Magelis XBT N/R/RT
Compact Display Units
User Manual

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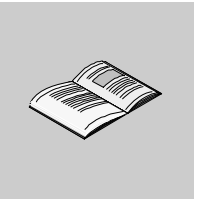
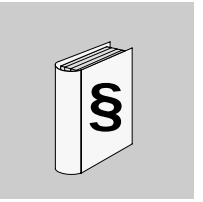
Table of Contents



Safety Information



Important Information

NOTICE

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

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

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

⚠ DANGER

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

⚠ WARNING

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

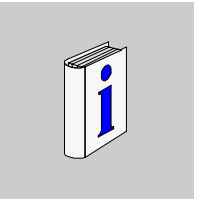
⚠ CAUTION

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

PLEASE NOTE

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

About the Book



At a Glance

Document Scope

This manual describes how to use the Magelis XBT N/R/RT device.

Validity Note

Schneider Electric assumes no responsibility for any errors that may appear in this document. If you have suggestions for improvements or amendments or have found errors in this publication, please notify us.

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The data and illustrations found in this documentation are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Related Documents

Title of Documentation	Reference Number
Vijeo-Designer Lite	Online help
Modbus Master Protocol XBT N/R/RT	33003986
Modbus SlaveProtocol XBT N/R/RT	33003980
Uni-Telway Protocol XBT N/R/RT	33003974
Siemens PPI Protocol XBT N/R/RT	33003992
AB DF1 Protocol XBT N/R/RT	33003998
AB DH485 Protocol XBT N/R/RT	33004016
Mitsubishi FX Protocol XBT N/R/RT	33004004
SYSMAC-WAY Protocol XBT N/R/RT	33004010

You can download these technical publications and other technical information from our website at *www.telemecanique.com*.

Product Related Warnings

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

When controllers are used for applications with technical safety requirements, please follow the relevant instructions.

User Comments

We welcome your comments about this document. You can reach us by e-mail at techpub@schneider-electric.com

Document Conventions

1

General information

Pictograms

The meaning of the pictograms used in this document is explained below.

Pictogram	Description
	Indicates information concerning the communication LED.
	Indicates information concerning LEDs in general.
	Represents a button on the Vijeo-Designer Lite program toolbar.
	Represents a button on the XBT terminal.

Overview

2

Standards and General Safety Precautions

List of Standards

XBT terminals have been developed to conform to the following standards:

- UL 508 for Industrial Control Equipment
- UL 1604 Electrical Equipment for Use in Class I and Class II Division 2 and Class III Hazardous Locations
- CAN/CSA-C22.2, No. 14, No. 213, and No. 60950 Industrial Control Equipment Miscellaneous Apparatus - For Hazardous Locations.

General Safety Precautions

⚠ DANGER

EXPLOSION

- Compatibility: Power and external device wiring must be in accordance with Class I, Division 2 wiring methods - Article 501- 4(b) of the National Electrical Code, Groups A, B, C and D Hazardous Locations or Non-Hazardous Locations, NFPA 70 or as specified in section 18-152 of the Canadian Electrical Code for installations within Canada and in accordance with the authority having jurisdiction.
- Do not perform substitution of components that may impair compliance to Class I, Division 2.
- Confirm that the location is not subject to any risk of explosion before connecting or disconnecting equipment, replacing or wiring modules.
- Confirm that the power supply has been turned OFF before disconnecting, replacing or wiring modules.
- Before turning ON, sweep front panel with a damp cloth to discharge electrostatics.
- Do not use apparatus that has been damaged.
- When used in hazardous locations (Class I Div.2, UL and CSA) and if suitable for the application (see product label) do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

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

⚠ WARNING

LOSS OF CONTROL

Due to the risk that a value entered on the terminal may not reach the equipment (for example, if a communication break occurs due to huge bandwidth consumption, the value may not be sent to the PLC) you are not allowed to use the terminal to pilot safety critical processes, for example emergency stop or crane load manipulation where human beings may get injured.

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

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Read and follow all user instructions and documentation.
- Follow all local and national product safety codes and standards.

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

Characteristics of the XBT Terminal Range

3

At a Glance

Overview

This chapter presents the different types of XBT terminals with their individual characteristics.

What's in this Chapter?

This chapter contains the following sections:

3.1 Characteristics of the XBT Terminal Range

At a Glance

Overview

This section lists the characteristics of the individual versions of the XBT terminal range.

What's in this Section?

This section contains the following topics:

Characteristics Applying to All XBT Terminals

Overview

XBT Type		XBT N200	XBT N400 / XBT R400 / XBT RT500 / XBT RT511	XBT N410 / XBT N401 / XBT NU400 / XBT R410 / XBT R411
Environment				
Compliance with standards		IEC 61131-2, IEC 60068-2-6, IEC 60068-2-27, UL 508, CSA C22-2 no. 14, no 213, and no. 60950		
Product certification		CE, UL, CSA, Class 1 Div 2 T5 (UL and CSA)		
Temperature	Operation	0...+55°C (32°F...131°F)		
	Storage	-20...+60°C (-4°F...140°F)		
Humidity (without condensation)		0...85%		
Protection	Front panel	IP 65 - (IEC 60529 - NF C 20010) XBT RT: UL Type 4, indoor use only. Do not store or operate the LCD display in areas receiving direct sunlight since the sun's UV rays may cause the LCD display's quality to deteriorate. XBT N/R: UL Type 4, 4X outdoor use (only for support ≥ 1.5 mm / 0.059 in.)		
	Rear panel	IP 20 (IEC 60529)		
ESD withstand		IEC 61000 - 4 - 2, level 3		
Electromagnetic interference		IEC 61000 - 4 - 3, 10 V/m		
Electrical interference		IEC 61000 - 4 - 4, level 3		
Impact		IEC 60068 - 2 - 27; 1/2 sinusoidal pulse for 11 ms, 15 g on 3 axes		
Vibration		IEC 60068 - 2 - 6 and marine certifications ± 3.5 mm 2 Hz...8.45 Hz 1 g 8.75 Hz...150 Hz XBT RT does not have marine certifications		

Mechanical characteristics		
Mounting and fixing		Flush-mounted, fixed by 2 (for XBT N) or 4 (for XBT R and XBT RT) spring clips supplied pressure-mounted for panels 1.5...6 mm (0.06...0.23 in.) thick
Material	display unit protection	Polyester
	Front frame	Polycarbonate/polybutylene terephthalate alloy
	Keypad	UV autotex polyester

Characteristics of the Individual XBT Terminals

Overview The following tables list the characteristics of the individual XBT terminal versions.

XBT Type		**XBT N200**	**XBT N400 / XBT R400 / XBT RT500**	**XBT N410 / XBT N401 / XBT NU400 / XBT R410 / XBT R411/ XBT RT511**
Electrical characteristics				
Power supply	Voltage	5 VDC supplied by the PLC. For the specific cables see *Connecting XBT Terminals, p. 65*.		24 VDC (200 mA max)
	Voltage limits	5 V ± 5% DC, 1 W maximum		18...30 VDC, 5 W maximum
	Ripple factor			5% maximum

Note: For products with a resettable fuse (XBT N410 / XBT N401 / XBT NU400 / XBT R410 / XBT R411 / XBT RT511), switch off the power supply for 5 seconds before resetting the fuse.

⚠ CAUTION

OVERVOLTAGE DAMAGE TO EQUIPMENT

Make sure to connect the following terminals only to a source providing 5 VDC.

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

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

Note: XBT RT500 terminals are protected against accidental connection to higher voltages (up to 30 V) but the other terminal types are not and will be damaged.

XBT Type		**XBT N200**	**XBT N400 / XBT N410 / XBT N401 / XBT NU400 / XBT R400 / XBT R410 / XBT R411**	**XBT RT500 / XBT RT511**
Operating characteristics				
Display unit	Type	Backlit LCD		
	Capacity	2 x 20 characters	4 x 20 characters	10 x 33 characters

XBT Type	**XBT N200 / XBT N400 / XBT N410 / XBT NU400 / XBT R400 / XBT R410 / XBT RT500**	**XBT N401**	**XBT RT511**	**XBT R411**
Signaling	No LEDs	6 LEDs	13 LEDs	14 LEDs

XBT Type	**XBT N200 / XBT N400 / XBT N410 / XBT NU400 / XBT R400 / XBT R410 / XBT RT500 / XBT N401 / XBT R411**	**XBT RT511**
Buzzer	No buzzer	Buzzer for alarm signaling and feedback on keypad/touchpad activity

XBT Type		**XBT N200 / XBT N400**	**XBT N401/ XBT N410 / XBT NU400 / XBT R400 / XBT R410 / XBT R411 / XBT RT500 / XBT RT511**
Dialog application	No. of panels	128	200
Transmission medium (asynchronous serial link)		RS232C / RS485	

XBT Type	**XBT NU400**	**XBT N200 / XBT N400 / XBT R400**	**XBT N401 / XBT N410 / XBT R410 / XBT R411 / XBT RT500 / XBT RT511**
Supported protocols	Modbus master	Modbus master, Uni-Telway	Modbus master and slave(*), Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY
Real-time clock	Access to the PLC real-time clock		

(*) Modbus slave is not supported by the XBT RT500.

XBT Type		**XBT N200 / XBT N400 / XBT R400 / XBT RT500**	**XBT N401 / XBT N410 / XBT NU400 / XBT R410 / XBT R411 / XBT RT511**
Connection	Power supply	Via the PLC link cable or via an external 5 V power supply by using the XBT ZRTPW accessory	Removable terminal block 3 screw terminals (pitch 5.08) Clamping capacity: 1.5 mm^2 (0.0023 in^2)

XBT Type		**XBT N200 / XBT N400 / XBT R400 / XBT RT500 / XBT RT511**	**XBT N401 / XBT N410 / XBT NU400 / XBT R410 / XBT R411**
Connection	Serial link	RJ45 female connector (RS232C/RS485)	25-pin female SubD connector (RS232C / RS485)

XBT Type		**XBT N200 / XBT N400 / XBT N410 / XBT NU400 / XBT R400 / XBT R410 / XBT RT500**	**XBT N401 / XBT R411 / XBT RT511**
Connection	Printer link	No printer link	MiniDin (full RS232C, including modem signals)

Display Units	**Alphanumeric Display Unit XBT N200** 	**Matrix Display Unit XBT N400** 	**Matrix Display Unit XBT NU400** 	**Matrix Display Unit XBT N401** 
Display				
Type	Backlit LCD	Backlit LCD 122 x 32 pixels		
Color	Green			Green/Orange/Red
Capacity	2 lines of 20 characters	1...4 lines of 5...20 characters		
Active display unit area (width x height)	74 x 12 mm (2.91 x 0.47 in.)	72 x 20 mm (2.83 x 0.79 in.)		
Size of characters (width x height)	3.2 x 5.5 mm (0.13 x 0.22 in.	2.9 x 4.3 to 11.8 x 17.4 mm (0.11 x 0.17 to 0.46 x 0.69 in.)		
Keypad	8 keys, 4 of them can be re-labeled			
Signaling	No LEDs			6 LEDs including 4 for the 4 central keys
Functions				
Number of panels (maximum)	128 application panels	200 application panels 256 alarm panels		
Variables per panel	8	40		
Vertical panel scrolling	no	yes		
Number of lines per panel	2	25		
Representation of variables	Alphanumeric			
Fonts	Latin + Katakana	Latin + Cyrillic + Katakana + Greek + Simplified Chinese		
Languages	Number of languages only limited by the size of the memory			
Communication				
Serial link	RS232 C, RS485			

Display Units	**Alphanumeric Display Unit XBT N200**	**Matrix Display Unit XBT N400**	**Matrix Display Unit XBT NU400**	**Matrix Display Unit XBT N401**
				
Protocols	Modbus master, Uni-Telway		Modbus master	Modbus master and slave, Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY
Programming software	Vijeo-Designer Lite (using Windows XP or Vista)			

Matrix Display Units	**XBT N410**	**XBT R400**	**XBT R410**	**XBT R411**
				
Display				
Type	Backlit LCD 122 x 32 pixels			
Color	Green			Green/Orange/Red
Capacity	1...4 lines of 5...20 characters			
Active display unit area (width x height)	72 x 20 mm (2.83 x 0.79 in.)			
Size of characters (width x height)	2.9 x 4.3 to 11.8 x 17.4 mm (0.11 x 0.17 to 0.46 x 0.69 in.)			
Keypad	8 keys, 4 of which can be re-labeled	20 keys, 12 of which can be re-labeled		
Signaling	No LEDs			16 LEDs including 14 for the central keys
Functions				
Number of panels (maximum)	200 application panels 256 alarm panels			

Matrix Display Units	**XBT N410**	**XBT R400**	**XBT R410**	**XBT R411**
				
Variables per panel	40			
Vertical panel scrolling	yes			
Number of lines per panel	25			
Representation of variables	Alphanumeric			
Fonts	Latin + Cyrillic + Katakana + Greek + Simplified Chinese			
Languages	Number of languages only limited by the size of the memory			
Communication				
Serial link	RS232 C, RS485			
Protocols	Modbus master and slave, Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY	Modbus master, Uni-Telway	Modbus master and slave, Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY	
Programming software	Vijeo-Designer Lite (using Windows XP or Vista)			

Matrix Display Units	**XBT RT500**	**XBT RT511**
		
Display		
Type	Backlit LCD 198 x 80 pixels	
Color	Green	Green/Orange/Red
Capacity	2...10 lines of 5...33 characters	

Matrix Display Units	**XBT RT500** 	**XBT RT511** 
Active display unit area (width x height)	89.9 x 40 mm (3.54 x 1.57 in.)	
Size of characters (width x height)	2.7 x 4 to 16 x 16 mm (0.11 x 0.16 to 0.43 x 0.94 in.)	
Keypad	12 keys: in control and input variant 4 of them can be re-labeled, in touch variant 10 of them can be re-labeled	
Signaling	No LEDs	13 LEDs including 10 for the central keys
Functions		
Number of panels (maximum)	200 application panels 256 alarm panels	
Variables per panel	40	
Vertical panel scrolling	no	
Number of lines per panel	10	
Representation of variables	Alphanumeric semi-graphical (bargraph, trends, lights and buttons)	
Fonts	Latin + Cyrillic + Katakana + Greek + Simplified Chinese	
Languages	Number of languages only limited by the size of the memory	
Communication		
Serial link	RS232 C, RS485	
Protocols	Modbus master , Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY	Modbus master and slave, Uni-Telway, Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY
Programming software	Vijeo-Designer Lite (using Windows XP or Vista)	

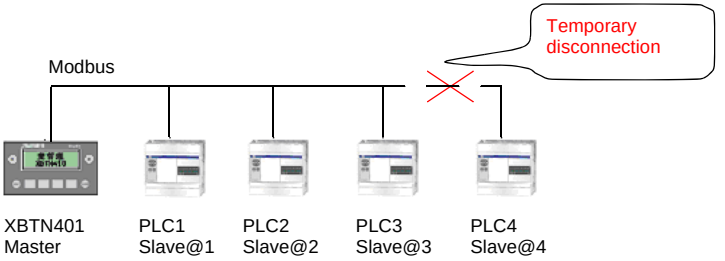
Polling Times

Overview

The polling times for non-connected equipment differ between XBT N/R/RT terminals and XBT NU400 terminals. The following sections describe general polling times of XBT N/R/RT terminals and specific polling times of XBT NU400 terminals.

General Polling Time for Non-Connected Equipment

The XBT N/R/RT terminal polls the missing equipment (usually a PLC) every 5 seconds. All the configured PLCs in an application should be connected. A missing equipment is therefore considered to be a temporary problem, i.e. the PLC or XBT is temporarily disconnected, and communication will resume as soon as the connection is re-established. In this arrangement, degraded communication performance is considered acceptable.



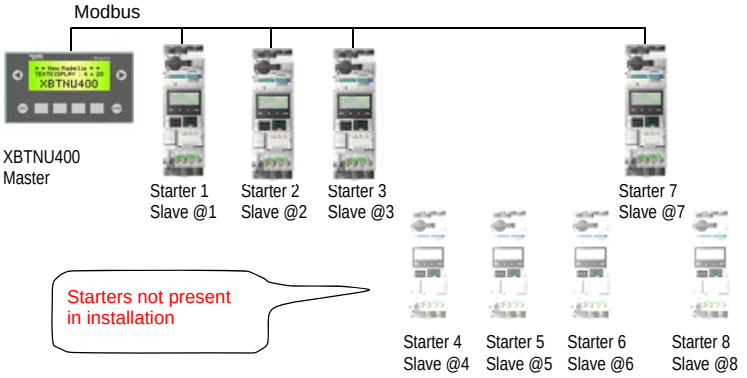
Polling Time of XBT NU400 Terminals

The XBT NU400 polls the missing equipment, i.e. a starter, every 5 minutes. This time interval has been selected due to performance and system validation reasons.

The XBT NU400 is delivered with a unique pre-loaded application for communication with up to 8 TESYS model U starters. However, in the final system configuration, less than 8 starters may be used permanently as a normal installation. In this case, polling the missing starter(s) in too short time intervals will drastically decrease the communication with the connected starters. This, in turn, may lead to increased response times and cause critical application issues. In some cases, time between operator action and starter acknowledgement can be longer than 20 seconds.

This is why the polling time of non-connected equipment has been set to this much longer period of 5 minutes.

The pre-loaded application in XBTNU400 in version 2.2 and later provide a page for manually resetting the communication. During this manual restart of the terminal the reconnected devices will be detected.



Operating Elements, LEDs and Connectors

4

At a Glance

Overview

This section describes all operating elements, LEDs and connectors provided on the front and rear panels of the XBT N/R/RT terminals.

What's in this Chapter?

This chapter contains the following sections:

4.1 Operating Elements, LEDs and Connectors

At a Glance

Overview

This section describes all operating elements, LEDs and connectors provided on the front and rear panels of the XBT N/R/RT terminals.

What's in this Section?

This section contains the following topics:

Front Panels

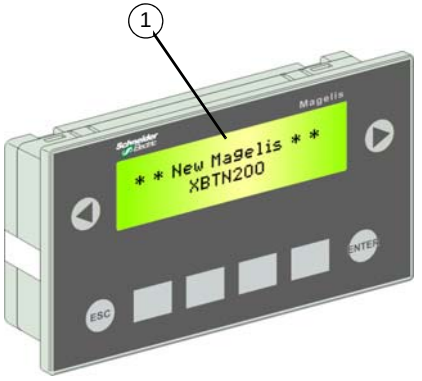
Overview

The following sections list the front panels of the individual XBT terminal versions with the operating and control elements.

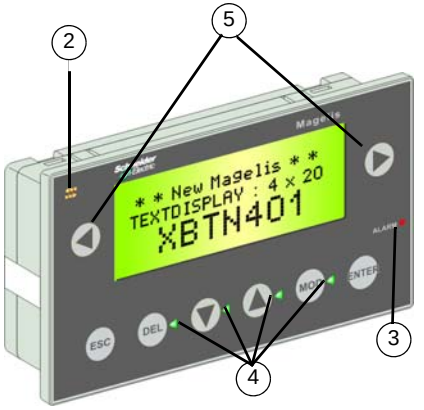
XBT N Terminals

On their front panels the XBT N terminals provide the following operating and control elements:

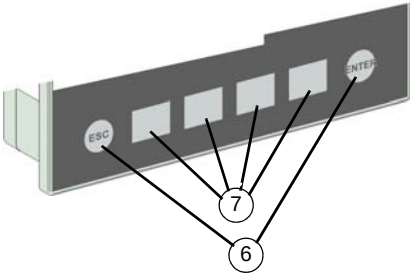
XBT N200



XBT N401



XBT N••

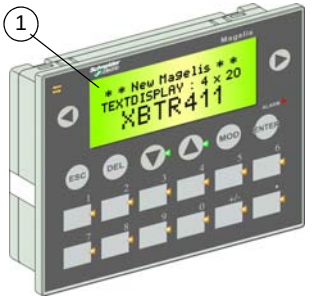


No.	Description
1	Backlit LCD display
2	Communication LED (XBT N401)
3	Alarm LED (XBT N401)
4	LEDs that can be controlled by the PLC (XBT N401)
5	Service keys for functional link
6	Service keys
7	Keys for function or numeric input (according to software configuration)

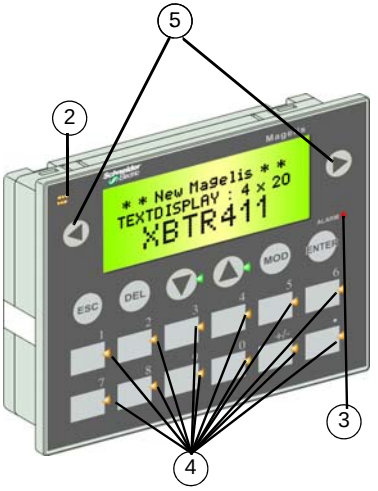
XBT R Terminals

On their front panels the XBT R terminals provide the following operating and control elements:

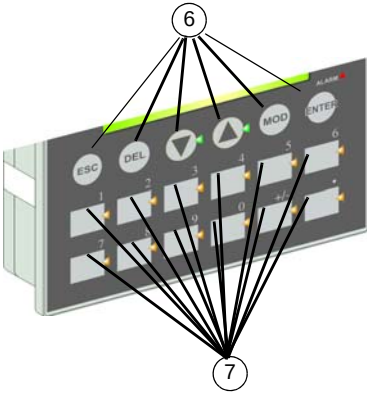
XBT R4••



XBT R411



XBT R4••

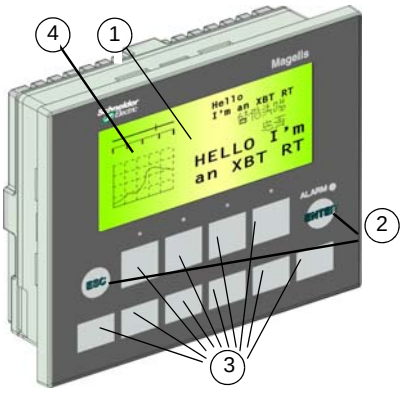


No.	Description
1	Backlit LCD display
2	Communication LED (XBT R411)
3	Alarm LED (XBT R411)
4	LEDs that can be controlled by the PLC (XBT R411)
5	Service keys for functional link
6	Service keys
7	Control keys for function or digital input (according to the context)

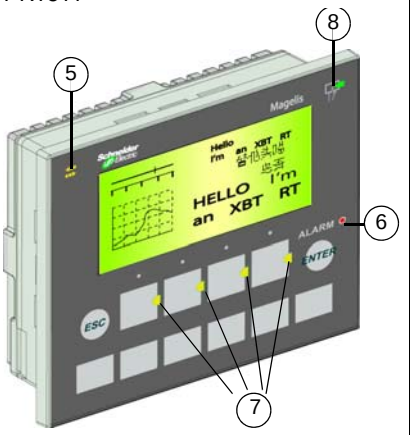
XBT RT Terminals

On their front panels the XBT RT terminals provide the following operating and control elements:

XBT RT5••



XBT RT511



No.	Description
1	Backlit LCD display
2	Service keys
3	Keys for control or service (according to software configuration)
4	Configurable touchscreen
5	Communication LED (XBT RT511)
6	Alarm LED (XBT RT511)
7	LEDs that can be controlled by the PLC (XBT RT511)
8	Touch LED (XBT RT511)

Rear Panels

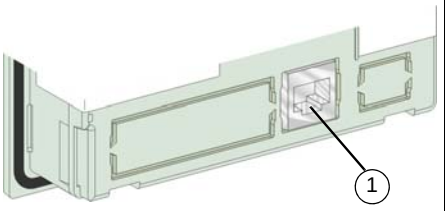
Overview

The following section shows the different rear panels of the individual XBT terminal versions with their connectors.

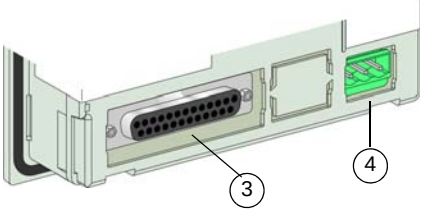
Rear Panel

On their rear panels the XBT terminals provide the following connectors

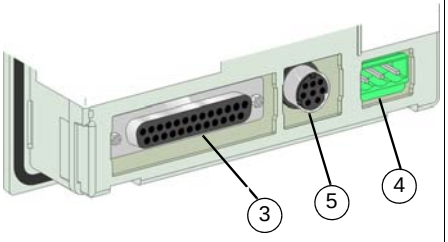
XBT N200 / XBT N400 / XBT R400



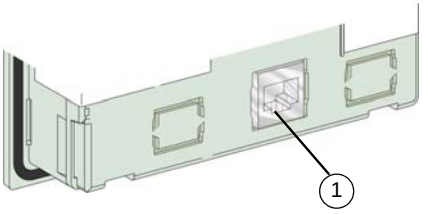
XBT N410 / XBT NU400 / XBT R410



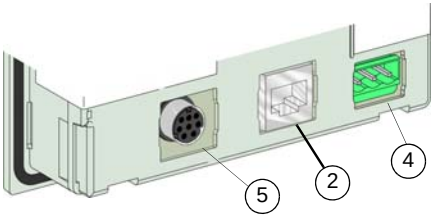
XBT N401 / XBT R411



XBT RT500



XBT RT511



No.	Description
1	RJ45: serial link + PLC power supply
2	RJ45 serial link
3	SubD25 serial link
4	3-wire terminal for 24 VDC power supply
5	MiniDIN connector for printer

Overview of Keys on the Individual XBT Terminals

Overview

The various types of XBT terminals provide different front panels including different keys for executing functions or entering values . The following paragraphs provide an overview of the keys provided on the individual XBT terminals.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The control key insert label must match the configured function of the key.

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

Types of Keys

The front panels of the terminals include 2 types of keys:

- Service keys
  Service keys provide different actions to the operator, like scrolling within the display of the terminal, selecting the panel to be displayed as well as selecting objects or entering values in the panel shown on the terminal display.
- Function keys
  Function keys are individually configured by the HMI designer who created the HMI application of the XBT terminal using the Vijeo-Designer Lite software. 2 different types of function keys are available:
  - static function keys: Static function keys are assigned a constant function (like selecting the panel to be displayed or executing commands) for the entire HMI application.
  - dynamic function keys: Dynamic function keys can be assigned different functions (like selecting the panel to be displayed, setting/resetting bits or executing commands) by the HMI designer, depending on the actually displayed panel.

  XBT N and XBT RT terminals can be configured for different variants (control and input variant as well as touch variant only for XBT RT) with the function keys providing different functions in each variant. XBT R terminals, on the other hand, only provide one variant.
  It is also possible that function keys have different functions in one variant, depending on whether you are only viewing the panels (normal mode) or you are entering values (edition mode). Function keys with 2 functions are referred to as dual labelled keys in this manual.

Overview of Keys on the Terminals

The individual terminals provide the following keys:

XBT N	XBT R	XBT RT
4 customizable keys which can be configured as function keys (control variant) or as service keys (input variant)	12 customizable function keys	10 customizable keys which can be configured as 10 function keys (touch variant) or as 4 function and 6 service keys (control or input variants)
2 non-configurable service keys	• 2 non-configurable service keys • 4 non-configurable service keys	2 non-configurable service keys
2 configurable service keys for functional link keys	2 configurable service keys for functional link keys	
		configurable touchscreen

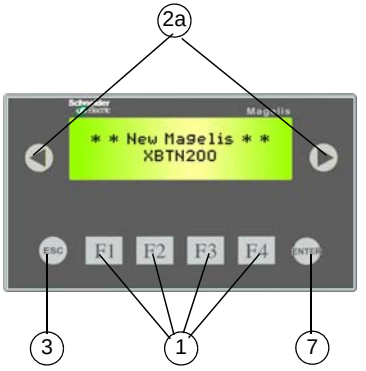
Keys on XBT N Terminals

XBT N terminals are customized for 2 different variants:

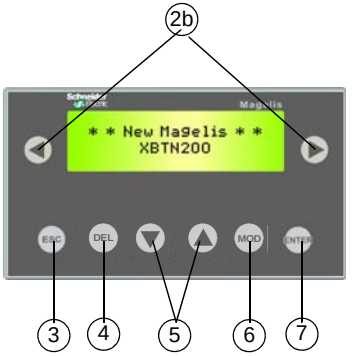
- control variant
- input variant

In these 2 different variants the terminals provide the following keys on their front panels:

Control variant

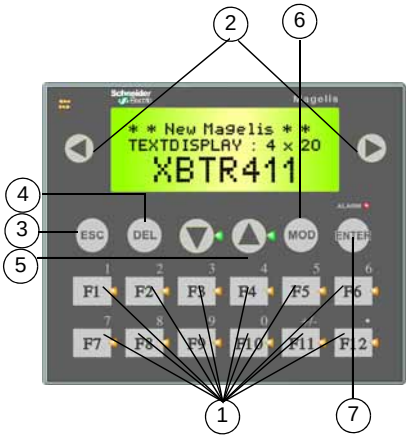


Input variant



No.	Element	Description	
1	Static function keys	• access to a panel • impulse command • toggle command	
2a	Left/right arrows in control variant (functional link keys)	Navigation link keys: • change panel in a menu • display current alarms	Command link keys: • impulse command • toggle command • variable write operation
2b	Left/right arrows in input variant (functional link keys)	Navigation link keys: • change panel in a menu • display current alarms • change digit in a variable field during edition	Command link keys: • impulse command • toggle command • variable write operation
3	ESC	Cancel an entry or an action	Return to the previous panel
4	DEL	Clear the selected digit or field	
5	Up/down arrows	Go up, go down in a panel (XBT N40• and NU400) Increment/decrement the selected digit	Select a value in a selection list Increment/decrement the value of a variable field
6	MOD	Select a field	Go to the next field
7	ENTER	Confirm a selection or an entry	Acknowledge an alarm

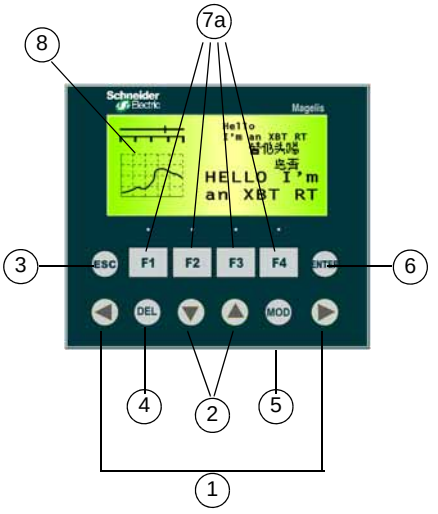
Keys on XBT R Terminals



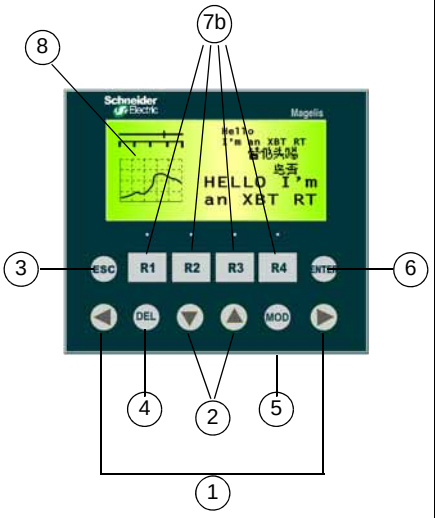
No.	Element	Description	
1	Dual labelled keys (function/ numeric)	• access to a panel • impulse command • toggle command • modification of a value	
2	Left/right arrows (functional link keys)	Navigation link keys: • change panel in a menu • display current alarms • change digit in a variable field during edition	Command link keys: • impulse command • toggle command • variable write operation
3	ESC	Cancel an entry or an action	Return to the previous panel
4	DEL	Clear the selected digit or field	
5	Up/down arrows	Go up, go down within a panel; Increment/decrement the selected digit	Select a value in a selection list; Increment/decrement the value of a variable field
6	MOD	Select a field	Go to the next field
7	ENTER	Confirm a selection or an entry	Acknowledge an alarm

Keys on XBT RT Terminals

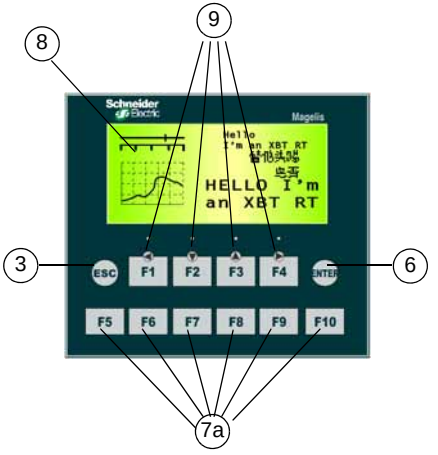
Control variant



Input variant



Touch variant



No.	Element	Description	
1	Left/right arrows (functional link keys)	Navigation link keys: ● navigation: change panel in a menu ● display current alarms ● change digit in a variable field during edition	Command link keys: ● impulse command ● toggle command ● variable write operation
2	Up/down arrows	Select a functional link in a panel Increment/decrement the selected digit	Select a value in a selection list Increment/decrement the value of a variable field
3	ESC	Cancel an entry or an action	Return to the previous panel
4	DEL	Clear the selected digit or field	
5	MOD	Select a field	Go to the next field
6	ENTER	Confirm a selection or an entered value	Acknowledge an alarm
7a	Control or touch variant	Static function keys: ● access a panel ● impulse command ● toggle command	
7b	Input variant	Dynamic function keys (functionality is panel-dependent): ● access a panel ● set / reset bit ● impulse command ● toggle command	
8	Touchscreen	Activity depending on the selected variant: ● enabled in touch variant ● disabled in control and input variant	
9	Dual labelled keys	The active function of keys F1 to F4 is determined by the selected terminal mode: ● in edition mode: arrow keys acting like up/down/left/right arrows ● in normal mode: static function keys (see description 7)	

Insert Labels

5

At a Glance

Overview

This section describes the different insert labels provided for the different XBT types and gives instructions on how to properly install them.

What's in this Chapter?

This chapter contains the following sections:

5.1 Insert Labels

At a Glance

Overview

This section describes the different insert labels provided for the different XBT types.

What's in this Section?

This section contains the following topics:

Insert Labels XBT N

Overview

XBT N terminals are delivered with an insert label sheet providing the following label types to assign different texts or symbols to the keys:

- service key labels
- function key labels
- blank labels

All labels are pre-cut and just have to be pressed out of the label sheet.

The ready-to-use service key and function key labels can directly be inserted into the XBT N terminal as described in section *Inserting Insert Labels, p. 55*.

To print your own text or symbols on the blank labels, use the Vijeo-Designer Lite configuration software.

New label sheets can be ordered at Schneider with the following part numbers:

XBT Terminal	Label Sheet Part Number
XBT N200 / XBT N400 / XBT NU400 / XBT N410	XBLYN00
XBT N401	XBLYN01

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Make sure that the text/symbols on your insert label always correspond to what is configured for your XBT terminal in the Vijeo-Designer Lite configuration software. Otherwise the keys of your terminal will not initiate the actions indicated on them.

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

Service Key Labels for XBT N Terminals

If you have configured your XBT N terminal for input variant in the Vijeo-Designer Lite configuration software, insert the following service key label into your XBT N terminal.

Service key label XBT N

Service key label XBT N401 (with LEDs)

Function Key Labels for XBT N Terminals

If you have configured your XBT N terminal for control variant in the Vijeo-Designer Lite configuration software, insert the following function key label into your XBT N terminal.

Function key label XBT N

Function key label XBT N401 (with LEDs)

Blank Labels for XBT N Terminals

The insert label sheet includes blank labels providing you the possibility to create labels with your own texts or symbols.

Blank label XBT N

Blank label XBT N401 (with LEDs)

For a detailed description on how to print your own labels see *Creating Individual Labels, p. 61*

Insert Labels XBT R

Overview

XBT R terminals are delivered with an insert label sheet providing the following label types to assign different texts or symbols to the keys:

- function key labels
- blank labels

All labels are pre-cut and just have to be pressed out of the label sheet.

The ready-to-use function key labels can directly be inserted into the XBT R terminal as described in section *Inserting Insert Labels, p. 55*.

To print your own text or symbols on the blank labels, use the Vijeo-Designer Lite configuration software.

New label sheets can be ordered at Schneider with the following part numbers:

XBT Terminal	Label Sheet Part Number
XBT R400 / XBT R410	XBLYR00
XBT R411	XBLYR01

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Make sure that the text/symbols on your insert label always correspond to what is configured for your XBT terminal in the Vijeo-Designer Lite configuration software. Otherwise the keys of your terminal will not initiate the actions indicated on them.

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

Function Key Labels for XBT R Terminals

The following function key label is provided on the label sheet of XBT R terminals.

Function key label XBT R

Function key label XBT R411 (with LEDs)

Blank Labels for XBT R Terminals

The insert label sheet includes blank labels providing you the possibility to create labels with your own texts or symbols.

Blank label XBT R

Blank label XBT R411 (with LEDs)

For a detailed description on how to print your own labels see *Creating Individual Labels, p. 61*

Insert Labels XBT RT

Overview

XBT RT terminals are delivered with 2 insert label sheets providing the following label types to assign different texts or symbols to the keys:

- service key labels
- function key labels
- touch key labels
- blank labels

All labels are pre-cut and just have to be pressed out of the label sheet.

The ready-to-use service key, function key and touch key labels can directly be inserted into the XBT RT terminal as described in section *Inserting Insert Labels, p. 55*.

To print your own text or symbols on the blank labels, use the Vijeo-Designer Lite configuration software.

New label sheets can be ordered at Schneider with the following part numbers:

XBT Terminal	Label Sheet Part Number
XBT RT500	XBLYRT00
XBT RT511	XBLYRT01

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Make sure that the text/symbols on your insert label always correspond to what is configured for your XBT terminal in the Vijeo-Designer Lite configuration software. Otherwise the keys of your terminal will not initiate the actions indicated on them.

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

Service Key Labels for XBT RT Terminals

If you have configured your XBT RT terminal for input variant in the Vijeo-Designer Lite configuration software, insert the following service key label into your XBT RT terminal.

Service key label XBT RT

XBT RT500

XBT RT511

Function Key Labels for XBT RT Terminals

If you have configured your XBT RT terminal for control variant in the Vijeo-Designer Lite configuration software, insert the following function key label into your XBT RT terminal.

Function key label XBT RT

XBT RT500

XBT RT511

Touch Key Labels for XBT RT Terminals

If you have configured your XBT RT terminal for touch variant in the Vijeo-Designer Lite configuration software, insert the following touch key label into your XBT RT terminal.

Touch key label XBT RT

XBT RT500

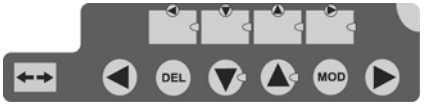
XBT RT511

Blank Labels for XBT RT Terminals

The insert label sheet includes blank labels providing you the possibility to create labels with your own texts or symbols.

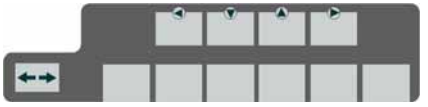
Service blank label XBT RT

XBT RT500

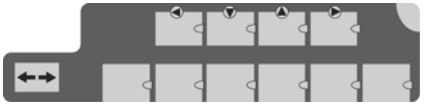


XBT RT511

Touch blank label XBT RT



XBT RT500



XBT RT511

For a detailed description on how to print your own labels see *Creating Individual Labels, p. 61*

Inserting Labels

6

Inserting Insert Labels

Overview

In order to be sure that each key of the XBT terminals executes the requested function it is of vital importance that you correctly insert the insert label into the device. The following paragraphs describe the procedures of inserting insert labels into XBT N, XBT R and XBT RT terminals.

⚠ WARNING

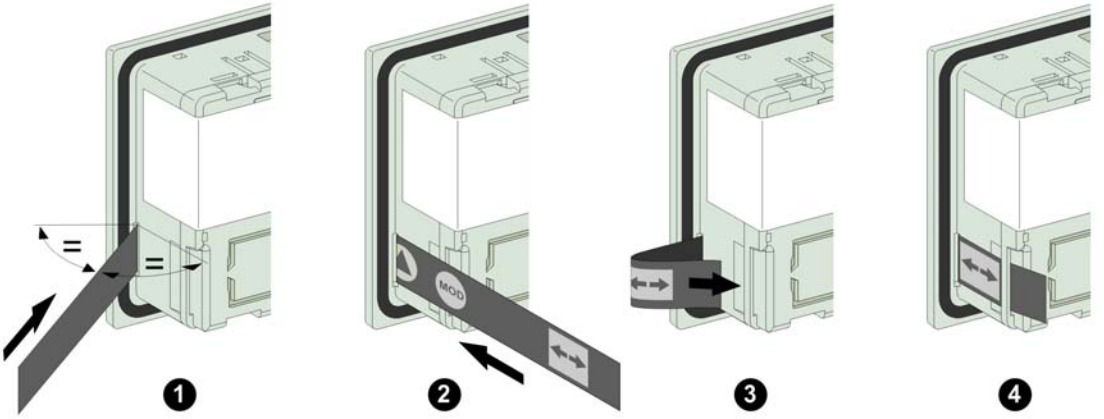
UNINTENDED EQUIPMENT OPERATION

Make sure that the text/symbols on your insert label always correspond to what is configured for your XBT terminal in the Vijeo-Designer Lite configuration software. Otherwise the keys of your terminal will not initiate the actions indicated on them.

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

Graphical Representation of Correctly Inserting Labels into XBT N Terminals

The graphic below shows how to correctly insert an insert label into an XBT N terminal:



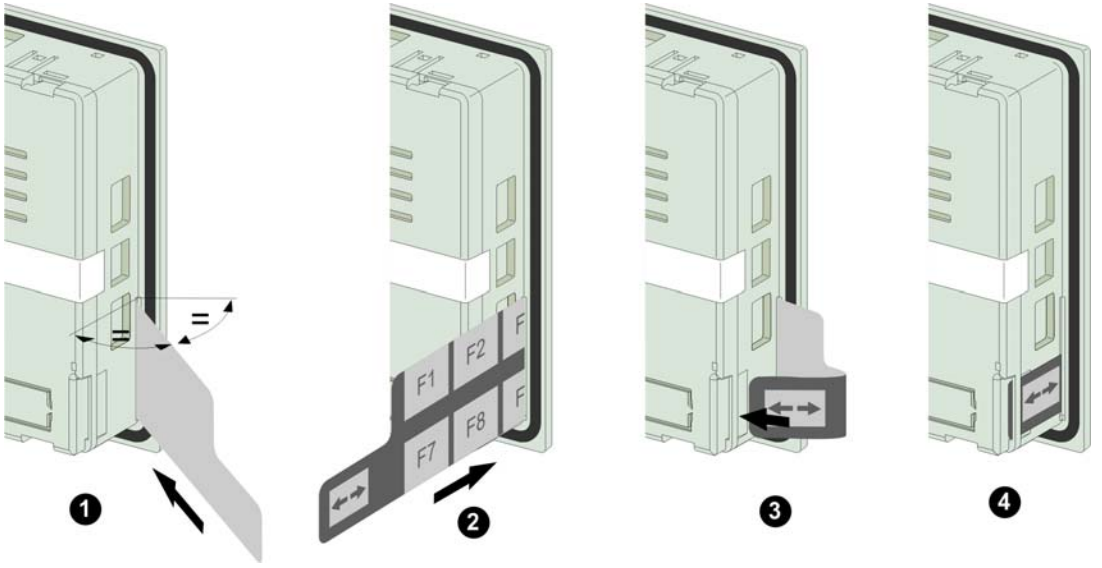
Inserting Labels into XBT N Terminals

For inserting insert labels into XBT N terminals proceed as follows:

Step	Action
1	Press the pre-cut insert label of your choice out of the insert label sheet.
2	Take your XBT N terminal and turn it around so that you can see its rear panel. On the left-hand side of the rear panel, located directly behind the overlapping display, you will find the opening for the insert label.
3	Insert the insert label cautiously into this opening (as shown in steps 1 and 2 of the above figure) until the 4 key symbols / texts have disappeared and the only sign that can still be seen of the insert label is the double arrow.
4	Turn your XBT N terminal around and check at its front side that all 4 symbols / texts are clearly visible at the keys. If the texts / symbols are not clearly visible, insert the insert label a bit further into the opening. A graphical example of a not correctly inserted insert label is provided for XBT R / RT terminals below in this chapter.
5	If the texts / symbols are clearly visible on the front of the terminal, take the part (with the double arrow sign) of the insert label that is still visible on the rear of the terminal and slide this flap into the slit indicated in step 3 of the above figure. The flap should now be flush with the rear of the terminal (see step 4 of the above figure). If the insert label has not correctly been inserted into the XBT terminal, the flap of the insert label will be too long to fit into this slit. A graphical example of a not correctly inserted insert label is provided for XBT R / RT terminals below in this chapter.

Graphical Representation of Correctly Inserting Labels into XBT R / XBT RT Terminals

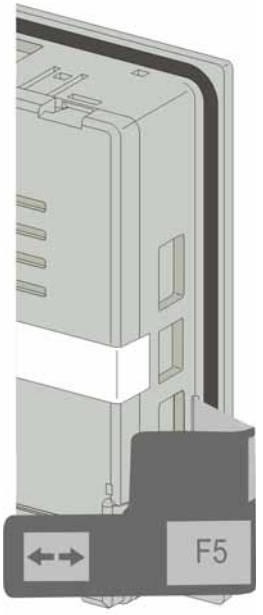
The graphic below shows how to correctly insert an insert label into an XBT R / XBT RT terminal:



Inserting Labels into XBT R / XBT RT Terminals

For inserting insert labels into XBT R / XBT RT terminals proceed as follows:

Step	Action
1	Press the pre-cut insert label of your choice out of the insert label sheet.
2	Take your XBT R / XBT RT terminal and turn it around so that you can see its rear panel. On the right-hand side of the rear panel, located directly behind the overlapping display, you will find the opening for the insert label.
3	Insert the insert label cautiously into this opening (as shown in steps 1 and 2 of the above figure) until the key symbols / texts on the wide part of the insert labels have disappeared and the wide part of the insert label is flush with the opening. There will be merely the small flap of the insert label with the double arrow being visible outside the terminal.
4	Turn your XBT R / XBT RT terminal around and check at its front side that all symbols / texts are clearly visible at the keys. If the texts / symbols are not clearly visible, insert the insert label a bit further into the opening. Front of XBT RT terminal with insert label not correctly inserted 

Step	Action
5	If the texts / symbols are clearly visible on the front of the terminal, take the small part (with the double arrow sign) of the insert label that is still visible on the rear of the terminal and slide this flap into the slit indicated in step 3 of the above figure. The flap should now be flush with the rear of the terminal (see step 4 of the above figure). If the insert label has not correctly been inserted into the XBT terminal, the flap of the insert label will be too long to fit into this slit. Rear of XBT terminal with insert label not correctly inserted 

Creating Individual Labels

7

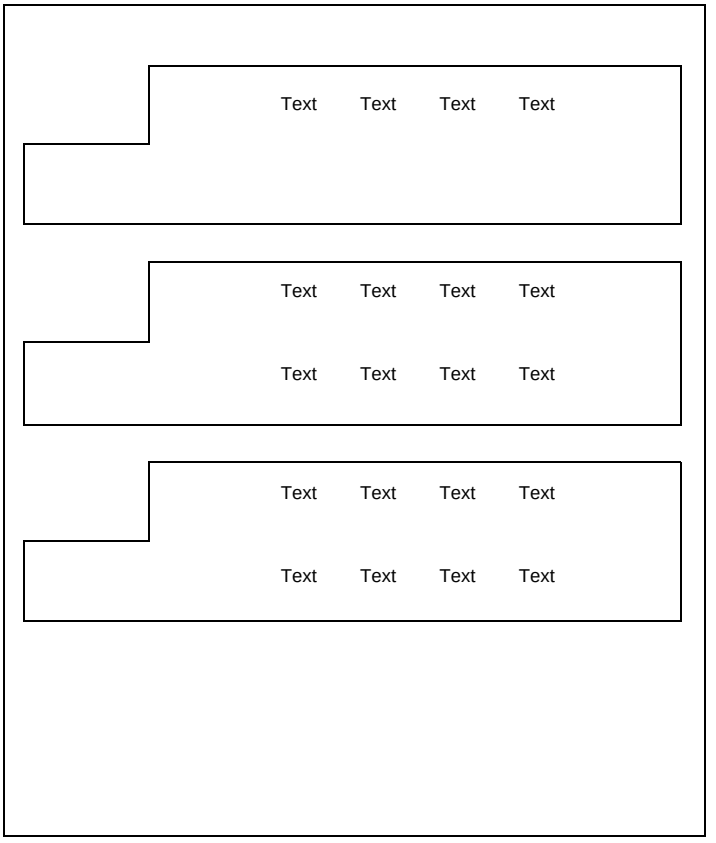
Creating Individual Labels

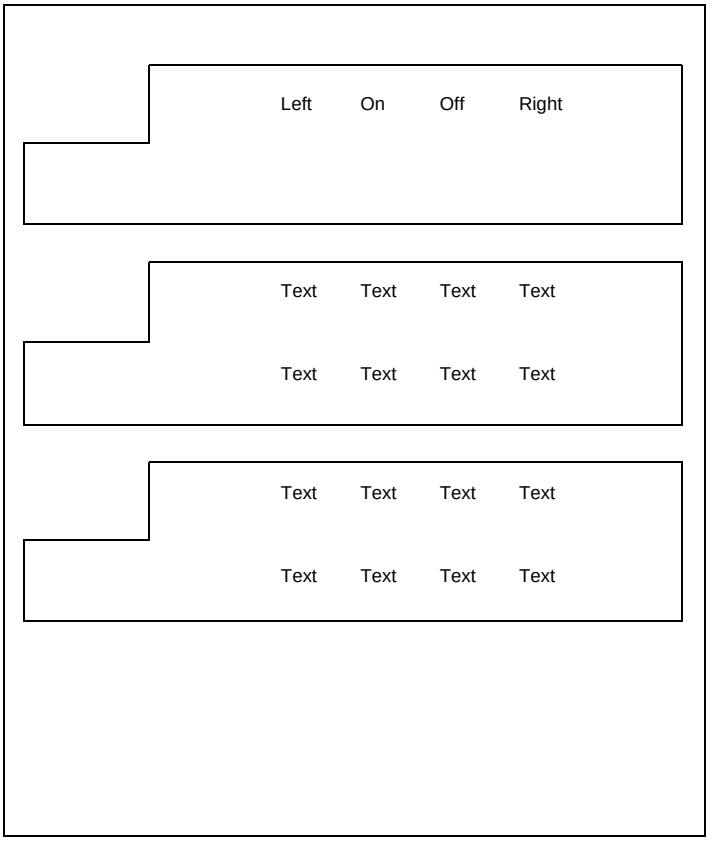
Overview

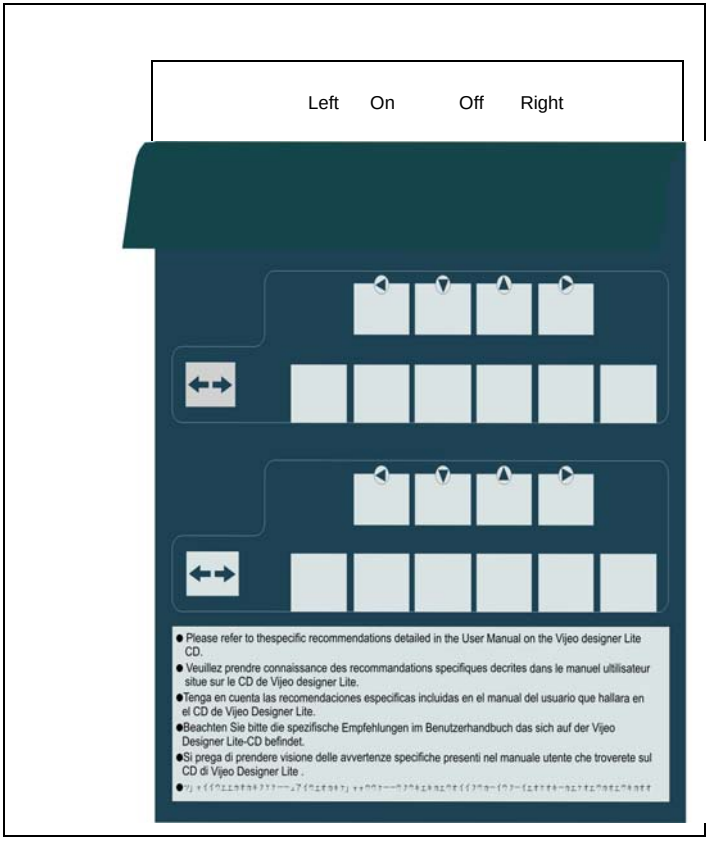
For describing the procedure of creating and printing individual texts or symbols on the blank labels, blank labels of XBT R / RT terminals are used as an example in this section. The process of printing labels for XBT N terminals is identical, with the difference that they provide only 1 line of text / symbols.

Creating Individual Labels

To create insert labels with your own texts or symbols, proceed as follows:

Step	Action
1	Open the **Static Function Keys** dialog box in the Vijeo-Designer Lite configuration software for your XBT terminal type.
2	Click the **Print Label** button. Result: A special Microsoft Word template opens. Microsoft Word template for XBT RT 
3	Modify the Word template to create your own key labels.

Step	Action
4	Print the modified Word document first on a blank paper to create a reference sheet. Printout of the modified Word template 

Step	Action
5	Position the insert label sheet on the reference printout in a way that the keys the new texts / symbols should be printed on are exactly on top of the new texts / symbols on the reference printout. Positioning insert label sheet on the reference printout 
6	Fix the insert label sheet on the reference printout using adhesive tape and insert them in your printer.
7	Activate the print command to print on the insert label sheet.
8	After the texts / symbols have been printed on your insert label sheet, remove the insert label sheet from the reference printout, press the insert label out of the sheet and insert it in your terminal as described in section *Inserting Insert Labels, p. 55*.

Connecting XBT Terminals

8

At a Glance

Overview

XBT terminals can be connected to different equipment to perform the following tasks:

- For exchanging software configuration data with Vijeo-Designer Lite, connect the XBT terminal with a PC where Vijeo-Designer Lite is running.
- For controlling an automation system, connect the XBT terminal with a PLC.
- For printing alarms as a data stream, alarm log files or a list of current alarms, connect the XBT terminal with a printer.

The following sections describe how to connect your XBT terminal to the different equipment and provides safety information concerning the cabling.

What's in this Chapter?

This chapter contains the following sections:

8.1 Grounding and Safety

Safety Information Concerning the Grounding of Terminals

Danger of Point-to-Point Connections Between Separate Buildings

Care must be taken when XBT terminals are directly connected to a PLC that is located in another building. When you remove the cable from the terminal, you will loose the protective earth ground of the terminal. Since these 2 buildings can have different earth grounds, unplugging the cable from the terminal can lead to an electric shock created by a ground loop (voltage potential difference between two separate buildings).

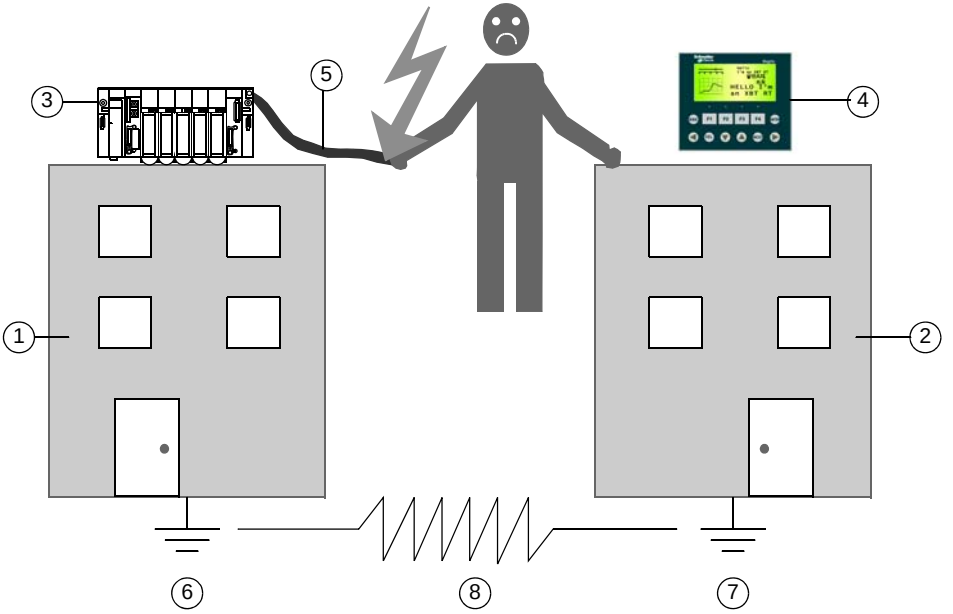
⚠ DANGER

HAZARD OF ELECTRIC SHOCK DUE TO IMPROPER GROUNDING

- Remove power before installing or maintaining equipment.
- Ensure the equipment is properly grounded to the service entrance of the building.

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

Point-to-point connections between separate buildings



1 building 1
2 building 2
3 PLC
4 XBT RT
5 signal cable
6 earth ground of building 1
7 earth ground of building 2
8 resistance R between the 2 earth grounds

8.2 Connecting XBT Terminals to a PC

At a Glance

Overview

The following sections provide information on how to connect XBT terminals to a PC for exchanging software configuration data.

What's in this Section?

This section contains the following topics:

Distinguishing XBT Terminals by Power Supply

Overview

For exchanging software configuration data with Vijeo-Designer Lite, connect your XBT terminal to a PC running the Vijeo-Designer Lite configuration software.

The correct cabling depends on whether your XBT terminal is

- powered by the PLC
- powered by an external 24 VDC power supply

The following XBT terminals need 5 V power that must be supplied by the PC in this case:

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

⚠ CAUTION

OVERVOLTAGE DAMAGE TO EQUIPMENT

Make sure to connect the following terminals only to a source providing 5 VDC.

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

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

Note: XBT RT500 terminals are protected against accidental connection to higher voltages (up to 30 V) but the other terminal types are not and will be damaged.

The following XBT terminals need an external power supply supplying 24 VDC:

- XBT N410
- XBT N401
- XBT NU400
- XBT R410
- XBT R411
- XBT RT511

Connecting XBT Terminals Powered by the PLC to a PC

Overview

The following XBT terminals need 5 V power that is usually supplied by the PLC:

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

When connecting these terminals to a PC for exchanging software configuration data with Vijeo-Designer Lite, the 5 V required by the terminal must be provided by the PC.

⚠ CAUTION

VOLTAGE DAMAGE TO EQUIPMENT

Connect the serial link connector with power off and tighten connector screws.

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

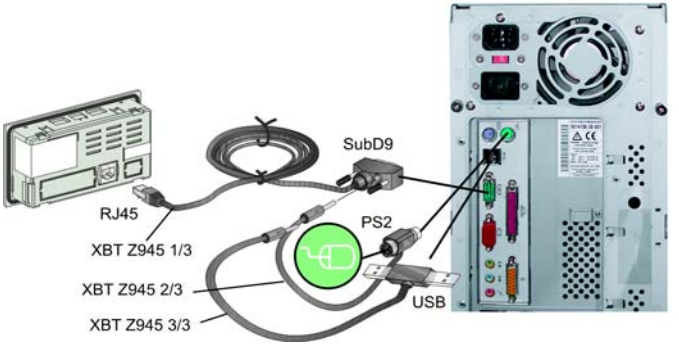
Note: For connecting XBT terminals to a PC use the Schneider cables described in the following sections.

Connecting XBT N200 / N400 / R400 to a PC

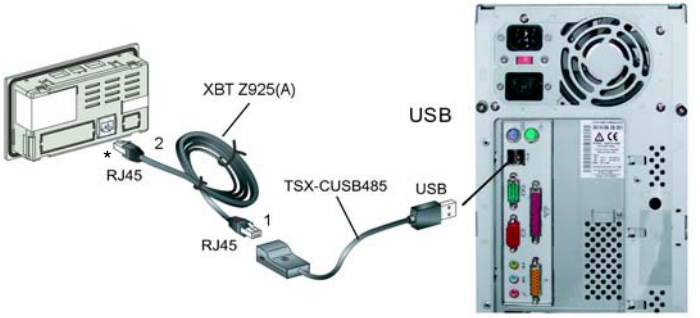
XBT N200 / N400 and R400 terminals can be connected to a PC in 2 different ways:

- via the serial port of the PC using the Schneider cable XBT Z945
- via the USB port of the PC using the Schneider cables XBT Z925 and TSX-CUSB485

Connecting XBT N200 / N400 / R400 to a serial port of a PC using the Schneider cable XBT Z945



Connecting XBT N200 / N400 / R400 to a USB port of a PC using the Schneider cables XBT Z925 and TSX-CUSB485.



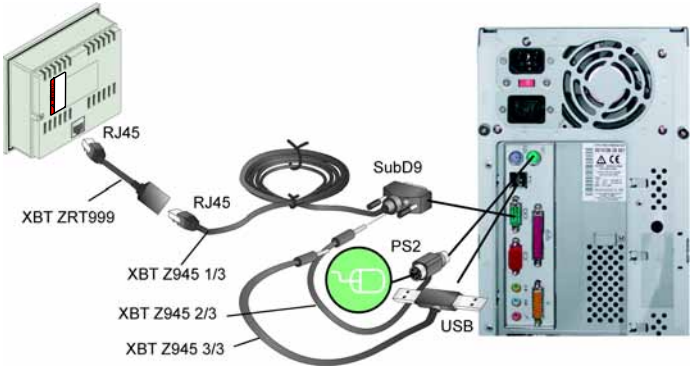
* XBT N200 and XBT N400 without logo: you must add a XBT ZN999 cable adapter.

Connecting XBT RT500 to a PC

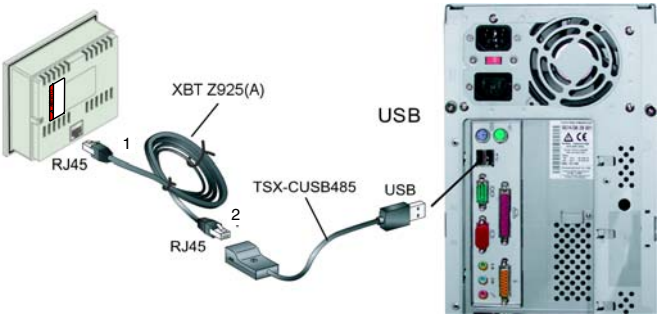
XBT RT500 terminals can be connected to a PC in 2 different ways:

- via the serial port of the PC using the Schneider cable XBT Z945 and the adaptor XBTZRT999
- via the USB port of the PC using the Schneider cables XBT Z925 and TSX-CUSB485

Connecting XBT RT500 to a serial port of a PC using the Schneider cable XBT Z945 and the adaptor XBT ZRT999



Connecting XBT RT500 to a USB port of a PC using the Schneider cables XBT Z925 and TSX-CUSB485



Connecting XBT Terminals Powered by an External Power Supply to a PC

Overview

The following XBT terminals need an external power supply supplying 24 VDC:

- XBT N410
- XBT N401
- XBT NU400
- XBT R410
- XBT R411
- XBT RT511

When connecting these terminals to a PC for exchanging software configuration data with Vijeo-Designer Lite it is also required to connect an external power supply via the 24 VDC power supply connector that is included in the scope of delivery of these XBT terminals.

⚠ CAUTION

VOLTAGE DAMAGE TO EQUIPMENT

Connect the serial link connector with power off and tighten connector screws.

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

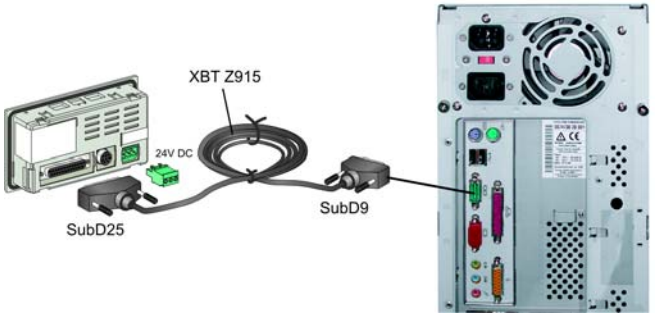
Note: For connecting these XBT terminals to a PC use the Schneider cables described in the following sections.

Connecting XBT N410 / N401 / NU400 / R410 / R411 to a PC

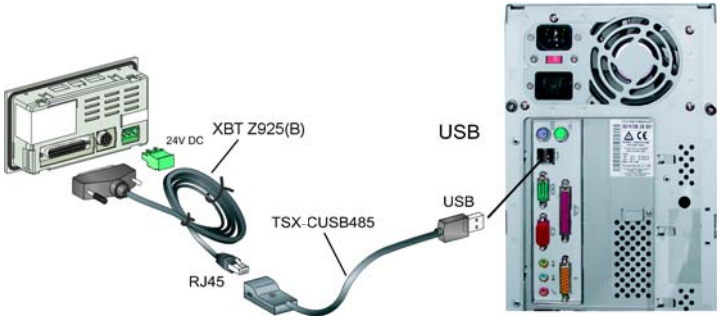
XBT N410 / N401 / NU400 / R410 / R411 terminals can be connected to a PC in 2 different ways:

- via the serial port of the PC using the Schneider cable XBT Z915
- via the USB port of the PC using the Schneider cables XBT Z925 and TSX-CUSB485

Connecting XBT N410 / N401 / NU400 / R410 / R411 to a serial port of a PC using the Schneider cable XBT Z915



Connecting XBT N410 / N401 / NU400 / R410 / R411 to a USB port of a PC using the Schneider cables XBT Z925 and TSX-CUSB485

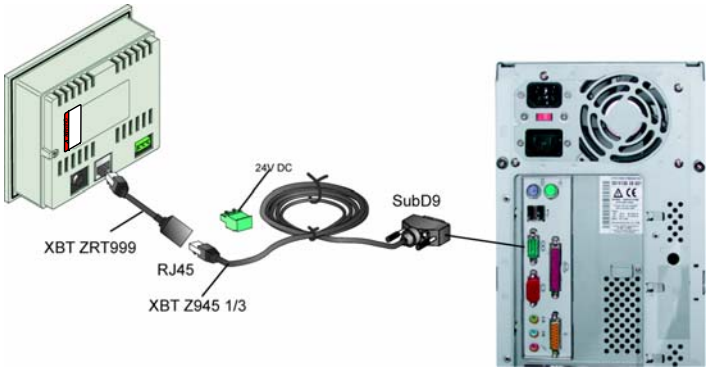


Connecting XBT RT511 to a PC

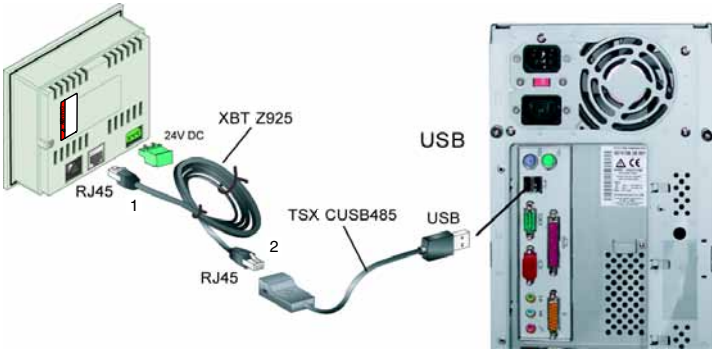
XBT RT511 terminals can be connected to a PC in 2 different ways:

- via the serial port of the PC using the Schneider cable XBT Z945
- via the USB port of the PC using the Schneider cables XBT Z925 and TSX-CUSB485

Connecting XBT RT511 to a serial port of a PC using the Schneider cable XBT Z945



Connecting XBT RT511 to a USB port of a PC using the Schneider cables XBT Z925 and TSX-CUSB485



8.3 Connecting XBT Terminals to a PLC

At a Glance

Overview

The following sections provide information on how to connect XBT terminals to a PLC for controlling an automation system.

What's in this Section?

This section contains the following topics:

Distinguishing XBT Terminals by Power Supply

Overview

For controlling an automation system, connect your XBT terminal to a PLC.

The correct cabling depends on whether your XBT terminal is

- powered by the PLC
- powered by an external 24 VDC power supply

The following XBT terminals need 5 V power that must be supplied by the PLC in this case:

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

⚠ CAUTION

OVERVOLTAGE DAMAGE TO EQUIPMENT

Make sure to connect the following terminals only to a source providing 5 VDC.

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

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

Note: XBT RT500 terminals are protected against accidental connection to higher voltages (up to 30 V) but the other terminal types are not and will be damaged.

The following XBT terminals need an external power supply supplying 24 VDC:

- XBT N410
- XBT N401
- XBT NU400
- XBT R410
- XBT R411
- XBT RT511

Data Exchanged Between XBT Terminals and PLCs

Since data are continuously exchanged in a human/machine dialog between an XBT terminal and a PLC please consider the following recommendations.

Loss of communication between the terminal and the PLC can result in partial or complete loss of control of the machine.

Unplugging the PLC cable during operation may lead to the loss of requests or responses exchanged between the terminal and the PLC.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Never remove the PLC cable from the XBT terminal while operations are in progress.
- Check the XBT terminal connection by monitoring the communication monitoring word in the dialog table via the PLC program.

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

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.*
- Each implementation of a Magelis XBT N/R/RT must be individually and thoroughly tested for proper operation before being placed into service.

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

*For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control*.

Connecting XBT Terminals Powered by the PLC to a PLC

Overview

The following XBT terminals need 5 V power that is usually supplied by the PLC but may also be supplied by an external 5 VDC power supply:

- XBT N200
- XBT N400
- XBT R400
- XBT RT500

⚠ CAUTION

VOLTAGE DAMAGE TO EQUIPMENT

Connect the serial link connector with power off and tighten connector screws.

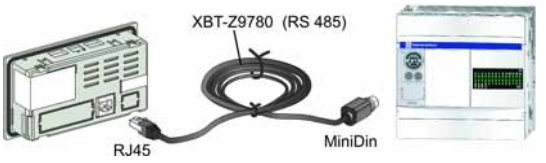
Failure to follow these instructions can result in injury or equipment damage.

Connection to Twido / Micro / Premium / Nano, Power by PLC

Use the Schneider cable XBT Z9780 (RS485) to connect XBT N200 / N400 / R400 or RT500 terminals to the following Schneider PLCs that provide the required 5 VDC:

- Twido
- Micro
- Premium
- Nano

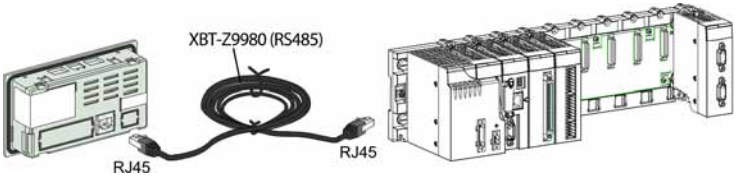
Connection to Twido / Micro / Premium / Nano via Schneider cable XBT Z9780 (RS485)



Connection to Modicon M340, Power by PLC

Use the Schneider cable XBT Z9980 (RS485) to connect XBT N200 / N400 / R400 or RT500 terminals to a Modicon M340 PLC that provides the required 5 VDC.

Connection to Modicon M340 via Schneider cable XBT Z9980 (RS485)

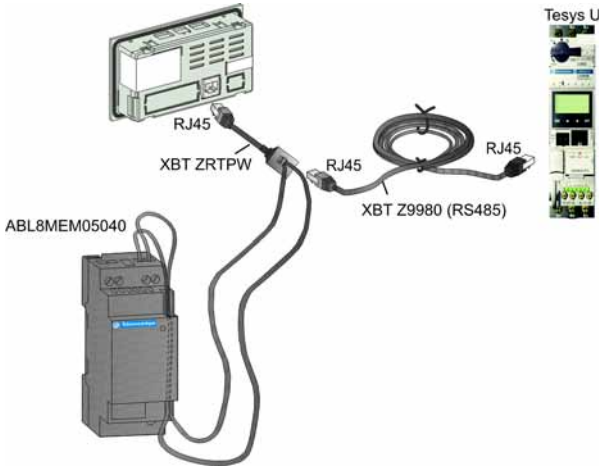


Connection to Tesys U, Altivar, Lexium 05, Zelio, Preventa XPS MC, Power by External Power Supply

To connect XBT N200 / N400 / R400 or RT500 terminals to the following PLCs use the Schneider ABL8MEM05040 power supply to provide the required 5 VDC together with the adaptor XBT ZRTPW and the Schneider cable XBT Z9980 (RS485):

- Tesys Model U
- Altivar
- Lexium 05
- Zelio with communication module
- Preventa XPSMC

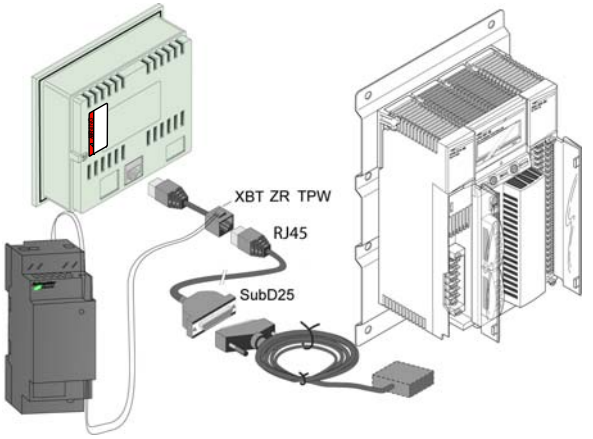
Connection to Tesys Model U, Altivar, Lexium 05, Zelio (with communication module) or Preventa XPSMC with ABL8MEM05040 power supply with adaptor XBT ZRTPW and Schneider cable XBT Z9980 (RS485)



Connecting XBT RT500 to other Devices

XBT RT500 terminals require different cables for connecting them to individual PLCs.

Connection to PLCs using the XBT ZG939 and the XBT ZRTPW cable adapter:



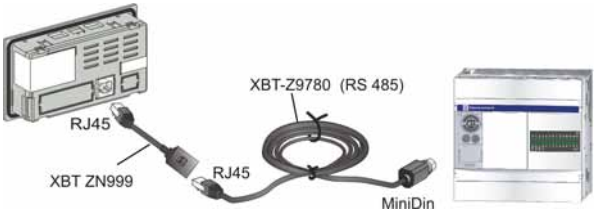
Cabling with PLCs:

PLC	Cable	+ XBT ZG939 cable adapter	+ XBT ZRTPW for power supply
Advantys STB	XBT Z9715 (RS232)	-	x
Momentum	XBT Z9711 (RS232C)	x	x
Quantum / 984	XBT Z9710 (RS232C)	x	x
Rockwell Micrologix	XBT Z9733 (RS232)	-	x
Rockwell SLC500, Drop 1761NETAIC	XBT Z9734 (RS485)	-	x
Siemens S7-200	XBT ZG9721 (RS485)	-	x
Omron CPM1,CPM2 , CJ1 , CS1	XBT Z9743 (RS232	x	x
Mitsubishi FX	XBT Z980 (RS232)	x	x

Communication Interruption with XBT N200 or XBT N400 Terminals

A communication interruption may have occurred if ????? is displayed rather than any values, or the connection popup remains on the display unit. If you are using an XBT N200 or an XBT N400 terminal, it may be caused by the cabling because different cables are required for the different terminal versions. Use the cables as shown in the table below. If you are using other terminals or the condition still persists with these cable, refer to section *Troubleshooting, p. 168* or to the manual describing the protocol you are using for more information.

RJ45 connector compatibility table

XBT N Front Panel	**Cable**
Without Telemecanique or Schneider Electric logo 	XBT Z978
	XBT Z9780 + XBT ZN999 adaptor Application example: XBT N without Telemecanique logo connected via XBT Z9780 cable and XBT ZN999 adaptor 
With Telemecanique or Schneider Electric logo  	XBT Z9780

Connecting XBT Terminals Powered by an External Power Supply to a PLC

Overview

The following XBT terminals need an external power supply supplying 24 VDC:

- XBT N410
- XBT N401
- XBT NU400
- XBT R410
- XBT R411
- XBT RT511

When connecting these terminals to a PLC for controlling an automation system it is also required to connect an external power supply via the 24 VDC power supply connector that is included in the scope of delivery of these XBT terminals.

⚠ CAUTION

VOLTAGE DAMAGE TO EQUIPMENT

Connect the serial link connector with power off and tighten connector screws.

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

Note: For connecting these XBT terminals to a PLC or a fieldbus tap use the Schneider cables described in the following sections.

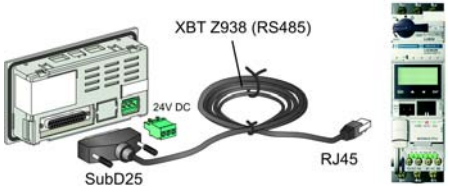
Connecting XBT N410 / N401 / NU400 / R410 / R411 to a PLC

XBT N410 / N401 / NU400 / R410 / R411 terminals require different cables for connecting them to individual PLCs or fieldbus taps.

Use the Schneider cable XBT Z938 (RS485) to connect XBT N410 / N401 / NU400 / R410 / R411 to the following Schneider PLCs:

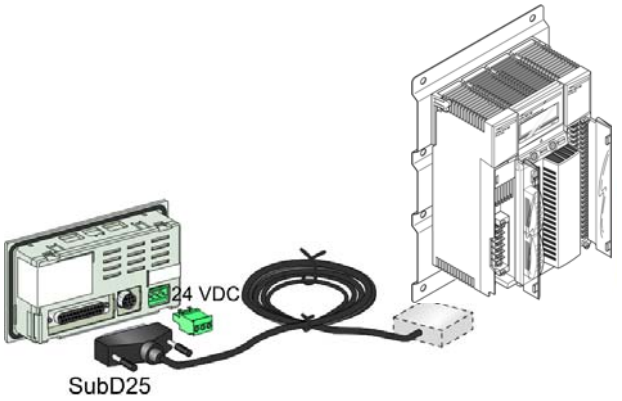
- Tesys Model U
- Altivar
- Lexium 05
- Zelio with communication module
- Preventa XPSMC

Connection via the Schneider cable XBT Z938 (RS485)



To connect your XBT terminal to other PLCs or fieldbus taps refer to the lists below showing the adequate cables.

Connection to PLCs or fieldbus taps using different Schneider cables:



Cabling with PLCs:

PLC	Cable
Advantys STB	XBT Z988 (RS232)
Momentum	XBT Z9711 (RS232C)
Quantum / 984	XBT Z9710 (RS232C)
Twido/Micro/Premium/Nano	XBT Z968 / Z9680 (RS485)
Modicon M340	XBT Z938 (RS485)

PLC	Cable
Rockwell SLC500 , Drop 1761NETAIC	XBT Z9730 (RS232)
Rockwell Micrologix	XBT Z9731 (RS232)
Mitsubishi FX	XBT Z980 (RS232/RS422)
Siemens S7-200	XBT Z9721 (RS485)
Omron CPM1 , CPM2 , CJ1 , CS1	XBT Z9740 (RS232)

Cabling with fieldbus taps:

PLC	Cable
LU9 GC3	XBT Z938 (RS485)
SCA62 (multipoint)	XBT Z908 (RS485)
SCA64	XBT Z908 (RS485)
TWDXCAT3RJ, TWDXCAISO	XBT Z938 (RS485)

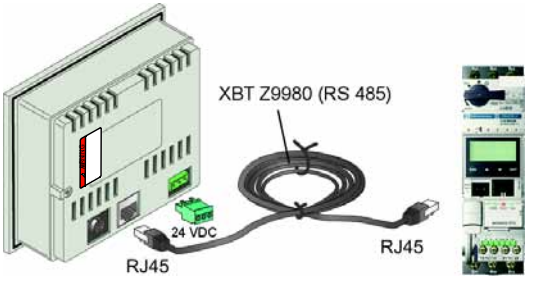
Connecting XBT RT511 to a PLC

XBT RT511 terminals require different cables for connecting them to individual PLCs or fieldbus taps.

Use the Schneider cable XBT Z9980 (RS485) to connect XBT RT511 to the following Schneider PLCs:

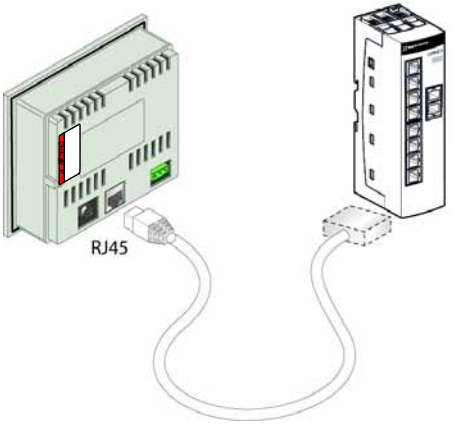
- Tesys Model U
- Altivar
- Lexium 05
- Zelio with communication module
- Preventa XPSMC

Connection via the Schneider cable XBT Z9980 (RS485)

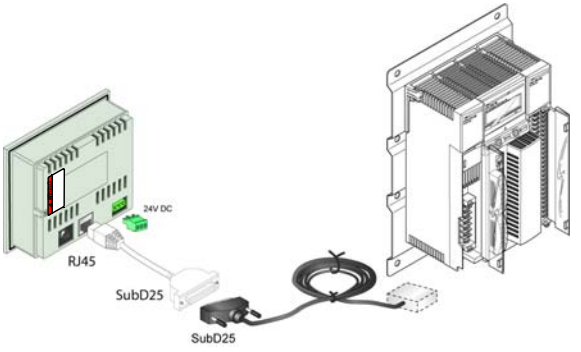


To connect your XBT terminal to other PLCs or fieldbus taps refer to the lists below showing the adequate cables.

Connection to PLCs or fieldbus taps using different Schneider cables:



Direct cable connection



Connection using the XBT ZG939 cable adapter

Cabling with PLCs:

PLC	Cable	+ XBT ZG939 cable adapter
Advantys STB	XBT Z9715 (RS232)	-
Momentum	XBT Z9711 (RS232C)	x
Quantum / 984	XBT Z9710 (RS232C)	x
Twido/Micro/Premium/Nano	XBT Z9780/Z9782 (RS485)	-
Modicon M340	XBT Z9980/Z9982 (RS485)	-
Rockwell Micrologix	XBT Z9733 (RS232)	-
Rockwell SLC500 , Drop 1761NETAIC	XBT Z9734 (RS485)	-
Siemens S7-200	XBT ZG9721 (RS485)	x
Omron CPM1, CPM2, CJ1 , CS1	XBT Z9743 (RS232	x

Cabling with fieldbus taps:

PLC	Cable	+ XBT ZG939 cable adapter
LU9 GC3	XBT Z9980 (RS485)	-
SCA62 (multipoint)	XBT Z908 (RS485)	x
SCA64	XBT Z908 (RS485)	x
TWDXCAT3RJ, TWDXCAISO	XBT Z9980 (RS485)	-

8.4 Connecting XBT N401 / R411 / RT511 Terminals to a Printer

Printer Connections

Overview

XBT N401, XBT R411 and XBT RT511 terminals provide a MiniDIN connector on their rear panel for connecting an RS232C printer.

Connecting XBT N401 / R411 / RT511 to a Printer

Use the Schneider cable XBT Z926 to connect your XBT N40, XBT R411 or XBT RT511 terminal to an RS232C printer.

Printer connection via Schneider cable XBT Z926

Overview of Applications and Functions

9

At a Glance

Overview

This chapter provides an overview of applications and functions of XBT terminals.

What's in this Chapter?

This chapter contains the following sections:

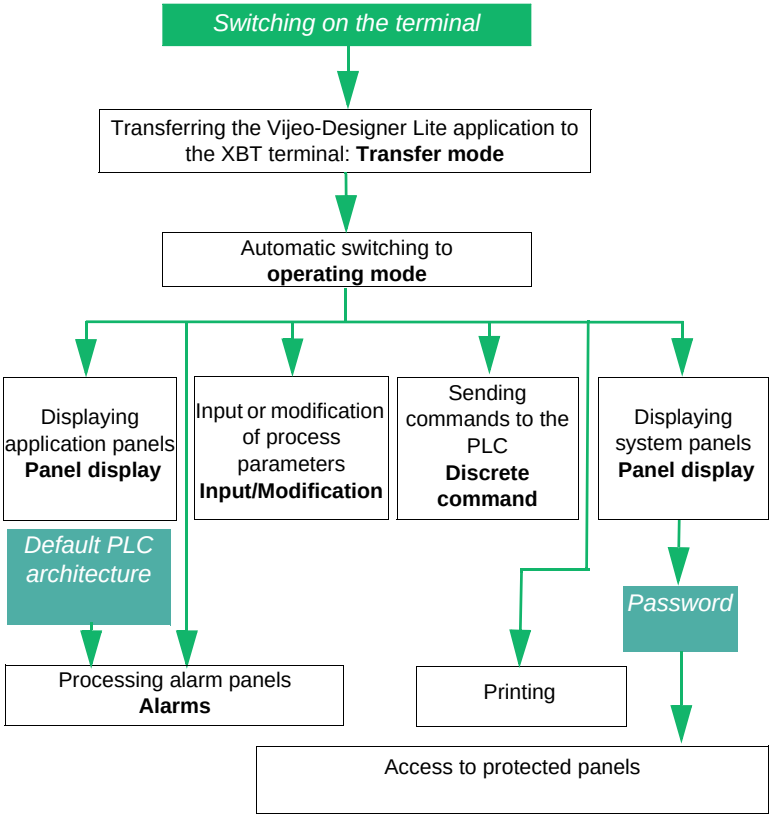
9.1 Overview of Functions

Overview of XBT Terminal Functions

Overview

The flowchart below shows the different functions of XBT terminals.

Representation

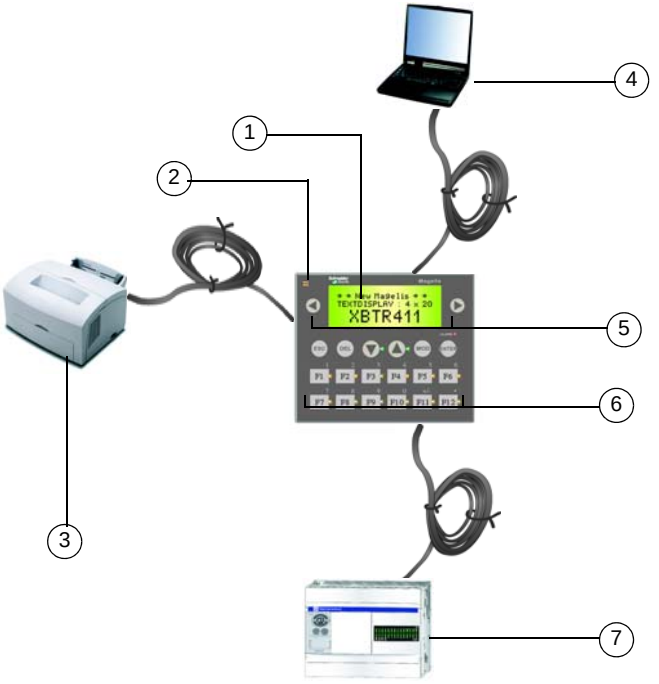


9.2 XBT Terminals in HMI Applications

HMI Applications

HMI Application Example

The figure below shows a typical HMI application with XBT R411.



No.	Description
1	XBT R411: terminal for visualizing data of the PLC
2	XBT R411: LED indicating the communication status
3	XBT R411 sends the alarms risen by the PLC on the flow to the printer
4	PC with Vijeo-Designer Lite for programming the XBT R411

No.	Description
5	XBT R411: keys for sending commands to the automation system ● changing the panel ● viewing current alarms ● modifying digits in variable edition ● activating the function associated with functional links
6	XBT R411: keys for modifying parameters of the PLC ● acknowledging alarms ● sending commands to the PLC ● entering values
7	Connection to a PLC

XBT N and XBT RT terminals provide different operating variants. Depending on the selected variant the keypad is either in control variant or in input variant or in touch variant (only XBT RT). In each variant, the individual keys provide different functions (for further information see *Overview of Keys on the Individual XBT Terminals, p. 39*). To indicate the different functions to the user, the key labels are interchangeable. Blank labels are provided that can be filled with individual texts.

Types of HMI Applications

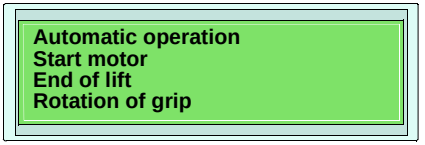
Applications for XBT terminals are created in the Vijeo-Designer Lite software. They can be associated with:

- production monitoring
- preventive maintenance
- corrective maintenance
- process control

Production Monitoring Example

In production monitoring applications XBT terminals display process status messages.

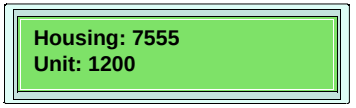
XBT terminal displaying a process status message:



Preventive Maintenance Example

In preventive maintenance applications XBT terminals count parts for production monitoring.

XBT terminal counting parts:



Corrective Maintenance Example

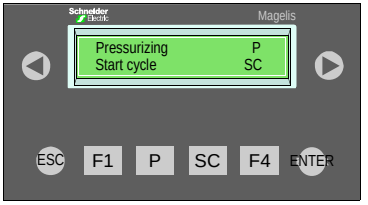
In corrective maintenance applications XBT terminals indicate process conditions.

XBT terminal indicating process conditions:

Process Control Example

In process control applications XBT terminals provide process control via configurable function keys.

XBT terminal providing process control via configurable function keys:



As indicated on the display unit of the XBT N in the above figure, the function **pressurizing** is controlled by the key named **P** and the function **start cycle** is controlled by the key named **SC**.

9.3 Functions of Keys, Touchscreen, LEDs

At a Glance

Overview

The following sections describe the functions of keys, touchscreen and LEDs on the different XBT terminal types.

What's in this Section?

This section contains the following topics:

Functions of Keys and Touchscreen

Overview

All XBT terminals provide keys on their front panels that perform different functions.

XBT R and XBT RT terminals provide specific keys, that can have 2 different functions depending on the current operating mode, the so-called dual labelled keys.

XBT RT terminals are additionally equipped with a touchscreen that allows execution of certain functions by pushing elements directly on the display unit of the terminal.

Functions of Keys

The functions of the individual keys provided on XBT terminals are listed in the following table:

Key	Key Function
	Select a field for edition or move on to the next field each time MOD is pressed (left to right and top to bottom).
	• exit the alarm display • return to the previous panel (the last 16 panels are memorized) • exit an edition without acceptance of the value entered

	• change panel in a menu
	• navigate in the alarm list or in the history list
	• select a digit in a variable field during edition
	• Activate the function associated with a functional link:
	  • impulse command
	  • toggle command
	  • writing variables
	  • set / reset bit

	• go up/down within a panel (for XBT terminals providing the scrolling function) • select a functional link in the panel • increment/decrement the selected digit • increment/decrement the value of a variable field • select a value in a selection list, and modify a digit in a variable field during input
	• delete the selected digit or field
	• confirm a selection • confirm an edition • acknowledge an alarm
	static function keys • access a panel • execute an impulse command • execute a **toggle** command • modify a value
	only for XBT RT: dynamic function keys having panel-dependant functions • access a panel • execute an impulse command • execute a **toggle** command • set / reset bit

Dual Labelled Keys on XBT R and XBT RT Terminals

XBT R and XBT RT terminals provide dual labelled keys.

For XBT R terminals this means that keys F1 to F12 are function as well as numeric keys, i.e. they can act as function keys as well as service keys.

They operate as follows:

- If the user is not modifying a value, the keys act as function keys.
- If the user is modifying the value of a field, the keys automatically act as service keys for edition mode.

Note: It is impossible to enter a value if a function key has been pressed, in the same way that it is impossible to leave edition mode if the value of a field is being modified.

For XBT RT terminals operated in touch variant, this means that keys F1 to F4 have different functions, depending on the selected terminal mode.

- In edition mode, keys F1 to F4 act as arrow keys.
- In normal mode, keys F1 to F4 act as static function keys.

Touchscreen on XBT RT Terminals

XBT RT terminals are equipped with a touchscreen that allows execution of functions by pushing elements directly on the display unit of the terminal.

You can activate HMI objects for edition mode by directly pressing the requested object on the touchscreen.

You can activate the function of a button displayed on the display unit of the terminal by directly pressing on this button.

⚠ CAUTION

EQUIPMENT DAMAGE

- Activate the touchscreen with fingers only.
- Never use sharp instruments, such as screwdrivers, as they may damage the touchscreen.

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

Functions of LEDs on XBT N401 / XBT R411 / XBT RT511 Terminals

Overview

The table below lists the functions of the LEDs provided on XBT N401, XBT R411 and XBT RT511 terminals.

LED	Color	Status	Meaning
Communication 	Amber	Off	No cable or no communication
		Blinking	Communication OK
Alarms 	Red	Alarm list:	
		Off	Empty
		On	Alarms already displayed
		Blinking	New alarms not previously displayed
Touch 	Green	Only available for XBT RT 511	
		Off	When there is no activity on the touchscreen or function key
		On	When you press the touchsceeen or function keys
Input variant			
Up/Down 	Green	Off	Key inactive
		On	Possibility of going up/down within a panel
		Blinking	Indicates the possibility: • of selecting a value in a list • of incrementing/decrementing the selected digit
Control variant			
LED for static function keys 	Green (XBT N) Amber (XBT R/ RT)	Off On	These LEDs are governed by the automation system. Their state is determined entirely by the application program of the automation system governing the terminal. As a result, their role can vary from application to application: • Signaling linked to the key (same type of role as the system LEDs above) • Signaling the status or a condition of the component governed by the key

Operating Principles of XBT Terminals

10

At a Glance

Overview

This sections describes general principles concerning the operation of XBT terminals.

What's in this Chapter?

This chapter contains the following sections:

10.1 Modes of Operation

At a Glance

Overview

This section provides an overview of the 2 modes of operation of XBT terminals and describes their selection process.

What's in this Section?

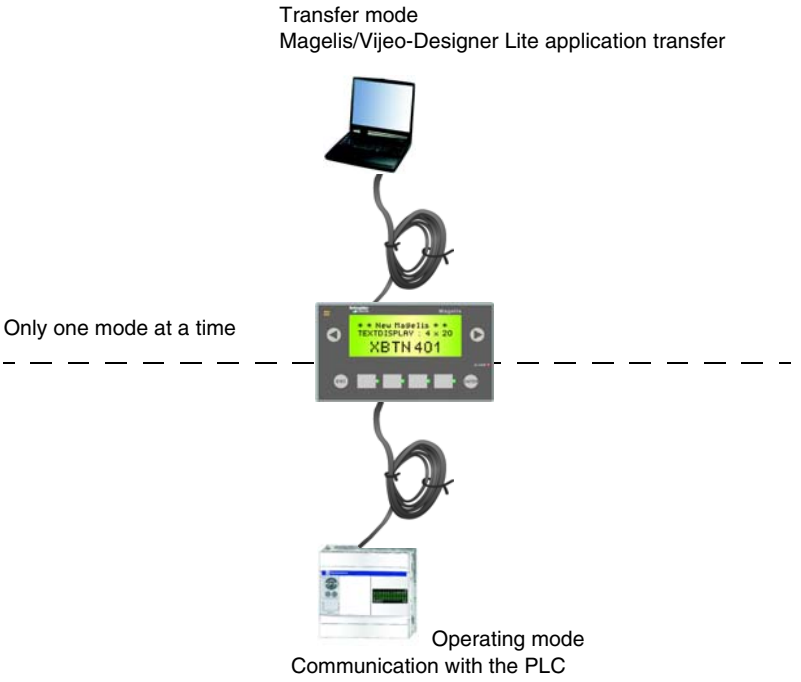
This section contains the following topics:

Introduction

Overview

Magelis XBT terminals provide the following 2 modes of operation:

- In **Transfer mode** dialog applications can be exchanged between the PC running the Vijeo-Designer Lite software and the Magelis XBT terminal.
- In **Operating mode** data is exchanged between the XBT terminal and the automation system (controlling the latter).



These 2 modes of operation will be described in the following sections.

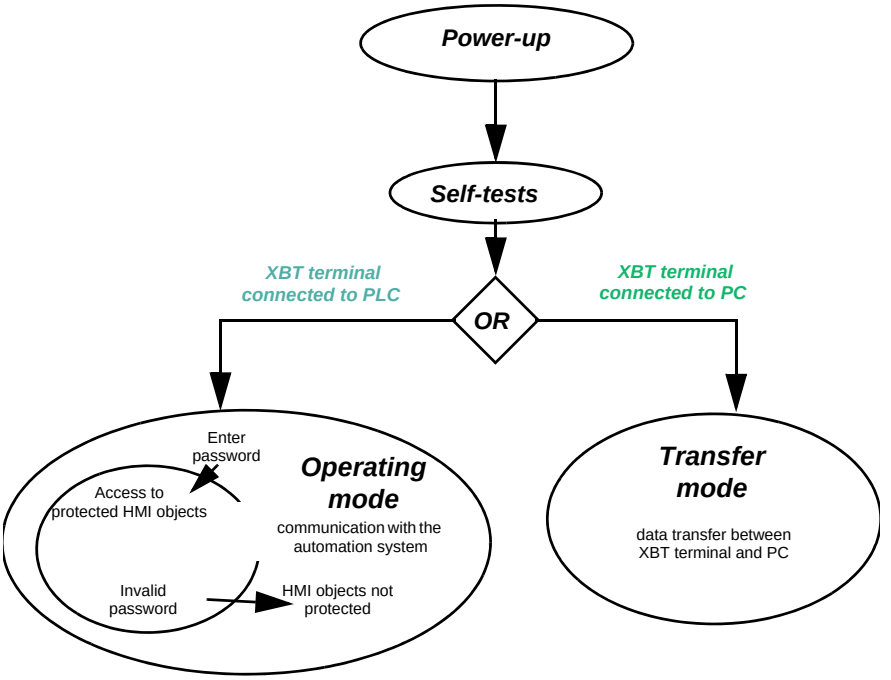
Automatic Selection of the Mode of Operation

Overview

On power-up, the XBT terminal automatically detects the equipment connected on its serial link and enables the suitable mode of operation (only one mode at a time).

Process of Selecting the Mode of Operation

Graphical presentation of the process of selecting the mode of operation



Transfer Mode

Overview

In transfer mode the XBT terminal communicates with the Vijeo-Designer Lite configuration software. Software applications can be transferred in both directions.

The XBT terminal automatically enables the transfer mode when it is connected to a PC via a communication cable. No operator action on the terminal is necessary in this mode.

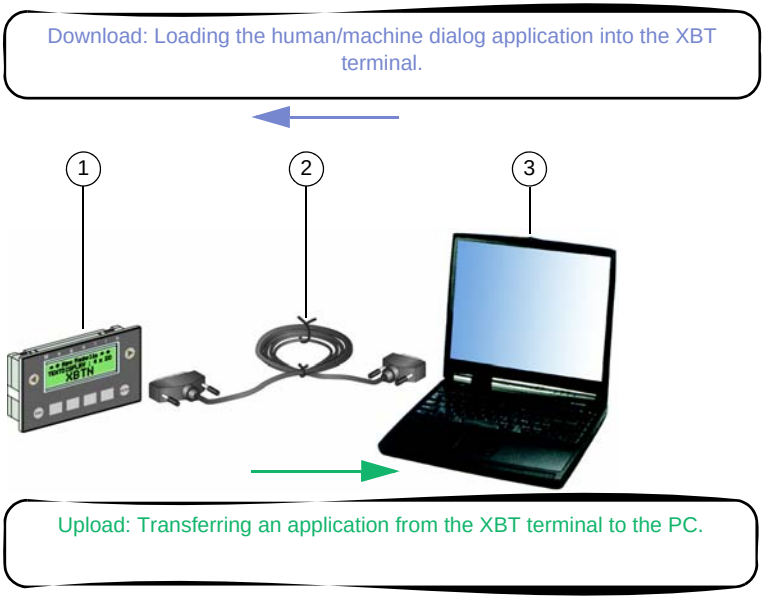
Procedure of Transferring Software Applications

For transferring software applications to or from your XBT terminal perform the following steps:

Step	Action
1	Connect your XBT terminal to a PC running the Vijeo-Designer Lite software. For the suitable Schneider cable see *Connecting XBT Terminals to a PC, p. 69*. Result: The XBT terminal automatically detects the connection to a PC, enables the transfer mode and waits for software application transfer.
2	From the Vijeo-Designer Lite software at your PC start the software application transfer. For transferring software configuration data from the PC to the XBT terminal, select the menus **Device** → **Download...**. For transferring software configuration data from the XBT terminal to the PC, select the menus **Device** → **Upload...**. XBT terminals that are equipped with a communication LED indicate data interchange with a PC by a blinking communication LED.

Transfer Mode Process

Transfer mode application example



No.	Description
1	XBT N401
2	Transfer cable (for a list of Schneider cables refer to *Connecting XBT Terminals to a PC, p. 69*)
3	PC with Vijeo-Designer Lite

Operating Mode

Overview

The operating mode is used for data interchange between the XBT terminal and the automation system to control the automation system. The following tasks can be performed in this mode of operation:

- panel display
- edition/modification of automation system architecture parameter values
- process control (discrete)
- viewing and acknowledging alarms

The XBT terminal automatically enables the operating mode when it is connected to a PLC via a communication cable.

Accessing Panels in Operating Mode

When the XBT terminal is connected to a PLC, the XBT terminal automatically displays the default panel after start-up. This default panel allows navigation to the remaining panels.

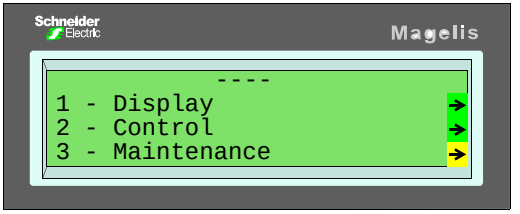
To navigate between panels and to access a selected panel use the arrow keys of your XBT terminal:

Arrow Keys	Function
	To navigate to another panel, press the up and down arrows of your XBT terminal.
	To access a selected panel, press the right arrow of your XBT terminal.

Example of Accessing Panels in Operating Mode

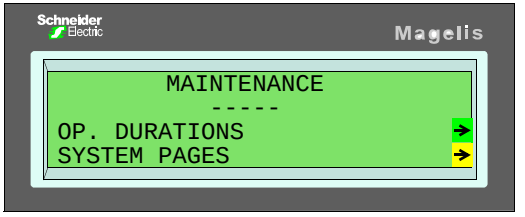
The following 2 figures illustrate how to navigate from a default panel to a panel of your choice (target panel).

Default panel



To open the **Maintenance** panel, press the arrow down key twice to select and then click the arrow right key to open it.

Target panel



10.2 Panel Structure of XBT Terminals

At a Glance

Overview

XBT terminals display panels on their display unit. These panels can contain not-animated objects (e.g. background images, static texts) and not animated HMI objects (e.g. value displays, bar graphs). 3 different types of are used in XBT terminals:

- application panels
- alarm panels
- system panels

What's in this Section?

This section contains the following topics:

Principle of Application Panels

Definition

Application panels are panels designed to provide information about the automation system architecture being run. They also serve to clarify any operation that the operator might have to carry out in a given context.

Application panels can be interlinked to create authorized sequences during operation.

Unauthorized operators can be prevented from displaying protected panels.

Displaying Application Panels

Default Panel on Power-Up

When designing the application in Vijeo-Designer Lite, the designer can select a default panel.

When the terminal is powered up, this is the first panel to be displayed.

There are different ways to display application panels:

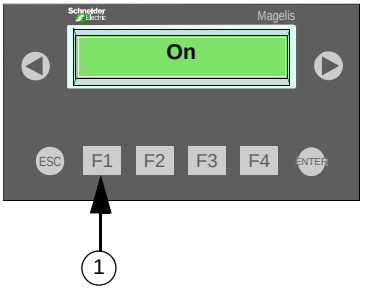
- by pressing function keys
- by activating navigation links provided on other application panels
- by pressing a button object or an active area on the touchscreen (XBT RT only)
- by pressing dynamic function keys Ri on products supporting this function
- via the PLC
- by activating links provided on system panels

Via Function Keys

It is possible to display a panel directly by pressing a function key.

Example

Pressing a function key for opening a specific panel:

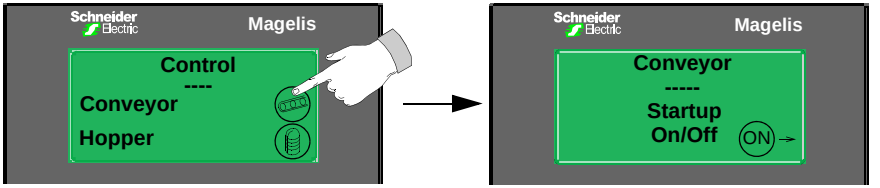


1 function key

Via Button Object or Active Area on Touchscreen

By using the touchscreen of XBT RT terminals operated in touch variant you can directly access a specific panel by pressing a button object or an active area provided on the actually displayed application panel.

Pressing a button for opening a specific panel:

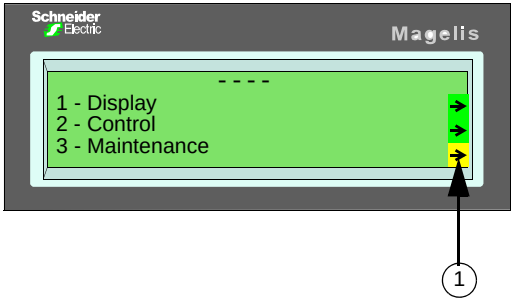


Via Navigation Links

You can directly access a specific panel by using a navigation link provided on the actually displayed application panel.

The following 2 figures illustrate how to navigate to a specific panel using a navigation link.

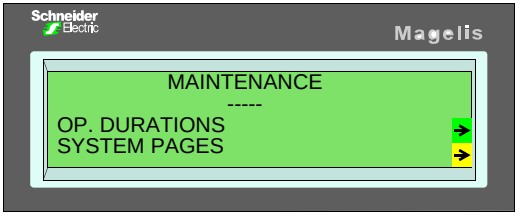
Source panel



1 Navigation link

To navigate directly to the **Maintenance** panel, select the arrow next to **Maintenance** and activate this link (by using the arrow keys of the front panel or directly touching the arrow on the touchscreen).

Target panel

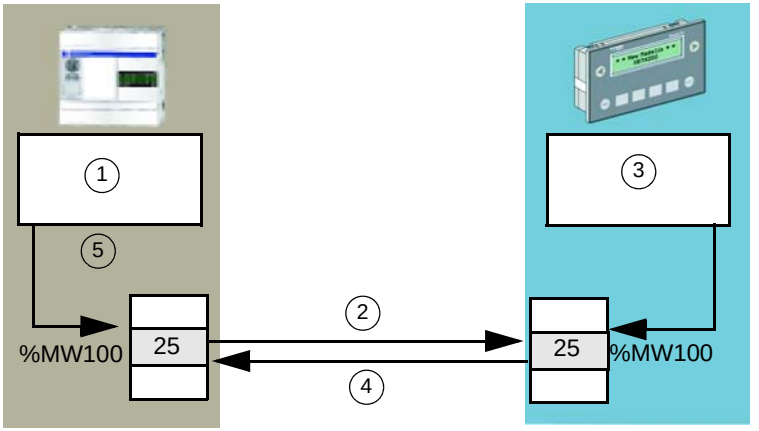


Via the PLC

A specific panel is displayed because the program has written the number of the panel to be processed in a word in the dialog table (for more information see *Exchanging Data with the Automation System via the Dialog Table, p. 163*).

The following figure illustrates how a specific panel is opened by the PLC.

PLC opening a specific panel



No.	Description
1	Program, Display panel 25
2	Table read by the terminal
3	Display panel 25
4	Write acknowledgment, panel to be processed H'FFFF'
5	Dialog table

The PLC dialog table contains the number of the panel to be processed (1). The XBT terminal reads the dialog table in the PLC (2) and displays the desired panel (3).

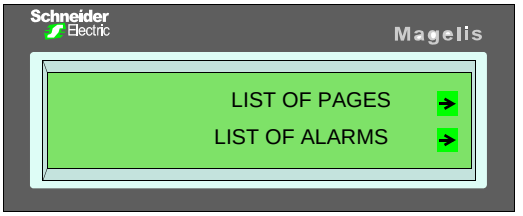
Once the command has been processed, the XBT terminal writes the value H'FFFF' in the panel to be processed word (4), to acknowledge the request to the PLC program.

From System Panels

You can directly access a specific panel by using a navigation link provided on a system panel.

The following figure shows a system panel providing links to application panels.

System panel with links to application panels



To navigate directly to the **LIST OF ALARMS** panel, select the arrow next to **LIST OF ALARMS** and activate this link (by using the arrow keys of the front panel or directly touching the arrow on the touchscreen).

For more information about system panels, see *Principle of System Panels, p. 122*

Principle of Alarm Panels

Objective

An alarm panel has the same characteristics as an application panel with respect to:

- the text
- the fields

The first line of an alarm panel is preconfigured (by Vijeo-Designer Lite) to show:

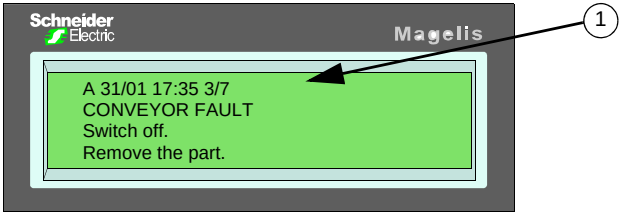
- the dates and times of alarm appearance/disappearance and acknowledgment
- the ranking of the alarm in the alarm list
- the total number of alarms in the list

The advantage of an alarm panel lies in its event-triggered display. Each alarm panel is associated with a word bit in the dialog table.

If the bit is at state 1, the panel is displayed and the text blinks.

Example

Example of an alarm panel



1 Line time-stamped by the XBT terminal (**A** for Alarm), the alarm text appears blinking and changes to a steady display once it has been acknowledged.

Listing Alarms in Operating Mode

- When an alarm appears, it is often the consequence of other alarms. Due to their **priority** system, XBT terminals can display the most important alarm, i.e. the alarm that is presenting the highest risk to the automation system architecture.
- All alarms are **time-stamped** on appearance.

Alarm Management

Alarm Indication

The actual display of an alarm depends on the priority it has been allocated (*see section Display Priority below)*.

Alarms pending on the automation system architecture are stored in an alarm list.

The graphic below shows an Alarm LED.

The Alarm LED continuously informs the operator about the state of the alarm list:

- Off: The alarm list is empty.
- Blinking: The alarm list contains alarms which have appeared since the alarm list was viewed (new alarms).
- On: The alarm list contains alarms which occurred before the alarm list was viewed (alarms already displayed).

Display Priority

A priority can be associated with each alarm panel. An alarm panel has priority over an application panel and a system panel. An alarm panel does not have priority over a value, which is currently being entered.

Different alarm panels may have different priorities. There are 16 possible levels of priority (the lowest display priority being priority no. 16).

Exception of Priority 0

When an alarm appears on the automation system architecture that is allocated to a priority 0 alarm panel, the following will happen:

- The alarm panel is not displayed, but stored in the alarm list, thus the current display will not be disturbed.
- The alarm LED blinks to signal the alarm.

When an alarm is activated, it is stored in the alarm list by the terminal.

Appearance Types

Alarm panels can appear in different ways. Alarm panels can be:

- displayed directly on the display unit
- printed directly from XBT terminals equipped with a printer connector (data-stream printing)
- stored in the list of current alarms

Storage Principle in the Alarm List

If the alarms have equal priority, they are stored from the oldest to the most recent.

If the display unit is available (i.e., not occupied by a higher-priority display), the oldest alarm is displayed. In an automation system, it is often the oldest alarm that is the most interesting, as the more recent alarms are often a consequence of the condition signaled by the first alarm (classic case of bursts of alarms).

If alarms with higher priority occur the following will happen:

- Alarms with higher priority are stored at the top of the list.
- If the display unit is available (i.e., not occupied by a higher-priority display), the new alarm with highest priority will be displayed.

Buzzer for Alarms Notification

You can set alert sounds to inform you of alarms by activating the buzzer of the XBT RT511 terminal.

Acknowledgment of Alarms

When designing alarm panels, it is possible to define whether the alarm panel should be acknowledged systematically by the operator (obligatory acknowledgment) or not.

To acknowledge the alarm panel on the display press ENTER. The alarm message changes to a steady display.

Depending on the choice made, management of these 2 types of alarm is as follows:

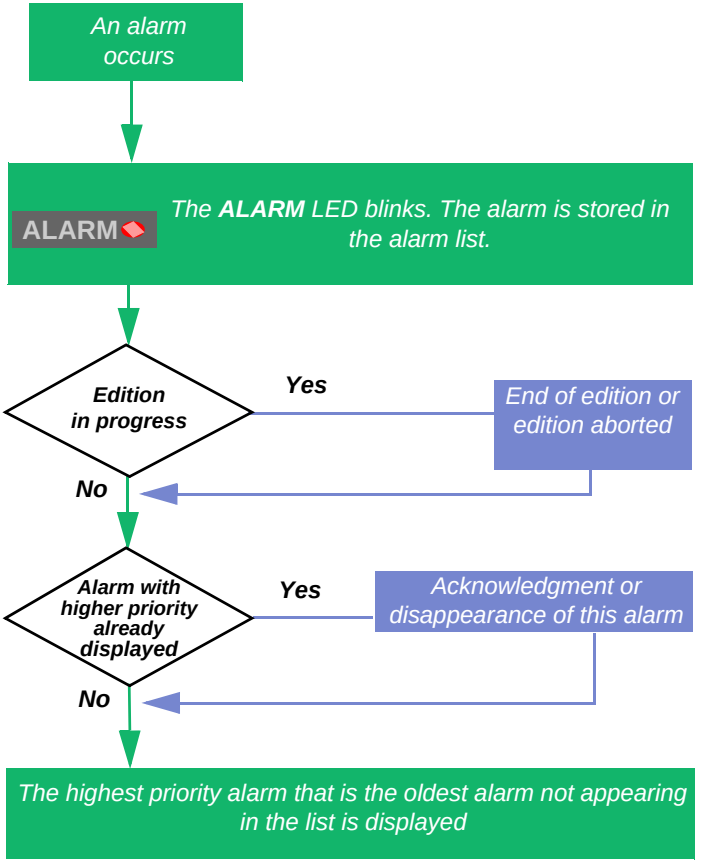
Alarms which must be acknowledged (obligatory)	**Alarms which can be acknowledged but do not have to be**
An alarm, which must be acknowledged, remains in the alarm list until it is acknowledged by the operator, even if the cause of the alarm has disappeared.	An alarm, which can be acknowledged but does not have to be, disappears from the alarm list as soon as the cause of the alarm has disappeared, regardless of whether or not it has been acknowledged by the operator.
Advantage: Picks up transient conditions (instability of a discrete sensor, for example).	**Advantage**: The display unit is not monopolized by displaying alarms considered to be of minor importance to the application.

Alarm Log

The terminals can manage a log of the alarm panels. They store the alarm panels with the text, but without variable values (for more information, see *Alarm Log, p. 156*).

Display Principle of Alarm Panels

Representation



Principle of System Panels

Definition

System panels are predefined panels which are used to perform operations relating to the XBT terminal "system".

In operating mode, these panels can be accessed in the same way as application panels.

System panels are panels processed as if they were application type panels. Hence they are stored with the application panels in the developed application file.

There are 3 types of system panels:

- standard system panels, which can be called by accessing an application panel (numbers 1 to 100)
- system panels, which cannot be called by accessing an application panel (numbers 101 to 200)
- popup/message system panels, which cannot be called (numbers 201 to 300)

The advantage of being able to view these panels with Vijeo-Designer Lite is that system messages can be translated.

Displaying System Panels

Overview

System panels are accessed by means of function keys or navigation links.

When designing the application in Vijeo-Designer Lite, the designer can choose the system panels that should be associated with these keys, or these links.

List of System Panels

The following system panels are available to HMI operators:

Number	Name	Description
2	panel list	displays a list of all application panels you can access, depending on your security access level The panels protected by password are listed only. The current security access level is in conformance with the security access level of the panel.
3	alarm list	displays a list of all the active alarms triggered by the automation system
4	alarm history	displays a list of the last events of the alarm history (coming alarms, going alarms, communication interruptions)
7	password	On this panel you can enter the password to change the security access level (A, B, C, or blank password).
10	default system panel	When a terminal cannot boot and displays a certain panel (for example, the first panel is protected by password), then the terminal displays the default system panel automatically.
22	language	On this panel you can choose the language of the terminal.
30	printer	displays the communication parameters for the second serial line (only significant for terminals supporting a second serial line)
100	protocol	displays the parameters for the communication with the equipment connected on the automation network
110	advanced	displays internal alarm counters These internal alarm counters can be of interest during calls to the technical support.

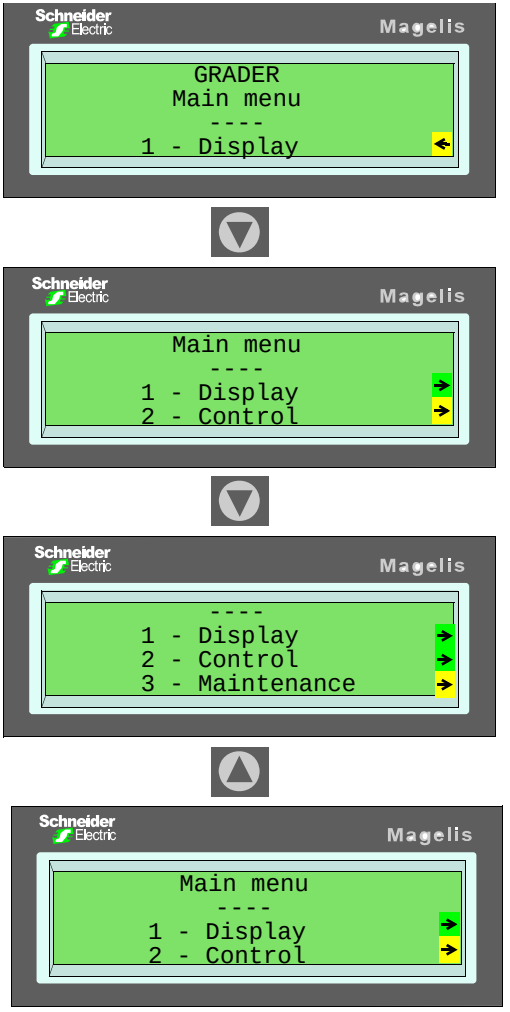
Scrolling within Panels

Overview

Scrolling is necessary in XBT N and XBT R terminals to view the entire panel that contains more lines than the display unit can display. When opening a panel the first n (n being the number of lines on the display unit) lines of this panel are displayed on the display unit. For example, four lines for the XBT N400 terminal.

Example

The other lines can be displayed by scrolling up or down the panel using the up and down keys on the keypad.



10.3 General Configuration Settings

At a Glance

Overview

This section describes general settings concerning the HMI language, the date and time format as well as access to product reference and line parameters.

What's in this Section?

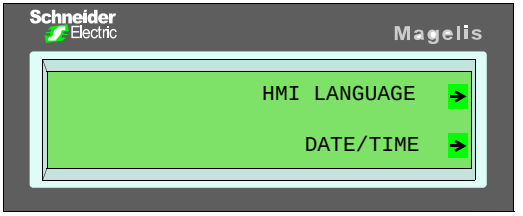
This section contains the following topics:

Accessing Configuration Parameters via the System Panel SYSTEM

Overview

It is possible to configure certain terminal parameters when the terminal is in operating mode, without going into Vijeo-Designer Lite.

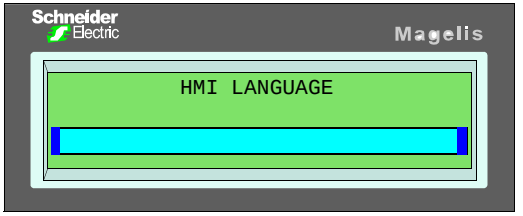
The configuration parameters are accessed via the **SYSTEM** system panel (for displaying system panels, see *Displaying System Panels, p. 123*).



Selecting the HMI Language

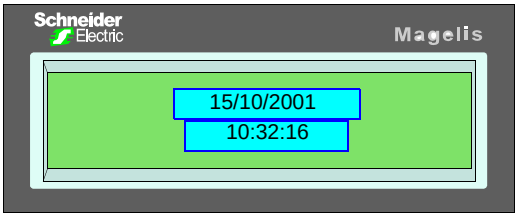
Overview

In the **HMI Language** system panel choose one of the languages configured by the designer.



Selecting the Date and Time Format

In the **DATE/TIME** panel set the current date and time and define the date and time display format of your choice.



Entering Date and Time

The date and time values are entered in the same way as a variable alphanumeric field (for further information see *Entering a Value in an Edition Field, p. 148*).

Selecting Display Format

The format can be configured using the Vijeo-Designer Lite program, during terminal configuration.

The time format selected applies to all times and dates processed by the software, including the dates and times printed and/or displayed in the log and in the alarm list.

Example

The following display formats are available:

Date formats	Time formats
DD/MM/YYYY	24:mm:ss
MM/DD/YYYY	12:mm:ss
YYYY/MM/DD	

Please note that the time you entered is only valid as long as the terminal is powered on. As soon as you power off the product the time will be lost.

Accessing the Product Reference

Overview

The references of the XBT terminals can be accessed from the system panels.

The references of the XBT terminal can be obtained if the designer has provided access to these panels (link to the system panels).

The following information is displayed:

- product reference
- name of the application developed in Vijeo-Designer Lite
- date and time when the application file was saved in Vijeo-Designer Lite
- communication protocol name
- version of Vijeo-Designer Lite used to create the application
- XBT terminal BIOS reference and version
- XBT terminal application software reference and version

Note: The most important information is placed on the first few lines so that it is displayed consecutively, avoiding the need to scroll through the panel.

Accessing the Line Parameters

Overview

System panels contain detected error counters whose content is protocol-dependent. For further information refer to the XBT protocol manual describing the protocol you are using.

10.4 Password-Protection

Accessing Password-Protected Panels, Fields, Functional Links

Protection

To be sure that only authorized persons are able to read and write data, it is possible to protect:

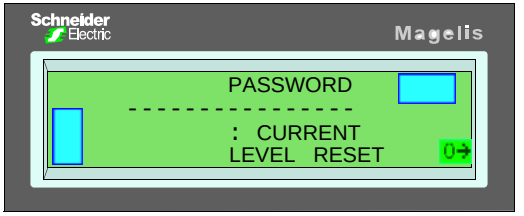
- access to panels
- modification of fields
- control via functional links

If an operator does not have authorization:

- protected panels no longer appear in the list of panels
- protected fields behave as if they had been configured as read-only

Password

To access password-protected areas enter your password via the **Password** system panel. A navigation link to the **Password** system panel is required on one of the application panels. (For more information about how system panels are displayed, see *Displaying System Panels, p. 123*).



XBT terminals provide three access levels: A, B and C.

The passwords for these levels are defined in Vijeo-Designer Lite. A password consists of four alphanumeric characters (default value: 1111).

Communication Between XBT Terminals and the Automation System

11

At a Glance

Overview

This chapter provides information about the communication between XBT terminals and the automation system, listing the types of commands and how they are activated as well as the processes of entering / modifying values or handling alarms.

What's in this Chapter?

This chapter contains the following sections:

11.1 Types of Commands

At a Glance

Overview

This section describes the 2 types of commands that can be sent via function keys (or functional links) or button object on touchscreen of the XBT terminal to the automation system:

- impulse commands
- toggle commands

What's in this Section?

This section contains the following topics:

Impulse Commands

Impulse Command

The automation system is activated by pressing a function key (or functional link) or button object on touchscreen of XBT RT terminals. If the key (or functional link) is released, the action stops.

Example

Motor command

Key	Bit
released	0
pressed	1
released	0

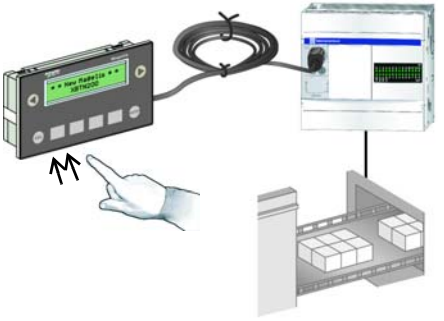
Toggle Commands

Toggle Command

The automation system is activated by pressing the function key (or functional link) or button object on the touchscreen of XBT RT terminals. If the function key (or functional link) is pressed again, the action on the control system stops.

Example

Conveyor forward command



Key	Bit
released	0
pressed	1
released	1
pressed	0

11.2 Activating Commands

At a Glance

Overview

This section describes the different ways commands can be activated at XBT terminals.

What's in this Section?

This section contains the following topics:

Activating Commands via Functional Links, Button Objects or Dynamic Function Keys on the Display Unit

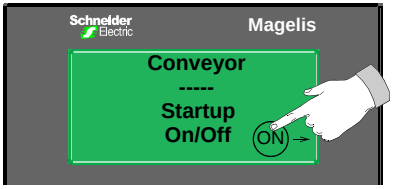
Overview

Functional links, button objects and dynamic functions are integrated by the application designer on the different panels to create additional control functions.

To activate functional links, use the left and right keys on the front panel of the XBT terminals.

To activate buttons, press the button directly on the screen if your XBT terminal is equipped with a touchscreen. If your XBT terminal is not equipped with a touchscreen, press the **MOD** key to select the button and the **ENTER** key to activate the button.

Example of a button object



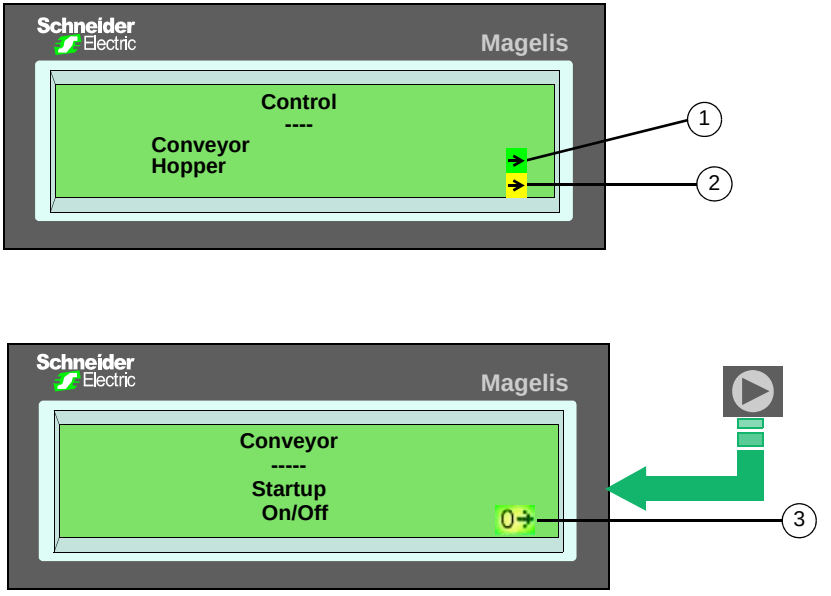
To activate dynamic functions, use the Ri keys on the front panel of the XBT terminals. These keys can also be linked to pictograms on screen.

Example of dynamic function keys linked to pictograms on screen

Links, button objects and dynamic functions are programmed by the application designer to send different types of commands to the equipment from the application panel:

- impulse commands
- toggle commands
- set value
- reset value
- write value

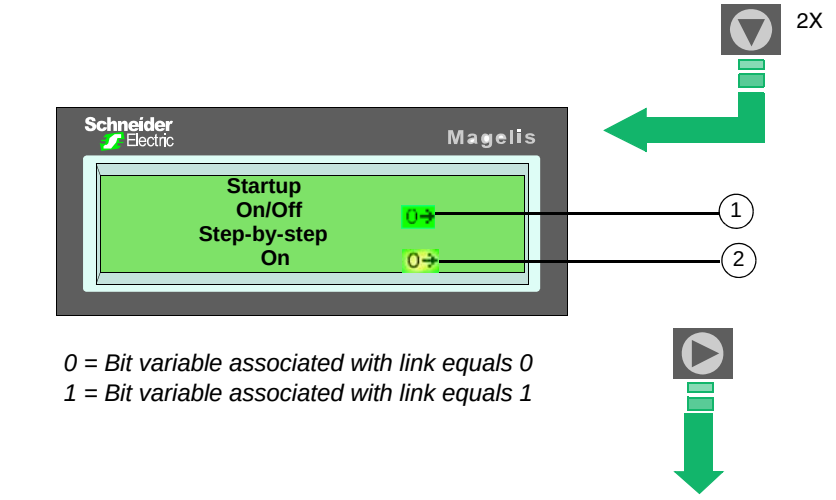
Functional Link Example



No.	Description
1	Change panel (link blinking to indicate that it is active)
2	Change panel
3	Toggle (link blinking to indicate that it is active)

Representation of Command Links

Example



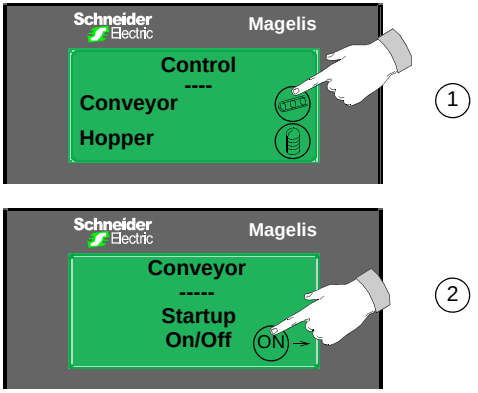
0 = Bit variable associated with link equals 0
1 = Bit variable associated with link equals 1

The operator controls the conveyor step-by-step. When the operator releases the button, the conveyor stops.

No.	Description
1	Toggle
2	Impulse (link blinking to signal that the link is active)

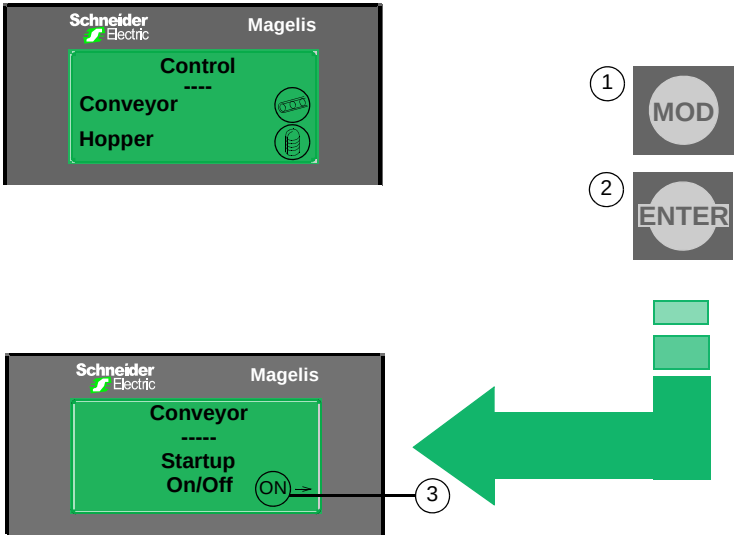
Buttons

Example of XBT RT in touch variant



No.	Description
1	Push button on touchscreen to go to the **Conveyor**panel.
2	Push button on touchscreen to activate the function.

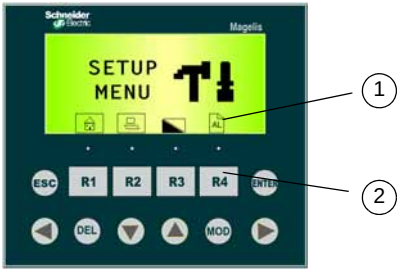
Example of XBT RT in No-touch variant



No.	Description
1	Press the **MOD** key once to select the button.
2	Press the **ENTER** key to go to the **Conveyor** panel.
3	Press **MOD** and **ENTER** to activate the function.

Dynamic Function Keys

Example of dynamic function keys linked to pictograms

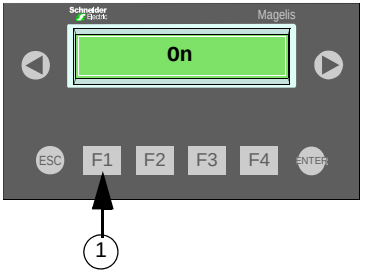


No.	Description
1	Pictograms illustrating the functions of the dynamic function keys.
2	Dynamic function keys.

Activating Commands via Function Keys on the Display Unit

Example

Function key



1 Function key

The dialog table enables dialog between the PLC and the terminal. In this table, one word is reserved to supply the PLC with the status of the function keys in the form of a word bit.

Bit 15 to Bit 12	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Reserved	F12	F11	F10	F9	F8	F7	F6	F5	F4	F3	F2	F1

11.3 Entering / Modifying Values Alphanumeric Fields in Edition Mode

At a Glance

Overview

This section describes how to select and modify alphanumeric fields, i.e. fields that allow to enter characters (A-Z) and numbers (0-9).

What's in this Section?

This section contains the following topics:

Accessing an Alphanumeric Edition Field

Overview

Alphanumeric edition fields can either be accessed by the user or by the automation system.

User Selecting an Edition Field

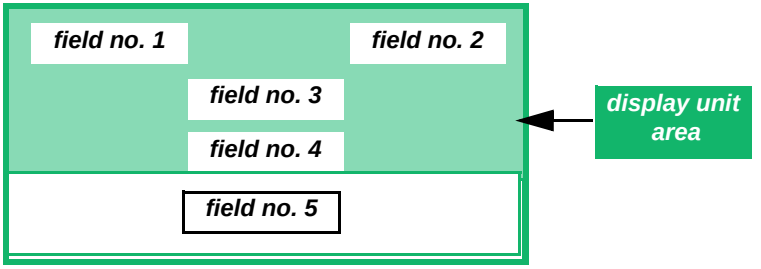
To access an alphanumeric edition field, it must first of all be visible on the display unit. To select the field, press the **MOD** key of the XBT terminal.

If there are several edition fields available on the actually displayed panel, press the **MOD** key several times in succession to run through the variable fields in edition mode from left to right and from top to bottom.

You access an alphanumeric edition field on XBT RT terminals in touch variant directly by touching the screen if an active area has been configured by the HMI application designer.

Example

Selecting an edition field out of several edition fields on the same panel:



1st time **MOD** is pressed:	If no edition has been made in any field on the display unit since the panel was displayed, the top left-hand field on the display unit is the edition field (field no. 1) Otherwise the edition field will be the one that has already been edited (field no. 1, 2, 3 or 4).
We will assume that field no. 1 is the edition field	
2nd time **MOD** is pressed:	Edition field no. 2
3rd time **MOD** is pressed:	Edition field no. 3
4th time **MOD** is pressed:	Edition field no. 4
5th time **MOD** is pressed:	Edition field no. 1, etc.
Field no. 5 cannot be the edition field because it is not visible on the display unit.	

Automation System Accessing an Edition Field

The connected device sets a variable field into edition mode by writing its number in a word in the dialog table. To display the number of variable fields in Vijeo-Designer Lite, use the **Layout** → **Display Fields Indices** menu.

In return, the XBT terminal writes the number of the field being completed in a word in the dialog table (see *Exchanging Data with the Automation System via the Dialog Table, p. 163*).

Specific feature of this type of selection:

You cannot select another variable field at the XBT terminal until the one requested by the connected device has been completed because the **MOD** key is inactive during this time.

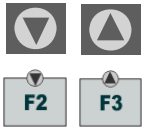
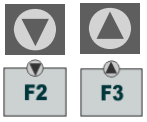
Entering a Value in an Edition Field

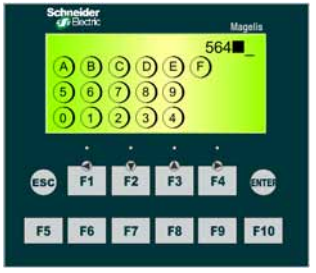
Input Methods

Before you can enter a value in an edition field, activate the input mode in the XBT terminal.

After you have activated the input mode for a field, the whole field blinks and the following edition methods are available:

- accelerated incremental edition
- thumbwheel edition
- direct edition
- direct edition via virtual numeric keypad

Edition Methods	Key	Description
Accelerated Incremental Edition:	Down/Up 	The total value of the field is increased or decreased by pressing the up/down keys.
Thumbwheel Edition:	Left/Right  Down/Up 	• First, the digit to be modified is selected and starts blinking when the up and down keys are pressed. (These keys are managed in the same way as a drum. This means that on reaching one end of the variable field, you go back to the other end.) • Next, when the left and right keys are pressed, the digit values are displayed in one direction or the other (these keys are also managed in the same way as a drum).

<table>
<tr><th>Edition
Methods</th><th>Key</th><th colspan="2">Description</th></tr>
<tr><td rowspan="14">Direct Edition (XBT R4•• only):</td><td rowspan="14">Key F1 to F12
  </td><td colspan="2">Keys F1 to F12 are dual labelled Fx/Nx (function/numeric) keys. They can be used to modify values directly. The correspondence between keys and numeric values is as follows:</td></tr>
<tr><td>Key</td><td>Value</td></tr>
<tr><td>F1</td><td>1</td></tr>
<tr><td>F2</td><td>2</td></tr>
<tr><td>F3</td><td>3</td></tr>
<tr><td>F4</td><td>4</td></tr>
<tr><td>F5</td><td>5</td></tr>
<tr><td>F6</td><td>6</td></tr>
<tr><td>F7</td><td>7</td></tr>
<tr><td>F8</td><td>8</td></tr>
<tr><td>F9</td><td>9</td></tr>
<tr><td>F10</td><td>0</td></tr>
<tr><td>F11</td><td>+/-</td></tr>
<tr><td>F12</td><td>.</td></tr>
<tr><td>Direct Input via Virtual numeric Keypad (XBT RT in touch variant only):</td><td>Virtual numeric keypad on touchscreen of XBT RT:
  </td><td colspan="2">Activate the individual buttons on the touchscreen with your finger to enter the respective character.</td></tr>
</table>

Confirming / Cancelling an Edition

Overview

To confirm or to cancel the edition of alphanumeric fields, use the **ENTER** and **ESC** key.

Confirming an Edition

ENTER key

If you press the **ENTER** key after you have modified an edition field, the entered value is transmitted to the connected device. Refreshment of the field, which was in edition mode, is active again.

Canceling an Edition

ESC key

If you press the **ESC** key after you have modified an edition field, the following will happen:

- No write action is performed to the automation system.
- The value prior to edition is redisplayed.
- Refreshment of the field, which was in edition mode, is active again.

Exit Edition on Time Out

Overview

If you have enabled edition mode but you do not press any key for more than 1 minute, edition mode will be disabled automatically and the following will happen:

- No write action is performed to the automation system.
- Refreshment of the field, which was in edition mode, is active again.

Edition Report

Overview

After the edition mode has been disabled, the connected equipment is informed of how the edition ended:

- confirmation
- cancellation
- time out

by updating the **Report** word in the dialog table.

11.4 Handling Alarms

At a Glance

Overview

This section describes how to view, ignore and print alarms.

Please note that these functions are not available for XBT N200 terminals.

What's in this Section?

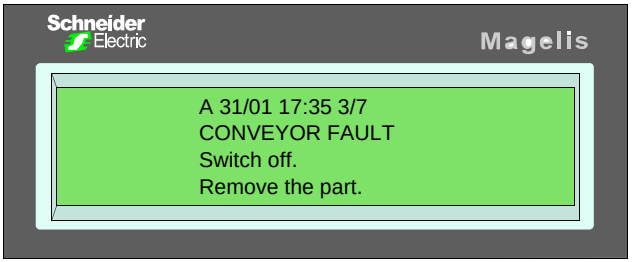
This section contains the following topics:

Viewing or Ignoring Alarms

Overview

When an alarm occurs, it is automatically displayed on the display unit.

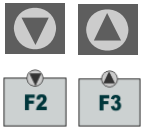
An alarm is displayed blinking



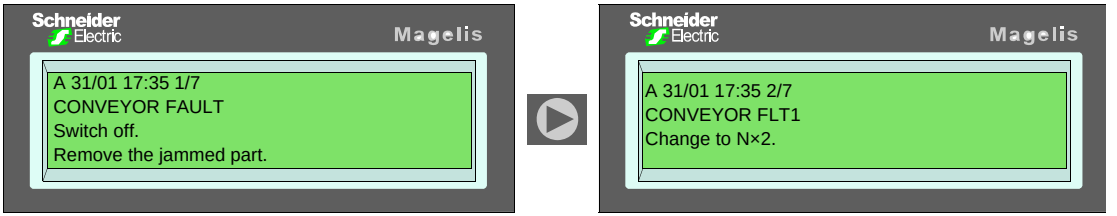
You can now view and acknowledge the alarm or you can ignore the alarm.

Viewing Alarms

To view the alarm, use the keys of your XBT terminal as described below:

Key	Description
	Scroll through the alarm panel (up to 25 lines).
	Scroll through the list of alarm panels.
	Press the **ENTER** key to acknowledge the alarm on the display. The alarm message stops blinking and changes to a steady display.
	Press the **ESC** key to exit viewing alarm panels.

Example Using the left and right arrow keys to scroll through the alarm list:



Ignoring Alarms To ignore an actual alarm, use the **ESC** as described below

Key	Description
	If an alarm is displayed during operation, you can press the **ESC** key to return to operating mode. The alarm remains in the list and the ALARM LED changes to a steady display.

Alarm Log

Log Principles

Alarms are automatically stored in a log file one after another. Once the log file is full, new alarms overwrite the oldest alarms. In this way each alarm event (for appearance, acknowledgment, disappearance see *Listing Alarms in Operating Mode, p. 118*) is recorded and time-stamped.

Note: XBT R411 and XBT RT511 are the only terminals that permanently save the log. Any other XBT terminal types loose the information stored in the log when they are switched off. The retention period for the log is limited to twelve hours. Beyond that time there is a possibility that the log will be cleared.

Note: In order for an alarm panel to be stored in the log, the store option must be enabled for the panel.

You can view, clear and print the log which will be described in the following sections.

Viewing the Log

You can access the alarm log from the **MENU** system panel (see *Displaying System Panels, p. 123*).

MENU system panel

Once inside the log, you can browse through the various alarms (see *Viewing Alarms, p. 154*).

Clearing the Log

To clear the log file proceed as follows:

Step	Action
1	In the **MENU** system panel select **ALARMS LOG**.
2	In the following panel select **CLEAR**. Result: The alarm log is empty.

11.5 Printing Alarms

At a Glance

Overview

This section provides a general overview of the printing function for alarms.

Please note that this function is only available for XBT N401, XBT R411 and XBT RT511 terminals.

What's in this Section?

This section contains the following topics:

Principles of Printing Alarms

Overview

You can print alarms in the following different ways that will be described in the following sections:

- printing alarms as a data stream
- printing the alarm log
- printing the list of current alarms

Printing Alarms as a Data Stream

Overview

The alarm name and status are printed whenever an alarm status changes.

The following information are printed:

- alarm number
- name of the alarm panel
- print date
- print time
- alarm status

Note: In order for an alarm panel to be printed, the print option must be enabled for the panel .

Example

```
!---!----------------------------!------------------!--!---!---!
!NUM!          ALARM LIST        !DD/MM/YYYY HH:MM:SS!ON!ACK!OFF!
!---!----------------------------!------------------!--!---!---!
!002!VAT2:Alarm number 2          !05/03/2004 09:12:05!XX!   !   !
!001!VAT1:Alarm number 1          !05/03/2004 09:10:02!  !   !XXX!
!001!VAT1:Alarm number 1          !05/03/2004 09:08:48!  !XXX!   !
!001!VAT1:Alarm number 1          !05/03/2004 09:04:57!XX!   !   !
```

Alarm 1 appeared, was acknowledged and then disappeared.

Alarm 2 is present but has not been acknowledged.

Printing the Alarm Log

Initiated by the Operator

The log is printed in sequential order (sorted by status), with the most recent alarm at the top.

The following information is printed for each alarm:

- its number
- name of the alarm panel
- date and time of appearance
- date and time of acknowledgment
- date and time of disappearance

Initiated by the PLC

The log is printed by means of the print command word in the dialog table.

The log is printed in sequential order (sorted by status), with the most recent alarm at the top.

The following information is printed for each alarm:

- alarm number
- name of the alarm panel
- date and time of appearance
- date and time of acknowledgment
- date and time of disappearance

Example

```
!---!----------------------------!------------------!--!---!---!
!NUM!          ALARM LIST        !DD/MM/YYYY HH:MM:SS!ON!ACK!OFF!
!---!----------------------------!------------------!--!---!---!
!002!VAT2:Alarm number 2          !05/03/2004 09:12:05!XX!   !   !
!001!VAT1:Alarm number 1          !05/03/2004 09:10:02!  !   !XXX!
!001!VAT1:Alarm number 1          !05/03/2004 09:08:48!  !XXX!   !
!001!VAT1:Alarm number 1          !05/03/2004 09:04:57!XX!   !   !
```

Alarm 1 appeared, was acknowledged and then disappeared.

Alarm 2 is present but has not been acknowledged.

Vijeo-Designer Lite Configuration Software

12

At a Glance

Overview

This chapter provides a short reference to the Vijeo-Designer Lite configuration software for XBT terminals.

What's in this Chapter?

This chapter contains the following topics:

Creating XBT Terminal Applications

Criteria

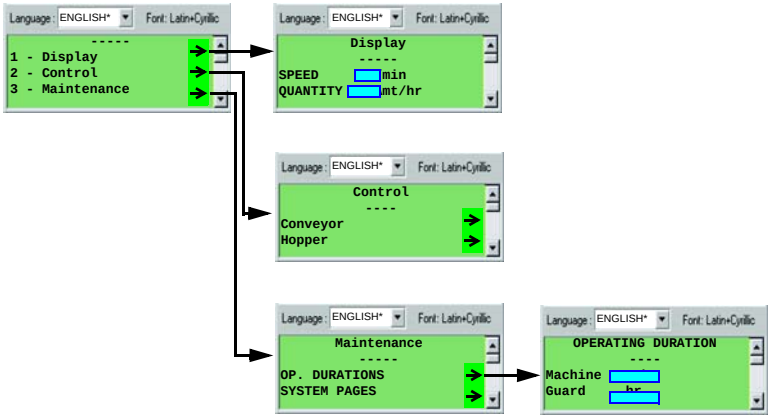
An XBT terminal application consists of the entire dialog between the operator and the automated process. In its entirety, this should take account of:

The criteria relating to the automation system:	The user criteria:	The criteria for creating the actual dialog application:
• production monitoring • preventive maintenance • corrective maintenance • process control	• user interface • level of intervention	• programming • debugging • upgrading

Note: These constraints mean that it is necessary to structure your application. An application should consist of a set of panels that can be arranged in a tree structure.

Example of a Panel Tree Structure

Tree structure



Exchanging Data with the Automation System via the Dialog Table

Overview

Dialog tables are integrated in the PLCs that are connected to XBT terminals.

A dialog table is a set of data exchanged between the PLC and the XBT terminal.

Dialog tables are used to inform terminals of alarm states.

For more information on the data exchange between XBT terminals and connected equipment via dialog tables refer to the Vijeo-Designer Lite online help.

Appendices

At a Glance

Overview

This part provides additional information on this manual.

What's in this Appendix?

The appendix contains the following chapters:

Troubleshooting and Further Information

A

At a Glance

Overview

This chapter provides additional information about troubleshooting, alert messages, internal variables and self-tests of the terminals.

What's in this Chapter?

This chapter contains the following topics:

Troubleshooting

Overview

Condition	Cause	Remedy
????? **displayed rather than any values**	The transmission parameters set in the Vijeo-Designer Lite software for the protocol you are using for communication are not configured correctly.	Check the transmission parameters in the dialog box of the Vijeo-Designer Lite software for the protocol you are using. For more detailed information refer to the user manual of this protocol.
	No memory allocation for this variable has been declared in the PLC	Allocate memory space for the variable
	The equipment declared for the variable does not exist	Modify the list of equipment and check the declared addresses
	The equipment is not connected to the terminal	Check the connection
	The equipment is connected to the terminal via an XBT Z978 cable	Check the connection. Try using an XBT Z9780 cable
	The equipment is connected to the terminal via an XBT Z9780 cable	Check the connection. Try using an XBT Z978 cable (equivalent to an XBT Z9780 cable equipped with an XBT ZN999 adaptor).
`Cannot read dialog table` **message displayed on terminal**	The equipment declared for the dialog table does not exist	Modify the list of equipment and check the declared addresses
	No memory allocation for the dialog table has been declared in the PLC	Allocate memory space for the dialog table in the PLC (e.g., %MW100 to %MW125)
	The equipment is not connected to the terminal	Check the connection
Incorrect dialog table authorization message	The value of the authorization word stored in the PLC is not correct	Using Vijeo-Designer Lite, check the expected value (\Configuration\Dialog Table) for the Authorization Table and its location in the memory equipment
Product seems to be not powered (backlight not on and nothing displayed on the display unit	XBT N401/NU400: No 24 V power supply	Check the power supply
	XBT N200/400: • No power supply via the PC mouse port. • Dialog table forces the back-light to remain off. • No power supply via the PLC communication port in run mode.	Check whether the PC mouse port has been activated (see PC Control Panel), check the PLC program. Check whether the cable is connected to the PLC port. Check that power is being supplied to the PLC.

Condition	Cause	Remedy
Cannot read/write variable message	The equipment declared for the variable does not exist	Check the addresses declared for the equipment
	The variable does not have a valid address in the declared device	Check the variable address
	The equipment is not connected to the terminal	Check the connection
Import impossible XBT--> PC	Application protected by password	Ask the creator of the application for the password
Inoperative keys	Locked by the dialog table	Check the PLC program
	Incorrect terminal configuration	Check that the terminal configuration is correct for input or control or touch variant
No application message	No application	Transfer an application
No printing	No connection	Connect the cable and check that it is connected correctly at both ends. Then check that the printer is switched on.
	The cable connecting the printer to the terminal is incorrect	Check that the cable is the appropriate type
	Incorrect printer configuration	Refer to the printer manual to check that the configuration saved by the terminal is the same as the current configuration
Abnormal printing	Every other line is printed	The terminal is configured as LF rather than auto-LF
	Lines are printing one on top of the other.	The terminal is configured as auto-LF rather than LF

System Messages

Single-Language System Messages

System messages generated by the XBT (single-language system messages: English), non-configurable.

System Message	Description
APPLICATION FAULT:	Application inconsistency.
AUTOTEST IN PROGRESS:	Autotests running.
BIOS ERROR # x CS:x IP:x:	Critical BIOS issue, consult Schneider Electric.
CHECKSUM FAILED:	Firmware checking result.
DOWNLOAD ABORTED:	Download to the XBT canceled by the operator. Redo a download.
DOWNLOAD COMPLETED:	Download to the XBT finished.
DOWNLOAD FAILED:	Download to the XBT not completed.
DOWNLOAD IN PROGRESS:	Download to the XBT in progress.
FPU ERROR # function x:	Critical math libraries result, consult Schneider Electric.
INCORRECT TERMINAL TYPE IN .DOP FILE:	Application is exported to a terminal type X when it had been created for a terminal type Y.
KERNEL TRAP #x ES:x IP:x:	Critical real-time kernel result, consult Schneider Electric.
NO APPLICATION:	Product has no application.
PROCESSOR TRAP # x CS:x IP:x:	Critical terminal result, consult Schneider Electric.
RUNTIME ERROR # x CS:x IP:x:	Critical RUNTIME result, consult Schneider Electric.
SWITCH POWER OFF CS:x IP:x:	Critical terminal result, consult Schneider Electric.
UPLOAD ABORTED:	Upload to the PC canceled by the operator.
UPLOAD COMPLETED:	Upload to the PC finished.
UPLOAD FAILED:	Upload to the PC not completed.
UPLOAD IN PROGRESS:	Upload to the PC in progress.
WAITING FOR TRANSFER:	Awaiting remote loading.
WIRING FAULT:	Wiring problem.

Multi-Languages System Messages

XBT system messages (6 languages), which can be translated by Vijeo-Designer Lite in the system panels.

Number	System Message	Description
#244	ALARM LIST EMPTY:	No alarms logged in the terminal.
#203	CANNOT READ DIALOG TABLE:	Connection problems between XBT <-> PLC.
#241	CANNOT READ VARIABLE:	Variable cannot be read.
#202	CANNOT WRITE DIALOG TABLE:	Writing to a protected zone or XBT <-> PLC connection problems.
#242	CANNOT WRITE VARIABLE:	Variable cannot be written.
#204	CONNECTION IN PROGRESS:	XBT is trying to connect to the PLC.
#247	DATE FORMAT INVALID:	The date cannot be displayed because of its format.
#201	DIALOG TABLE AUTHORIZATION:	Authorization word is incorrect.
#251	LANGUAGE DOES NOT EXIST:	Language not entered in the XBT.
#250	LANGUAGE IMPOSED BY THE PLC:	Current language determined by the PLC.
#257	LOG CLEARING IN PROGRESS:	Following an operator request, the log is being cleared.
#243	OVERFLOW MIN <= VALUE <= MAX:	Input of a value, which is outside the limits.
#249	PAGE DOES NOT EXIST:	Call-up of a non-existent page.
#253	PASSWORD IMPOSED BY THE PLC:	Current password determined by the PLC.
#258	PRINTING STOPPED BY USER:	The operator sent a request to stop the current print job. The next job in the print buffer will be printed as soon as the end of the line in the first print job is reached.
#255	PRINT RECOGNISED:	The print request sent by the operator has been accepted and placed in the processing buffer: it will be processed as soon as the current print job is completed.
#254	PROTECTED ACCESS PAGE:	Call-up of a page protected by password.
#256	REFUSED: PRINTING IS ALREADY IN PROGRESS:	The same print request was sent twice in succession by the operator before the first print request could be fulfilled. The request is rejected.
#246	TIME FORMAT INVALID:	The time cannot be displayed because of its format.
#248	WRONG PASSWORD:	Input of an incorrect password.

Internal Variables

Purpose

XBT terminals provides internal variables you can use to display information on your panels or to control your terminal.

List of the Internal Variables

Variable	Type	Description
%MW0... %MW299	All	Buffer (This variable is only available in Modbus Slave applications.)
%MW50000	Word	Date in ASCII
%MW50001	Word	Time in ASCII
%MW50002	Word	Seconds (0 to 59)
%MW50003	Word	Minutes (0 to 59)
%MW50004	Word	Hour
%MW50010 to %MW50056	Word	Free words
%MW50057	Word	Quick increment from 0 to 65535
%MW50058	Word	Quick decrement from 65535 to 0
%MW50059	Word	Increment from 0 to 9 every 2 seconds
%MW50060	Word	Decrement from 9 to 0 every 2 seconds
%MW10000	Word	Transmission speed
%MW10001	Word	Parity
%MW10005	Word	Address number
%MW10006,0	Bit	Counters reset
%MW10007... %MW10015	Word	Counters 1...9 (value depending on the protocol)
%MW10026	Word	Mute all buzzer output
%MW10028	Word	Value of the programmed language
%MW10033	String	Password level in progress
%MW10034	String	Password input in progress
%MW10035	Word	Reset current password value (=0 for Reset).
%MW10036	String	Product reference
%MW10037	String	Application name
%MW10038	String	Date of the last application backup
%MW10039	String	Time of the last application backup
%MW10040	String	Protocol name

Variable	Type	Description
%MW10041	String	Build time version
%MW10042	String	Firmware version
%MW10043	String	Run time name
%MW10044	String	Run time version
%MW10050... %MW10059	Word	Counter 10...19 (value depending on the protocol)
%MW11000	Word	Value of the panel to be displayed
%MW12000	Word	Values >0 clear the history
%MW12001	Word	Values >0 print the history
%MW12020	Word	Values >0 print the alarm list
%MW12030	Word	Values >0 stop the printing process
%MW60023	Word	Acknowlegment of all alarms

Terminal Self-Tests

Overview

XBT terminals perform 2 types of self-tests:

- self-test during power-up
- continuous self-test during operation

Self-Test Power-Up

When the terminal is powered up, the following self-tests are performed:

Element Tested	Test Principle	Non-passing Result Criterion	Action in Event of Non-Passing
The working memory (RAM)	Writing/reading	Value read different from value written	Operation impossible: STOP
The firmware	Checksum calculation and checking	Calculated checksum <> stored checksum	Operation impossible: STOP
The application memory	Checksum calculation and checking	Calculated checksum <> stored checksum	Operation impossible: Transfer compulsory

Continuous Self-Test

A continuous self-test checks that the program is operating correctly (watchdog).

Note: If a problem is detected that prevents operation of the product, the terminal turns off all its LEDs, stops working and displays a system message number (if the detected condition permits it to do so). If the same problem still persists after the terminal has been switched back on, inform the maintenance department of this system message number.

Architectures of Automation Systems

B

Types of Architectures of Automation Systems

Communication via Protocols

Communication between the XBT terminal and connected equipment is achieved by means of a communication protocol, which is selected when creating the application in Vijeo-Designer Lite.

The protocols available for the XBT range support communication with the Schneider range of PLCs, specific equipment (speed drives) and third party PLCs.

Supported protocols are Uni-Telway, Modbus (master and slave), Siemens PPI, AB DF1, AB DH485, Mitsubishi FX, SYSMAC-WAY. Please note that not all XBT types support all protocols.

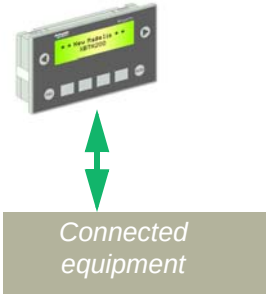
The following types of architecture are possible, which enable 1 XBT terminal to be linked to several equipment or several XBT terminals to 1 equipment:

- point-to-point connections
- multipoint connections
- multidrop connections

For more information on the protocols, please refer to the *Protocols User Manuals*.

Point-to-Point Connection (all XBT terminals

1 XBT terminal linked to 1 equipment.



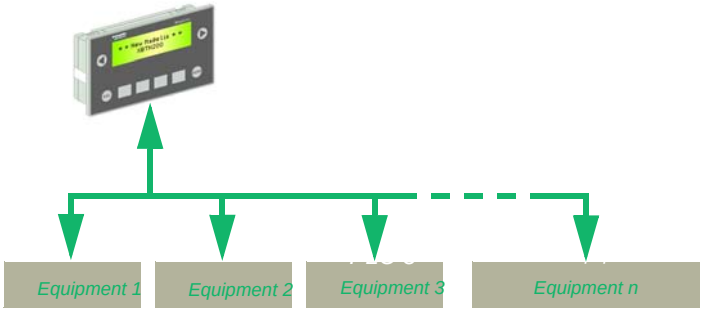
Protocols:

- Modbus master
- Uni-Telway slave
- Siemens PPI (*)
- AB DF1 (*)
- AB DH485 (*)
- Mitsubishi FX (*)
- SYSMAC-WAY (*)

(*) XBT N200/N400/R400 do not support these protocols.

Multipoint Connection (XBT N401 / N410 / NU400 / R410 / R411 / RT511)

1 XBT terminal linked to several equipment (maximum of 15).

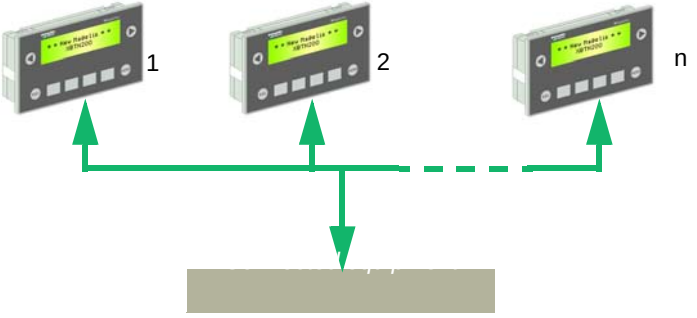


Protocols:

- Modbus master
- Uni-Telway slave
- Siemens PPI
- AB DF1
- AB DH485
- Mitsubishi FX
- SYSMAC-WAY

Multidrop Connection (XBT N401 / N410 / R410 / R411 / RT511)

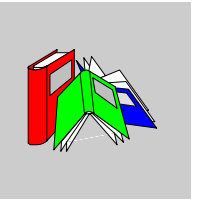
Several XBT terminals linked to 1 equipment



Protocols:

- Modbus slave
- Uni-Telway

Glossary



A

alarm panel Information panel displayed when an alarm occurs on the automation system.
An alarm panel is displayed by the automation system, when the associated boolean variable changes.
It is generally used to provide to the operator all the information and the description of the actions he has to do, in order to deal with the current alarm.

alarm table An alarm table is a communication table that contains only words related to alarm functions.
Each bit of alarm words can be associated to an alarm.
The equipment can use it to signal to the terminal that an alarm has occurred.
The terminal can use the status words of the alarm table to report to the equipment that the operator has acknowledged an alarm.

alphanumeric characters (A-Z) and numbers (0-9)

alphanumeric display units These are only capable of displaying characters (with a font resolution usually 5x7 pixels). The characters are physically separated from one another.

alphanumeric terminals These are equipped with alphanumeric display units or matrix display units used in character mode only.

animated HMI object Object which representation and behavior depends on operator actions or on variables belonging to an equipment or to the terminal.

application Please refer to HMI application.

application browser Structure tree representing the HMI application. The application bar is located at the left of the Vijeo Designer Lite user interface.

application panel An application panel can be displayed either by the operator or by the equipment of the automation system.
It can display any information about the automation system.
It allows the operator to input data into the automation system and to navigate from one panel to others.

automation system all components (e.g. PLCs, HMI terminals, sensors, actuators) of an automated process

B

bitmap Image with fixed dimensions, which can be handled by a Windows software.

button Windows object used to perform the action described by the label or the symbol it contains
A button is validated on touch screen or by pressing the enter key while the button is selected.

C

command table Part of the dialog table completed by the control system. This word list contains all the instructions passed to the terminal.

communication table generic word for either a dialog table or an alarm table

configuration software Vijeo Designer Lite is the configuration software that allows to create a HMI application and transfer it between a terminal and an equipment.

current language The language of the HMI application the designer is working on.

D

default terminal language The HMI language used by the terminal when it is powered on.

demo version Version of Vijeo-Designer Lite used to demonstrate the configuration software.This version does not allow any transfer of the HMI application between the Vijeo-Designer Lite software and an XBT terminal.

designer Please refer to HMI designer.

dialog application Set of data, necessary and sufficient to describe the behavior of a terminal during operation. Vijeo Designer Lite is the only tool that can be used to create this type of application for Schneider Electric terminals.

dialog table A dialog table is a communication table that can contain words related to any function of the terminal.
A dialog table can include an alarm table.
The purpose of a dialog table is to exchange data or orders between the terminal and the connected equipment.

download Transfer of an HMI application from an XBT terminal to Vijeo-Designer Lite.

dynamic function keys These keys are placed on the front face of a terminal and their behavior depends on the displayed panel.You can set different function to them (e.g. panel access, command functions, object selection).

E

equipment Any device (generally a PLC) which communicates with a terminal.

external variable Variable which belongs to an equipment.

F

firmware This is the terminal on-board software. It comprises mainly the BIOS and the loader used to communicate with Vijeo-Designer Lite.

H

HMI human machine interface

HMI application Names all the data necessary to describe the behavior of an HMI terminal in the operating mode.
Vijeo Designer Lite is the configuration software that allows to create an HMI application.

HMI designer (or designer) The person who designs an HMI application using Vijeo Designer Lite.
Even if there is no particular training to use Vijeo-Designer Lite, some skills in process automation are recommended to create a application.

HMI language An HMI application can be designed in several different languages. Each of these languages is an HMI language.

HMI object (or object) The smallest element contained in a panel. Can be either an animated or an not-animated HMI object.

HMI operator (or operator) The person who uses an HMI terminal in operation mode, in order to control and lead an automated installation or machine.
An operator is a person who does not have any specific skill in process automation or computer science.

HMI terminal (or terminal) Electronic terminal used by operators to control an automation system.
An HMI terminal is mainly used to display information and alarms from the automation system, to allow the operator to input some parameter values into the automation system, and to control it.
Basically, a terminal replaces former control panels that were mainly made of push buttons, lamps, indicators and measurement devices.

I

internal variable Variable which belongs to the terminal.
Some internal variables provide services (like date/time) that can be used by the HMI designer without any restriction, as if they were PLC/equipment variables.

L

link HMI object contained in a panel used to access application panels or system panels (navigation links) or to perform command functions (command links).

loader Part of terminal firmware responsible for handling communication with Vijeo Designer Lite to transfer a application in one direction or the other. Its role is also to store application data, sent by Vijeo Designer Lite, in the terminal memory.

M

Magelis Generic commercial name of the all range of Schneider HMI terminals.

matrix display units These consist of a continuous matrix of pixels, enabling the display of characters in different fonts and sizes, and also basic graphics. The technology and resolution of these display units is, however, too low for them to be considered true graphic display units.

matrix touch screen (or touch screen) Transparent sheet stuck on a display, composed of a matrix of areas and sensible to operator action on it.

menu Title, located in a menu bar, allowing by selection to access a list of menu items. Each of these menu items is associated with a function.

mode of operation There are 2 modes of operation:
- operating mode
- transfer mode

N

not-animated HMI object Object which representation is constant. It is always displayed exactly as it has been configured.

O

object Please refer to HMI object.

operating mode A terminal´s mode of operation in which the terminal communicates with one or several equipment of an automation system.
This is the normal operating mode of a terminal, when it uses the HMI application. The operator generally uses the terminal in this operating mode. Please refer to transfer mode.

operator Please refer to HMI operator.

optimum version Version of a terminal that can only be connected to some of the Schneider PLCs.
Main characteristics:
- just enough features
- external 5 VDC power supply (mainly provided by the PLC)
- 1back-light color

P

panel A terminal can display a panel. Its size can be larger than the terminal display. In this case, the terminal allows using the scrolling to move the visible part of the panel.
A panel can contain not-animated objects (e.g. background images, static texts) and animated objects (e.g. value displays, bar graphs).
There are 3 different types of panels:
- application panel
- alarm panel
- system panel

panel editor The panel editor displays the panel in WYSIWYG format (what you see is what you get). If the panel can not be displayed completely in the editor, a scroll bar is displayed.

pilot device A terminal can communicate with several control system-devices. Of these, only one is able to send commands to the terminal, and is capable of knowing its status; this device is called the pilot device. It contains the dialog table.

PLC programmable logic controller

protocol language of the communication between a terminal and equipment(s) connected to an industrial network

R

reference language Language in which the designer constructs his application panels. By default, it is the installation language of the Vijeo-Designer Lite programming software.

S

service keys Keys on the keypad necessary for certain terminal functions (scrolling, selecting fields, data input, requesting a menu, etc.).

standard version Version of a terminal with standard functionality.
Main characteristics:
- external 24 VDC power supply
- point to point and multi-point connection
- 1 back-light color

static function keys Keys placed on the front face of a terminal.
Their behavior is the same for the whole application.
You can set different functions to them (e.g. panel access, command functions).

status bar Zone located at the bottom of a Windows window. It is used to indicate the state of the application or active element to the developer.

status table Part of the dialog table completed by the terminal. This word list represents the terminal status.

system panel A system panel is a pre-built, ready to use panel, which is systematically embedded into an HMI application.
A system panel can be displayed either by the operator or by the equipment of the automation system, or by the terminal itself.
It informs the operator about system or automation errors by a system popup panel.
It allows the operator to change some terminal parameters (e.g. date, HMI language) and to navigate from one panel to others.

T

terminal Please refer to HMI terminal.

third party Indicates the fact that it is not a Schneider product.
As an example it can be used for:
- third party protocol
- third party PLC

thumbwheel edition Rudimentary edition mode based on the same principle as mechanical thumbwheels: selection of the digit to be modified by means of the horizontal arrow key(s), then selection of the digit value by means of the vertical arrow key(s).

touch screen Please refer to matrix touch screen.

transfer mode A terminal´s specific mode of operation in which the terminal is able to communicate with the configuration software to transfer an HMI application.
The HMI designer mainly uses the terminal in this mode of operation. Please refer to operating mode.

tree structure Structure representing the application panels and the links between them. By extension, this window is used to represent the structure of all types of panels.

U

universal version Version of a terminal that can be connected to Schneider and third party PLCs in point to point as well as multi-point.
Main characteristics:
- external 24 VDC power supply
- point to point and multi-point connection
- light indicators

- 3 back-light colors
- peripheral connection (printer)

upload Transfer of an HMI application from Vijeo-Designer Lite software to an XBT terminal.

user Either an operator or a designer (when it is not necessary to make the distinction).

V

variable Storage element containing a value evolving during the time. Can be either a internal variable or an external variable.

variable field Area on a panel configured to display an item depending on the value of a variable in the connected equipment.

version There are 3 terminal versions:
- please refer to optimum version
- please refer to standard version
- please refer to universal version

Vijeo-Designer Lite Configuration software for the low end Magelis range. It replaces the XBT-L1000 software.

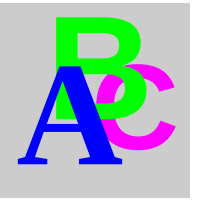
W

WYSIWYG What You See Is What You Get.

X

XBT Any HMI terminal (when it is not necessary to make the distinction).

Index



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