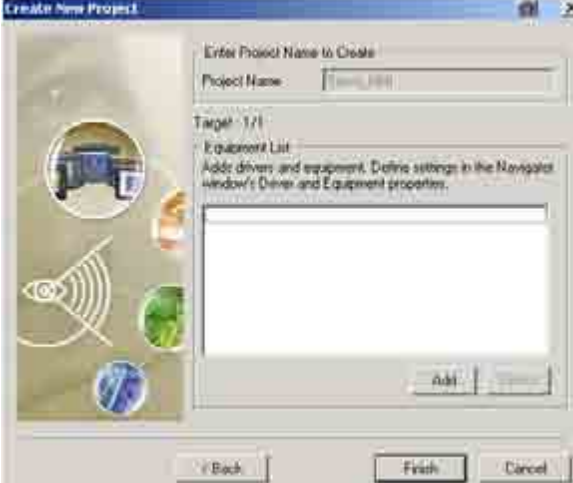
- Create a new project
- Give the project a name
- Specify the hardware
- Select new driver
- New screen
- Setup download
- Configure the Modbus connection
- Configure driver / Configure device
- Create new variables
- Create new screen
- Example of a numerical display
- Characteristics dialog
- Animation setup
- Check projekt
- Download Projekt

Vijeo Designer has the following components:

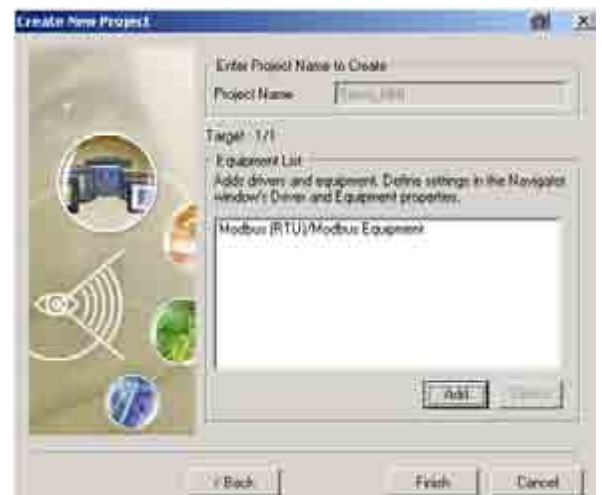
- 1 - Navigator
- 2 - Info-Display
- 3 - Inspector
- 4 - Data list
- 5 - Feedback Zone
- 6 - Toolbox



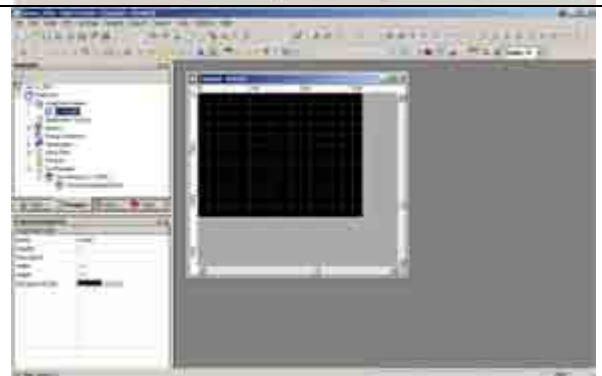
After starting Vijeo Designer, select Create New Project	 The 'Vijeo Designer' window shows a 'Welcome to Vijeo-Designer' message. It asks 'What would you like to do?' with three options: 'Create new Project' (selected), 'Open existing Project', and 'Don't show this dialog box again'. Navigation buttons at the bottom are 'Back', 'Next >', 'Finish', and 'Cancel'.
Input a Project Name e.g. Servo_HMI	 The 'Create New Project' dialog box has a 'Project Name' field containing 'Servo_HMI'. Below it is a 'Description or Comment' text area. The 'Type' section has 'Project with Single Target' selected. Navigation buttons at the bottom are 'Back', 'Next >', 'Finish', and 'Cancel'.
Select the target device Target Name: "Platform1" Target Type: "XBTG Series" XBTG Model: "XBTG2330"	 The 'Create New Project' dialog box shows the 'Target' section. 'Target Name' is 'Platform1', 'Target Type' is 'XBTG Series', and 'XBTG Model' is 'XBTG2330 (320x240)'. A list of other models is visible below. Navigation buttons at the bottom are 'Back', 'Next >', 'Finish', and 'Cancel'.

Input the ethernet addresses for the target device. (depends on the Type of XBT-G)	
Use Add, to select a new driver.	
Manufacturer: "Schneider Electric Industries SAS" Driver: "Modbus (RTU)" Equipment: „Modbus Equipment"	

The new driver has now been added

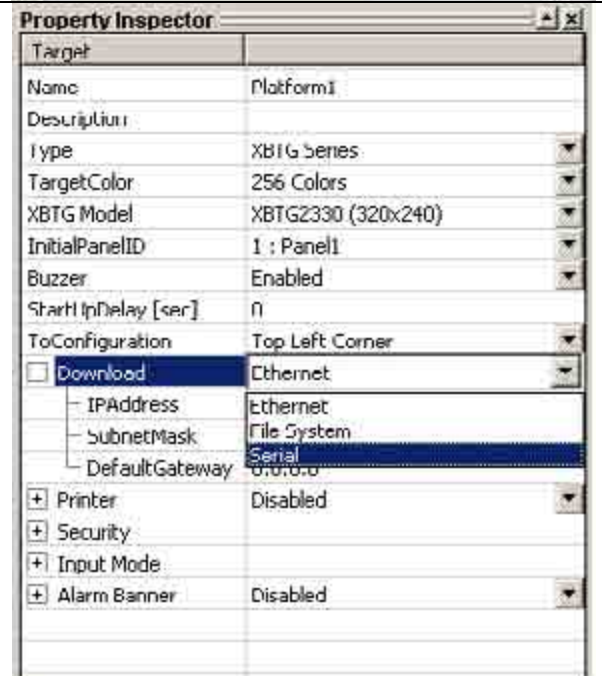


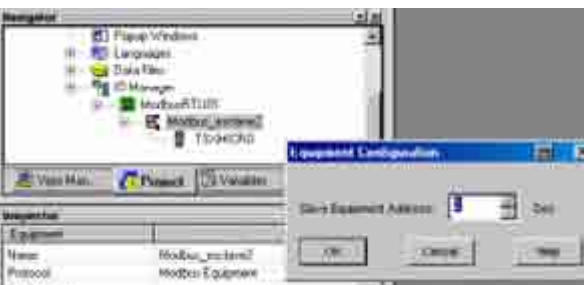
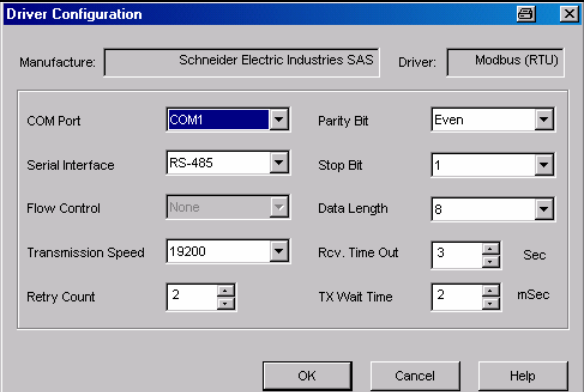
New Project Window



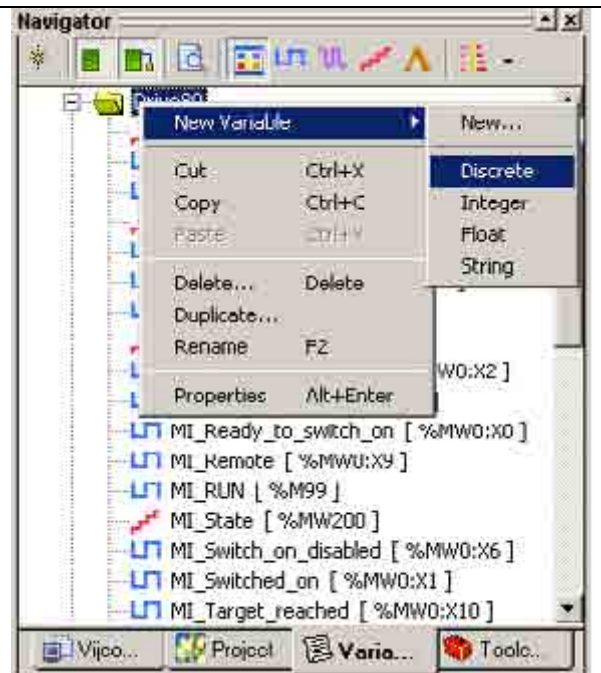
Select **Download** and define the **Serial** connection between the PC and Magelis.

As an alternative, you could select **Ethernet** for the connection.



Rename the communications device to PLC	
Configure the Modbus(RTU) Driver “IO Manager – ModbusRTU01 – „Configuration..”	
Driver Configuration COM Port: COM1 Transmission Speed:19200 Data: 8 Bit Stop bit : 1 Parity: Even	
Device Configuration of the communications device	

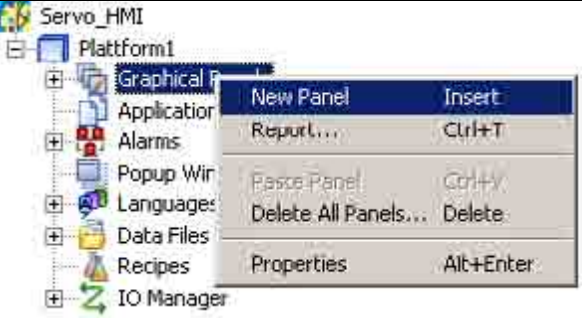
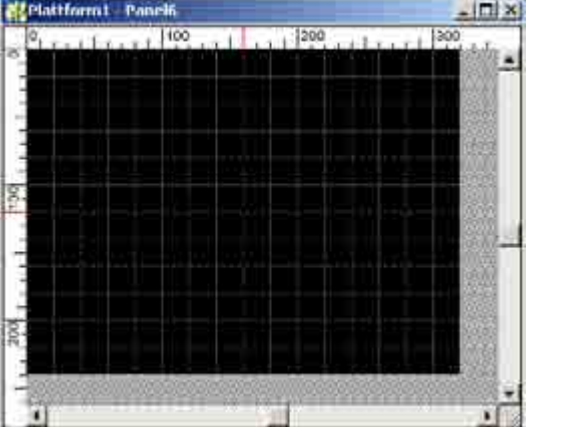
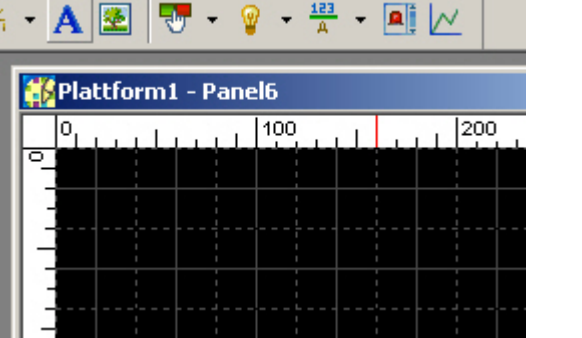
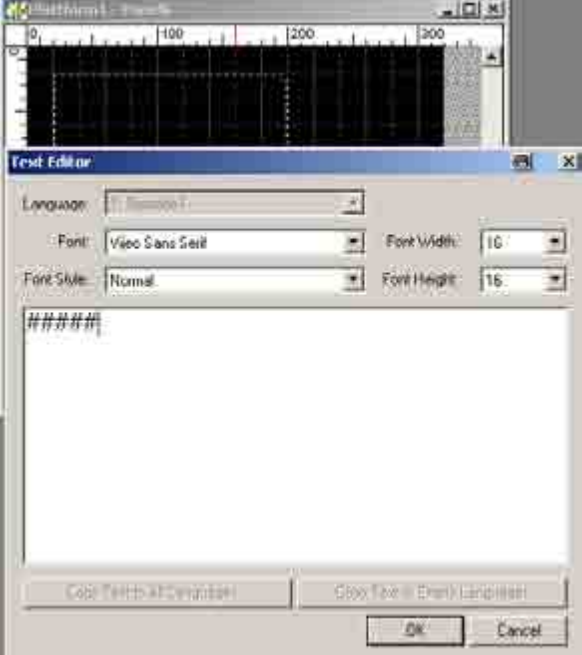
Create New Variable



Setup the Variable Properties:

- Variable Name
- Data Type
- Data Source – External – PLC
- Device Address in the PLC



Create a New Panel	
An Empty panel	
Example: Insert Text Select the text icon „A“ in the toolbar. The toolbar with the different tool icons is above the panel.	
Example: altering text Define the font size, font type, font style.... and type in the text.	

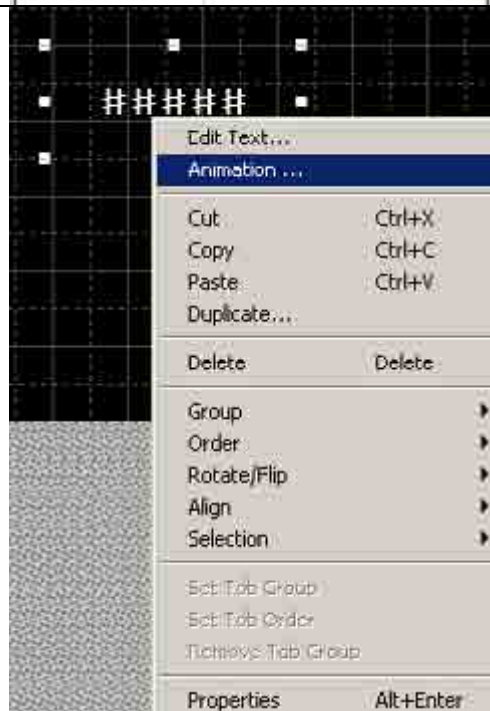
Property Inspector :

Text attributes such as position, size, colour can be changed here.



Click on the text element in the panel window. A right mouse click opens up a drop down menu. Select **Animation..** to animate the object.

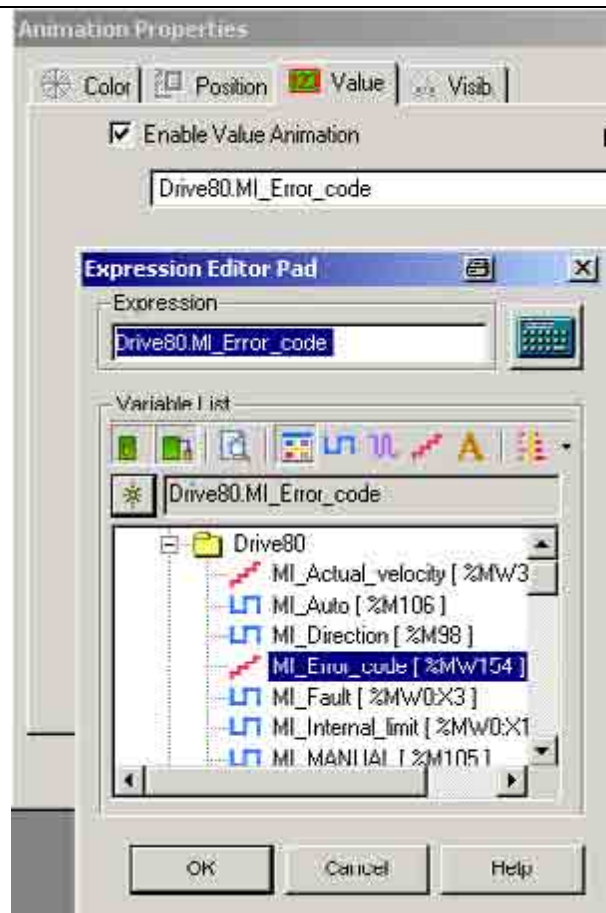
You can do this in the property inspector too.



Dialog Animation Properties:

- Colour
- Position
- Value
- Visible

After activating the animation, you can select how the animation is to be displayed.

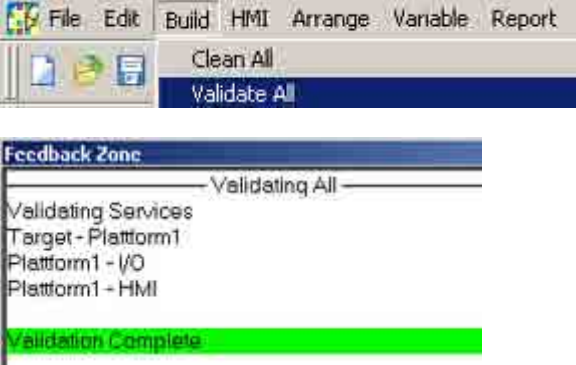
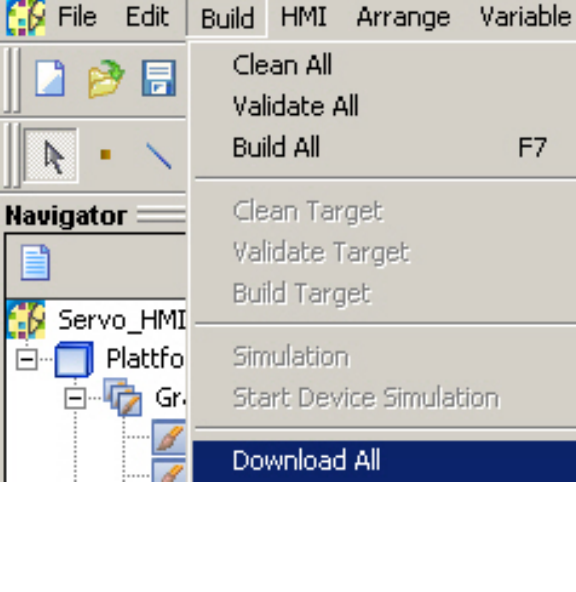


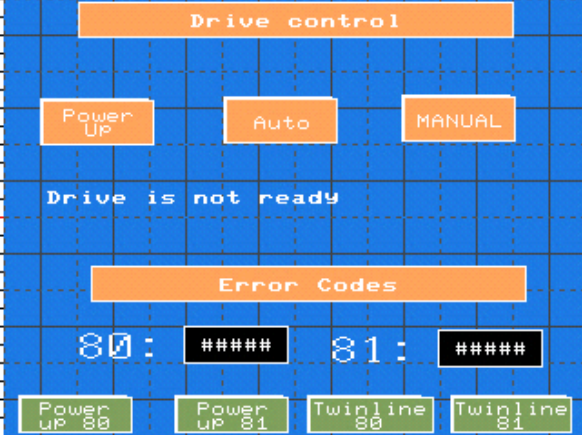
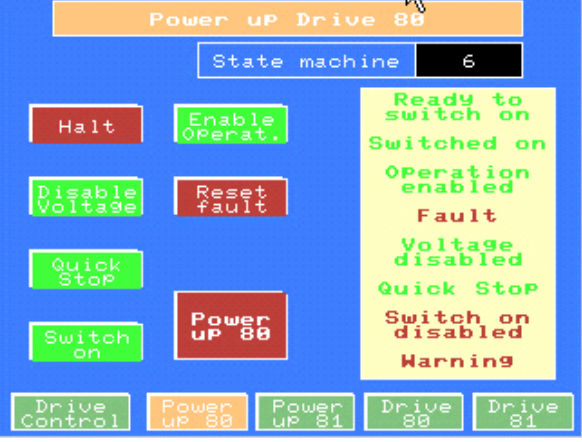
Some examples of texts, text fields and graphics.



The final screen with all the attributes for the animation and events.



With Validate All you can analyse your project. The feedback zone shows you the results of the analysis. You can invoke the project analysis using Build All too.	
Downloading the project to the Magelis (HMI) Select the project in the Navigator. Using either a right mouse click on the project name or the menu Build. Select Download All to transfer the project to the HMI device. The transfer is done using the configured protocol (serial or ethernet). The Vijeo Designer standard package contains a serial cable.	

HMI Screens for the application: Mode Selection : • Power Up (Initialisierung) • AUTO • MANUAL	
Status Screen Drive 80 or 81	
Drive Screen 80 / 81 Mode Selection: • RUN • STOP • LEFT • RIGHT Mode Display: • Speed setpoint • Actual Speed • Drive Status • Drive Mode	

Twin Line Drive Controller

Introduction

This section describes how to configure the parameters for the TLC Twin Line drive controller. You can input the TLC5325 parameters using the programming panel on the device itself (optional). However, the big advantage of using the TL Control Tool, is that you can store the data on your PC and also have the possibility to print and document this information. The software is also an aid to invoking the TLC and optimising the parameters in online mode.

Configuring and setting up the parameters of the TLC consists of:

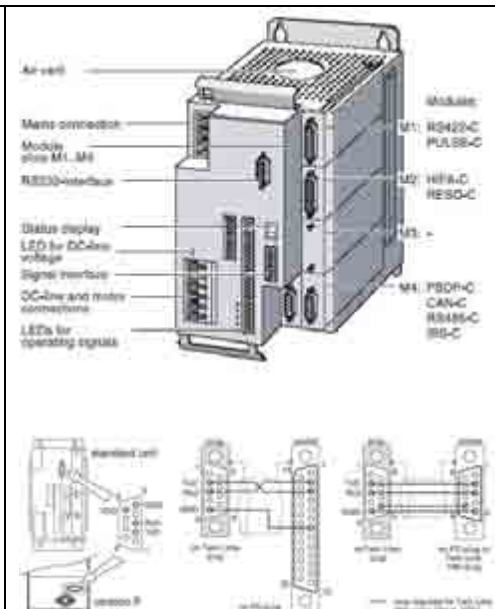
- TLC wiring for the signal interface
- TC Control Tool Start
- Open an existing parameter file (*.TLX)
- Connect the PC(COMxx) to the TLC motor controller
- The device is recognised
- Device on the Bus
- Set the Parameters
- Parameters for the Servomotor
- Parameters for M4 Module (here Modbus Option)
- Call the Assistant to go operational
- Operate TLC "Step by Step" using the TL Control Tool
- Download the Parameter(s) to the RAM of TLC
- Save the TLC RAM to the internal EEPROM.
- Description of TLC operation modes (Display)

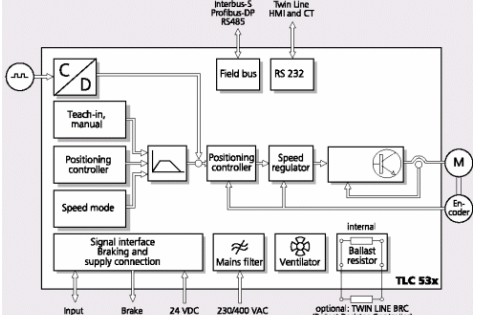
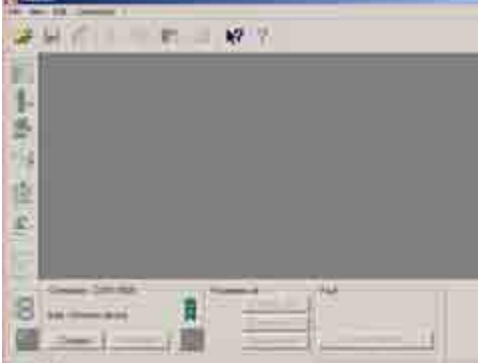
Layout of TLC 532

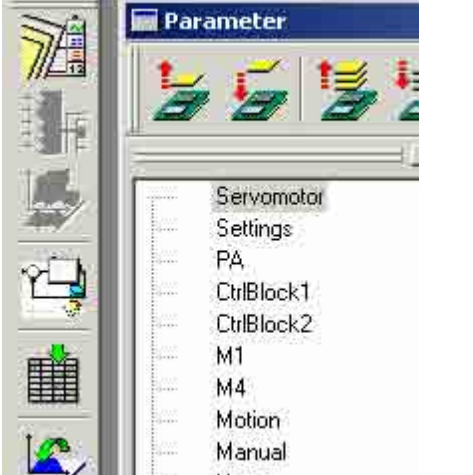
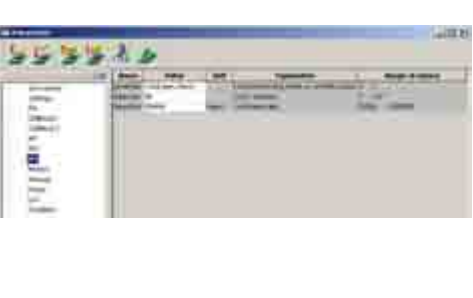
RS232-Interface. Der RS232-Connection is the communications interface of the device and used for connecting it to a PC (TL Control Tool) or a hand held HMI device.

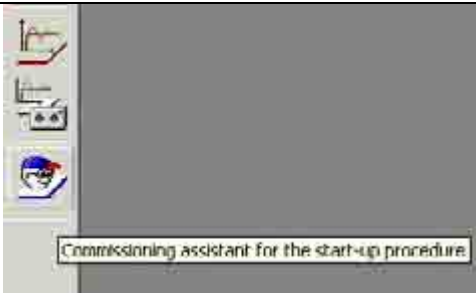
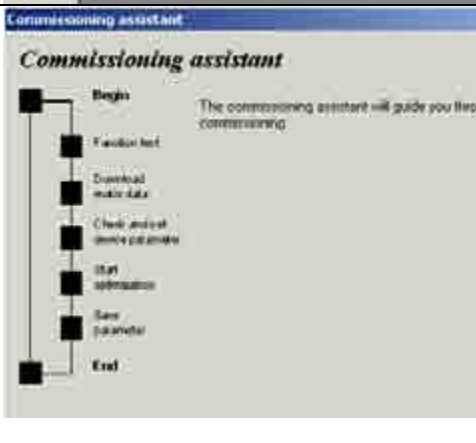
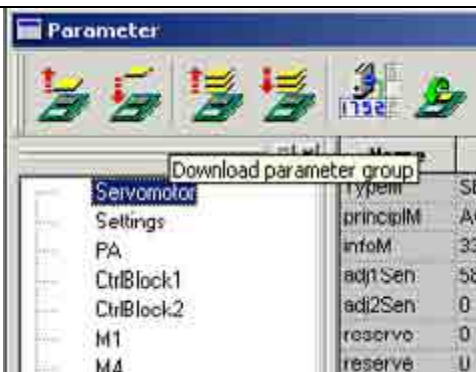
Connecting the RS232-Interface

Connect the RS232-interface with Sub-D-socket, 9-pole and M3 –screws 1:1 with the PC or with the Twin Line HMI. The drive controller supplies the current for the Twin Line HMI via Pin 9.



TLC Input wiring of the Signal interface	
TLC Functions	
TC Control Tool Start The screen looks like this on the first invocation of the TL Control Tool Software	
Use the Open dialog to open an existing Parameter file (*.TLX)	
Make the connection between the PC (COMxx) and the TLCDrive controller (COM1-Interface 9-polig) with a RS232 1:1 connecting cable.	

The Device is accepted and recognised	
Device on Bus Use Login to connect.	
Set the Parameters	
The parameters for Servomotor are greyed, i.e. disabled, and cannot be changed. These are the values sent from the servo motor.	
Parameter M4 Modul (here CANopen Option) are not greyed, i.e. are active. Settings: ProfilCAN - CANopen Slave AddrCAN - 80 BaudCAN - 500 kBaud These values must be set.	

Invoke the Assistant to start commissioning.																															
Operate the TLC “Step by Step” using the TL Control Tool • Start • Function test • Load motor data • Check/change device parameters • Start Optimisation • Store Parameters • Target You must always work through these steps from top to bottom.																															
Download the Parameter(s) to the RAM of the TLC																															
Store the TLC RAM Data in the internal EEPROM – so, they are safe during a power cut.																															
Description of the TLC Operation Modes (Display)	<table><tr><th>Value</th><th>Operating status</th><th>Meaning</th></tr><tr><td>1</td><td>Start</td><td>24-V switched on. Initialization of controller's elect</td></tr><tr><td>2</td><td>Not ready to switch on</td><td>Amplifier is not ready to switch</td></tr><tr><td>3</td><td>Switch on disabled</td><td>Amplifier can not be switched o</td></tr><tr><td>4</td><td>Ready to switch on</td><td>Amplifier is ready to switch on.</td></tr><tr><td>5</td><td>Switched on</td><td>Amplifier is switched on.</td></tr><tr><td>6</td><td>Operation enable</td><td>Controller is working in the ope mode set.</td></tr><tr><td>7</td><td>Quick Stop active</td><td>Quick stop is executed.</td></tr><tr><td>8</td><td>Fault reaction active</td><td>Fault reaction has been activat</td></tr><tr><td>9</td><td>Fault</td><td>Fault display.</td></tr></table>	Value	Operating status	Meaning	1	Start	24-V switched on. Initialization of controller's elect	2	Not ready to switch on	Amplifier is not ready to switch	3	Switch on disabled	Amplifier can not be switched o	4	Ready to switch on	Amplifier is ready to switch on.	5	Switched on	Amplifier is switched on.	6	Operation enable	Controller is working in the ope mode set.	7	Quick Stop active	Quick stop is executed.	8	Fault reaction active	Fault reaction has been activat	9	Fault	Fault display.
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8	Fault reaction active	Fault reaction has been activat																													
9	Fault	Fault display.																													

Addendum

Detailed Component List

Type / Software		Revision/Version
ABL7RE2403 VCF02GE	POWER SUPPLY 240VAC 1PH 24VDC 3A EMERGENCY ON/OFF MAINS SWITCH	
TSX3722101 TSXDMZ64DTK TSXDEZ32D2 TSXDSZ32T2 TSXPCX1031 TSXCPP110 TSXSCPCM4030	MODICON TSX MICRO:TSX37-22, DIGITAL I/O-MODULE 32In/32Out DIG.INPUT MODULE,32In(24V)SCHR DIG. OUTPUT MODULE 32Out COMMUNICATION CABLE MULTIFUNCTIONAL CANopen PC-Card Type III RS485 Branch Cable	PV10,RL13,SV6.0
XBTG2330 XBTZG915 XBTZG999 XBTZ968	Colour TFT LCD 256 Colours 5,7 Inch Programming Cable Cable adapter connecting cable 2,5M	Version 4.1.0.130
TLC532FHIFACAN SER3683L5SS0A00 GEA2M0AAAA003 GEA2EAAAAA003 62501446005 TLATA TLATB	Twin Line 230V/1F, 750W , CANopen AC-Servo Motor 350W with Resolver Motor Cable - 3m Signal Cable - 3m CAN- Kabel 0,5m 9-pol. Socket 9-pol. Plug	747.00 Rev.1.205
STBPDT3100 STBNCO2212 STBXCA4002 STBXBA3000 STBXBA2200 STBDRC3210 STBACI1230 STBDDI3610 STBXMP1100 STBACO1210 STBXTS2100 STBXBA1000 STBXBA2000 STBXTS1100 STBXTS1110 STBXTS1120 STBXTS1130	Power Supply. 24VDC PDM STD. BUS connector CANOPEN NIM STD. Configuration Cable RS232 SUBD/HE13 2M SOCKET I/O TYP3 27MM SOCKET PDM 18MM MODULE 2A RELAIS C 24VDC / 2A MODULE E2KAN. 12BIT ISOLATED 0...20MA MODULE 6E 24VDC SINK 2 WIRE 0.1MS FIX. S BUS TERMINAL MODULE ISLAND BUS MODULE 2CHAN. 12BIT 0...20MA PLUG I/O 6 CONNECT. FEDERZUGKL. (20ST) SOCKET I/O TYPE1 13.5MM SOCKET I/O TYPE2 18MM PLUG I/O 6CONNECT. SCREW. (20ST) PLUG I/O 5CONNECT. SCREW. (20ST) PLUG NIM 2CONNECT. SCREW. (10ST) PLUG PDM 2 CONNECT. SCREW. (10 ST)	
TLXCDPL7PP44M STBSPU1000 VJDSPULFUCDV10M SYCSPULFUCD28M 62501101803	Software PL7 Pro V4.4 M Software ADVANTYS Incl. Cable RS232 Software Vijeo Designer Field bus Configurator SyCon V2.8 Twin Line Control Tool	V4.4 V1.2 V4.1 V2.8 V1.045

Component Performance

Performance

PLC Micro TSX3722101

I/O :	max. 256 digital I/Os max. 32 analog I/Os
Program Memory :	up to 128 KBytes
Data Memory :	up to 35 KBytes
Networks :	CANopen (via PCMCIA)
Expert modules :	Counters, Emergency off (not used)
Programming :	PL7-Micro (4 Languages IEC1131-3)



Drive Controller Twin Line TLC532FHIFACAN

- Small Compact Dimensions
- same mechanical format for all performance classes
- integrated power electronics; Step or AC-Synchronous Servomotor
- Power Supply for the power electronics direct from mains without transformer
- Power Range von 350 W bis 8 kW
- integrated mains filter, cooler and fan
- Protection IP 20, for certain power ranges optional IP 54
- Device mounting integrated into housing
- all electrical connections accessible from the front
- connection screen und strain relief on device

Performance	von 0,75 kW (Size 1)
Power Variations	230 V ~, 1-phase / 400 V ~, 3-phase
Fieldbus Interface	CANopen



Servo motor SER3683L5S

Performance	0,6 kW
RPM	12000 min ⁻¹
Rated Continuous torque	0,48 Nm
Continuous Stationary torque	3,0 Nm
Voltage max.	230 V ~



Phaseo Power Supply Unit ABL7RE2403

Input Voltage	100...240 V ~, single phase, 50/60 Hz
Output Voltage	24 V =
Output power	3,0 A



Magelis full graphics Touch Panel XBTG2330

Display type	LCD-TFT 256 Colours
Display Dimensions	5,7" (320x240)
Protocols	Unitelway, Modbus, Modbus TCP/IP
Connections	RS232C/RS485 , Ethernet 10BaseT
Voltage	24 V = external



**Performance
(Ctd.)**

PL7 MICRO Programming software TLXCDPL7PP44M

Programming with Instruction List, Contact Plan and Structured Text
Access to all application elements using the navigator
Simplified hard- and software-configuration using special editors
Two types of application: Mono-task or Multi-task
Structuring of the Master- and Fast-task in sections
Selection of a different programming language in each section
Simple testing using automatically assembled animation tables



Here some features:

• **IEC 61131-3 standard languages**

- Ladder Diagram - LD, Instruction list - IL,
- Structured text - ST, Sequential Flow Chart (Grafcet) - SFC
- DFB - Derived Function Block
- Developers kit: Funktionen in C

• **Functions**

- DIGITAL I/O, ANALOG I/O, COUNTERS, POSITIONING, STEP-MOTOR,
- CLC, IEC Floating point, COMMUNICATION, FUZZY-Logic
- Integrated operator displays, operator displays with PL7- MMI/Windows
- APPLICATIONS DIAGNOSTIC with ' Runtime displays '

• **Editors / Tools**

- Applikationsnavigator, Verwaltung der Anwenderrechte
- Editors : Programming ST, LD, IL, SFC, DFB
- Editors : Configuration, Variables, Symbols, Documentation
- Tools: Cross Reference, Search/Replace, Import/Export, Application converter
- Tools: *Animations tables, Diagnostics, Debug, Online Changes*

Vijeo Designer VJDSPULFUCDV10M

The user friendly configuration software, Vijeo Designer, allows for simple and fast development of projects using configuration windows. Vijeo Designer allows the processing of process data using the touch panel XBT G and Java-Script.

Some of the features:

Navigator,
Library of animated graphical objects,
Online-Help,
Error Report Display,
Object Attributes Display,
Variablelists.



Advantys Configuration Software



Configuring Advantys STB- Systems consists of:

- If required, implementing all I/O Modules on the Advantys STB- Platform (digital, analog and intelligent modules) using standard functions.
- Parametering of the islands Reflex funktion.
these parameters are defined using the Advantys- Configurationssoftware STB SPU 1000.

The Software also allows you to:

- Optimise the Island performance by defining priorities for processing each module's data
- Add preferred modules or standard CANopen devices such as FTB, ATV31, Lexium05
- Analyse the configuration for errors in the conception and power supply.
- Change the standard functions of the modules.

SyCon Fieldbus Configurator



- SyCon is the Schneider Electric Fieldbus Configurator for the Quantum and Premium PLC Family.
- The Tool supports CANopen (TSX CPP110) ,Profibus DP (TSX PBY100) on the Premium/Micro and Profibus DP (140 CRP 811 00) and INTERBUS (140 NOA 622 00) on the Quantum.
- The SyCon Tool contains the „Device description“ files for the Schneider Electric I/O Modules.

Twin Line Control Tool Software (TLCT)

The software Twin Line Control Tool (TL CT) works together with the power electronics und Positioning control of the Twin Line device family. The Twin Line Control Tool is an aid to fast application and diagnosis and can be used with any Twin Line device with an RS 232-interface without the necessity for prior configuration.

Appropriate Twin Line devices are:

- TLD xxx, except TLD 01x
- TLC xxx



Some Functions:

- Input and Display of the device parameters
- Archiving and Duplication of device data
- Manual positioning of the motor with the PC
- Recording, Analysis and Archiving of motion cycles
- Offline und Online Processing of Parameter and motion cycles
- Optimising the closed loop control
- Diagnosis of operative errors
- Operations-Assistant for fast installation of a Twin Line device

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