Magelis range
Graphic XBT-F / TXBT-F
Instruction Manual

MODICON

◉ Telemecanique

GROUPE SCHNEIDER

■ Merlin Gerin ■ Modicon ■ Square D ■ Telemecanique

⚠ WARNING

UNINTENTIONAL EQUIPMENT OPERATION

- The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.
- XBT-L100_U ver 3.3 and later software should be used only with hardware date coded 9825 and later or firmware V2.1.15 or greater.

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

The date code is located on the back of the keypad on the nameplate following the word "France".

Man/machine dialog, application structure, application pages, alarm pages, help pages, control system, function keys, PLC/terminal dialog, starter kit.

Introduction

1

Application specifications, development with XBT-L1000 software, saving the application, transferring the application to the terminal.

Application Development

2

Terminal keys and indicator lights, operating principle, page display, entering and modifying fields, alarms, alarm log, process control, key locking, printing, terminal configuration.

Operating the Terminal

3

PLC and terminal communications dialog principle, dialog tables, dialog cycle.

PLC and Terminal Communications Dialog

4

Application specifications, page template architecture, creating the applications using XBT-L1000, transferring the application to the terminal, running the application.

Application Development Example

5

Appendices

XBT-F Specifications

A

System Messages

B

1

Chapter 1
Introduction

Graphic Magelis

1 - 1

This chapter includes the following sections:

1

Man/machine dialog

1.1 Man/machine communications dialog using Graphic Magelis terminals

1

The main functions of the terminals are to:

- Display data from the control system
- Modify the control system parameters
- Control the system using discrete commands.

Various terminals are available:

Figure 1-1:   XBT-F 5"

XBT-F 5"

- Terminals with LCD screen.
- STN Monochrome, 320x240 pixels.
- 10 static function keys.
- 8 dynamic function keys.
- System and alphanumeric keys.
- Downloadable protocols.
- Printer output (Figure 1-1).

Figure 1-2:   XBT-F 10"
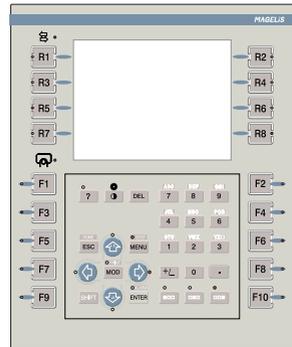
XBT-F 10"

- Terminals with LCD screen.
- STN Monochrome (9.5") or TFT color (10.4").
- 640x480 pixels.
- 12 static function keys.
- 10 dynamic function keys.
- System and alphanumeric keys.
- Downloadable protocols.
- Printer output (Figure 1-2 and 1-3).
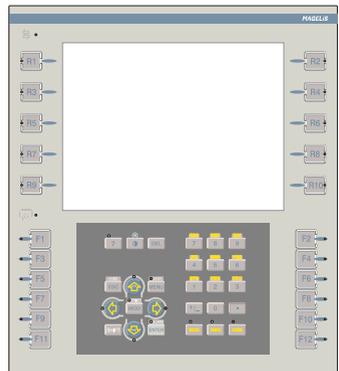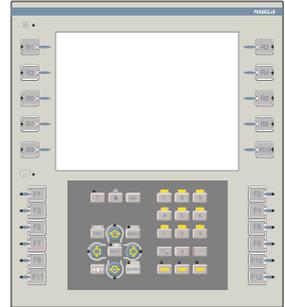
TXBT Terminals

- Terminals with LCD screen (640x480 pixels) either monochrome (9.5" screen: TXBT-F023) or color (10.4" screen: TXBT-F024)
- 1.6 Gb hard disk
- Windows 95
- 12 static function keys
- 10 dynamic function keys
- System and alphanumeric keys
- Pointing device (except TXBT-F034)
- Downloadable protocols
- Printer output
- External keyboard connection
- Slots for 2 ISA bus cards

The functions possible from the home screen (Figure 1-4) (using the dynamic keys) are:
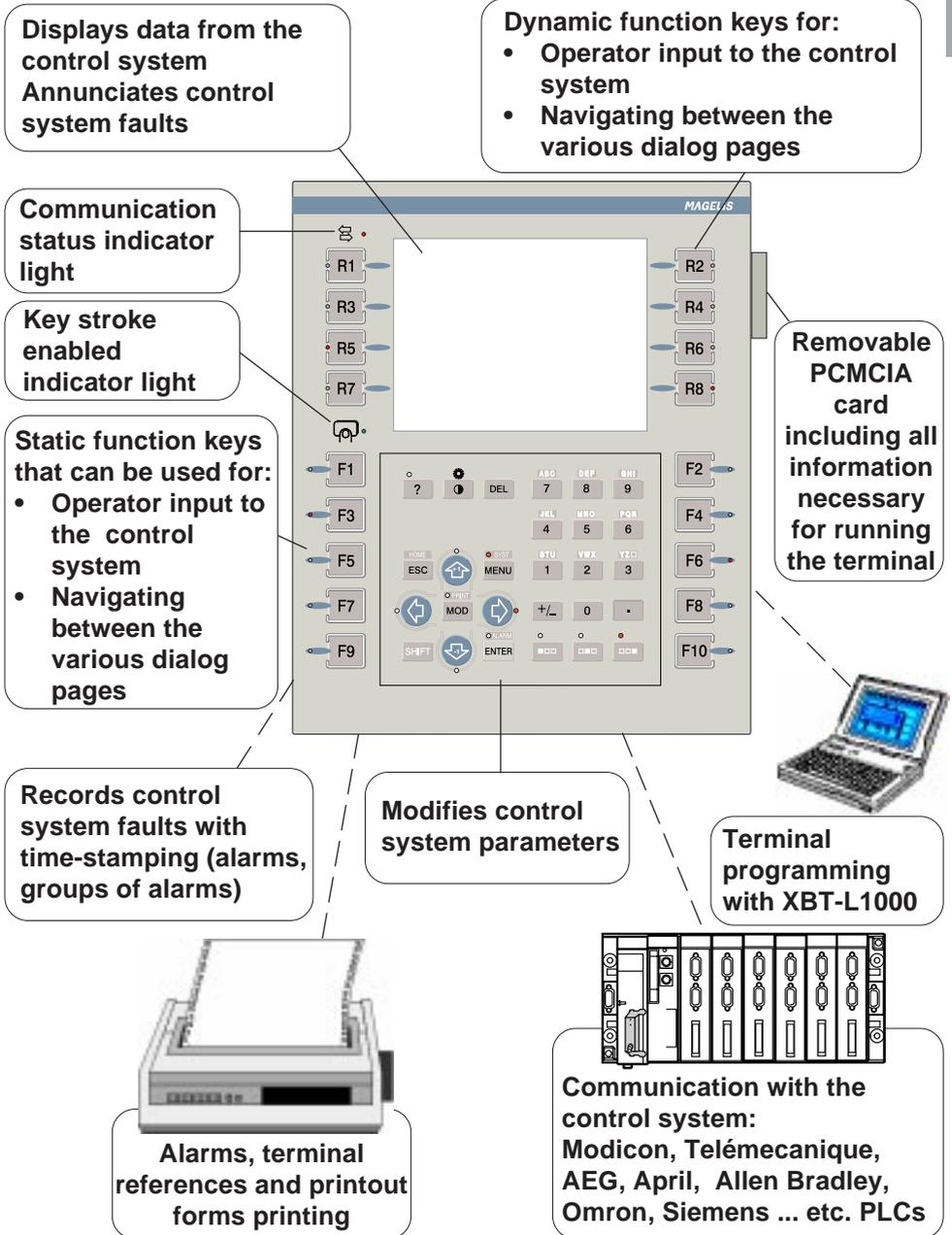
- Startup of Graphic Magelis applications
- Access to Windows 95
- Closure of home screen
- Setup: terminal parameters setup

For more information refer to the TXBT documentation.

Figure 1-4:   Application home screen

Graphic Magelis

1

Figure 1-5:   Man/Machine Dialog with Graphic Magelis Terminal

Displays data from the control system Annunciates control system faults

Dynamic function keys for:
- **Operator input to the control system**
- **Navigating between the various dialog pages**

Communication status indicator light

Key stroke enabled indicator light

Static function keys that can be used for:
- **Operator input to the control system**
- **Navigating between the various dialog pages**

Removable PCMCIA card including all information necessary for running the terminal

Records control system faults with time-stamping (alarms, groups of alarms)

Modifies control system parameters

Terminal programming with XBT-L1000

Alarms, terminal references and printout forms printing

Communication with the control system: Modicon, Telémecanique, AEG, April, Allen Bradley, Omron, Siemens ... etc. PLCs

Touchscreen terminals

The main functions of the touchscreen terminals are to:

- **Display** data from the control system,
- **Modify** the control system parameters,
- **Control** the system using discrete commands.

Various terminals are available:

Touchscreen XBT-F 5"

Figure 1-6: Touchscreen XBT-F 5"

- Resistive matrix touchscreen pad.
- 6x8 touchscreen zones.
- Terminals with LCD screen.
- STN monochrome, 320x240 pixels.
- Downloadable protocols.
- Printer output.

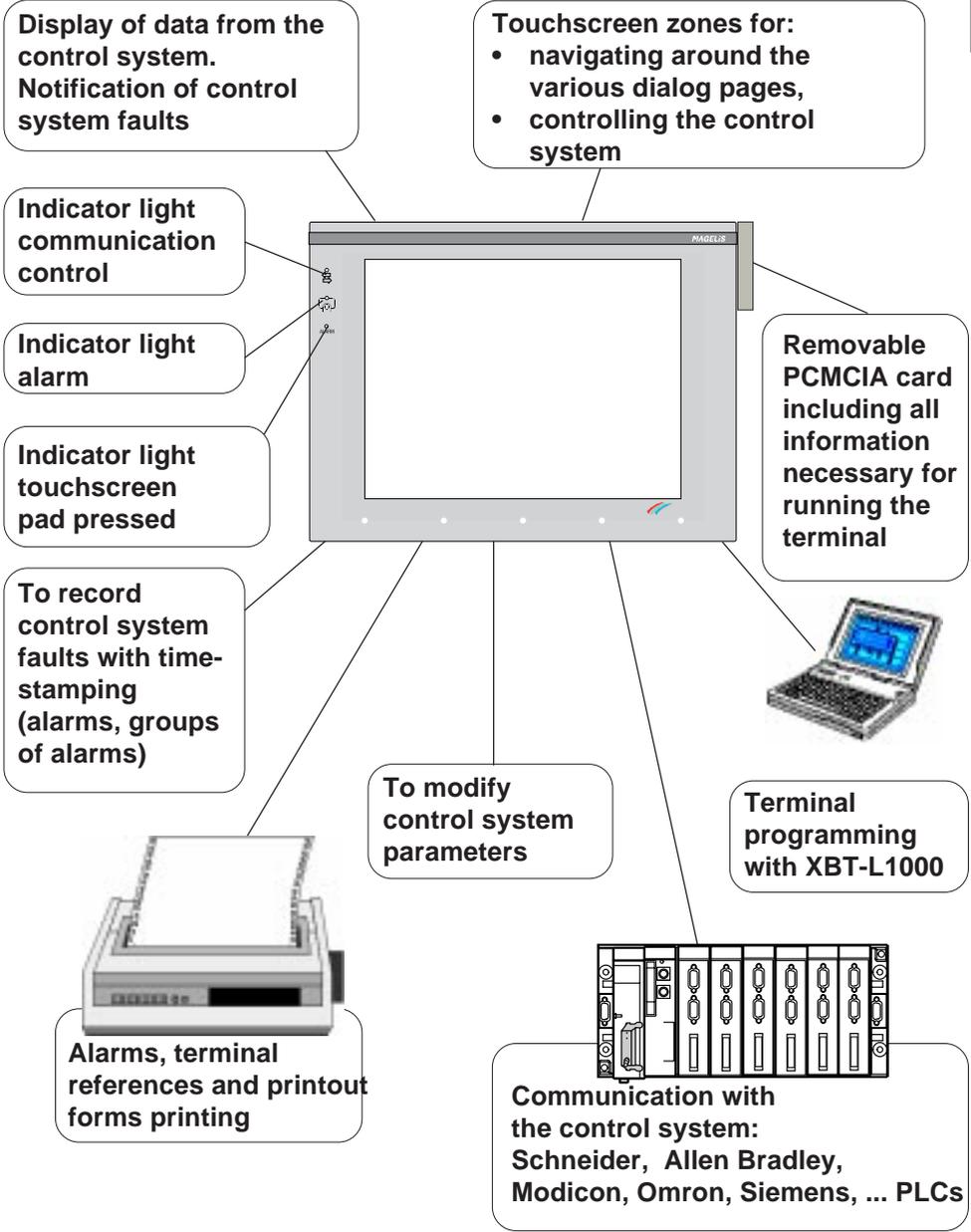**Figure 1-7: Touchscreen XBT-F 10"**
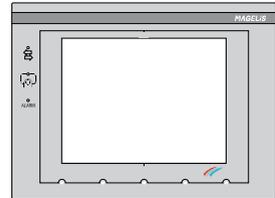
Touchscreen XBT-F 10"

- Resistive matrix touchscreen pad.
- 10x13 touch screen zones.
- Terminals with LCD screen.
- TFT color (10.4" screen)
- 640x480 pixels.
- Downloadable protocols.
- Printer output.

1

Figure 1-8: Man/Machine Dialog with Graphic Magelis Touchscreen Terminal

Display of data from the control system. Notification of control system faults

Touchscreen zones for:
• navigating around the various dialog pages,
• controlling the control system

Indicator light communication control

Indicator light alarm

Indicator light touchscreen pad pressed

Removable PCMCIA card including all information necessary for running the terminal

To record control system faults with time-stamping (alarms, groups of alarms)

To modify control system parameters

Terminal programming with XBT-L1000

Alarms, terminal references and printout forms printing

Communication with the control system: Schneider, Allen Bradley, Modicon, Omron, Siemens, ... PLCs

The following application examples may be configured with the Graphic Magelis:

Production monitoring

Ex.

R1 | Automatic operation
Start hydraulic unit
R3 | End of lift of manipulator
Rotation of grip to right

R2
R4
R5
R6
R7
R8

Preventive maintenance

Ex.

R1
R2

Counting with indication if threshold exceeded:
R3 | **Number of drillings   3137**
Tool change at   4000
R4

R5
R6
R7
R8

Process control

Ex.

R1

Commands
Pressurizing   P
R3 | Start Cycle   SC
Parameter modification
R5 | Level 1 : 556
Limit n12 : 725

R2
R8
R7

Graphic Magelis

1.2   Structure of the applications

1

An application represents the entire dialog between the user and the automated process. An application is developed based on the user requirements:

User Requirement Control System Interface
- Process control
- Production monitoring
- Preventive maintenance

Operator Concerns
- User interface
- Level of involvement

Developer Concerns
- Program structure
- Data structure
- Debugging
- Updating

These characteristics determine that your application must be structured. An application consists of a series of pages, which form a tree structure as shown in the following example:

The application is organized into menus and submenus.
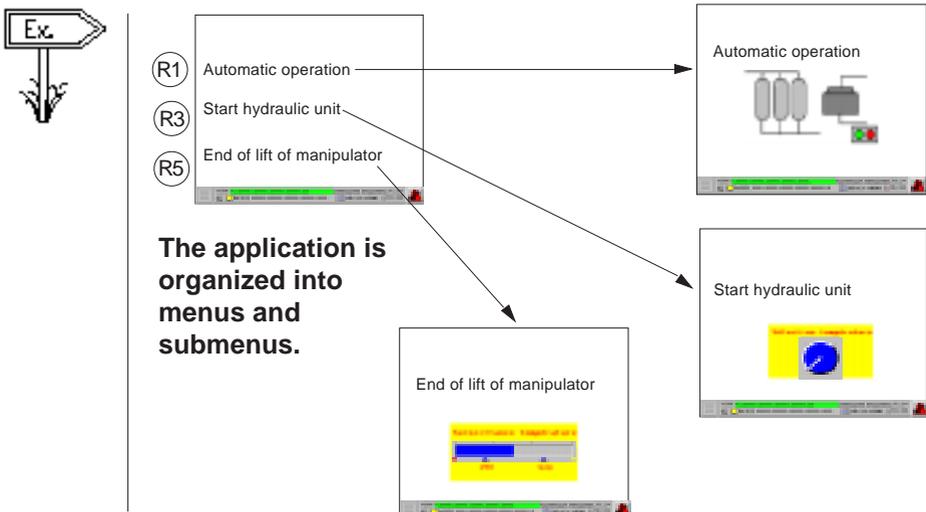
Each page may include the following:

- **Static alphanumeric text**

- **Variable fields used to:**
  - Display the values indicating control system status (status of a bit, a single or double word, a floating point word, or an ASCII string); or
  - Enter parameters for operating the control system (modification of bits, single or double words, floating point words, or an ASCII string).
  The display format can be binary, decimal, hexadecimal, or alphanumeric.

- **Static dynamic graphic objects**

- **Dynamic function keys objects** allowing the user to display other pages directly, or command the process, or start a Windows 95 application (TXBT).

- A page is identified by **a number, and a name** (optional).

- Pages may be accessed by pressing the keypad function keys or the control system.

- The arrow keys are used to navigate within a page. Navigation consists of selecting various input fields.

- Access to pages may be password protected.

Creating pages

The various elements making up pages are defined using the XBT-L1000 programming software, and then saved in the terminal.

- Application pages may be accessed by pressing a configured function key or using the control system variable to initiate a page change.

1

The development page has the same dimensions as the screen in the graphics display of the configuring software. This means that the appearance of the page being developed is exactly the same as the page being run on the XBT (Figure 1-9).

Figure 1-9:   Development Page
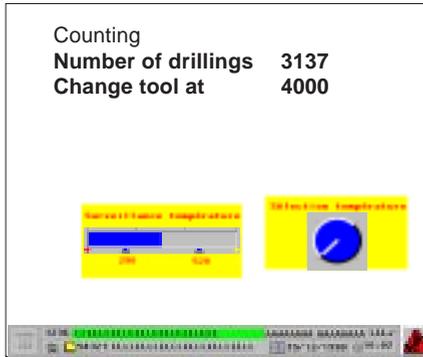
Page displayed by XBT-L1000 on the development PC.
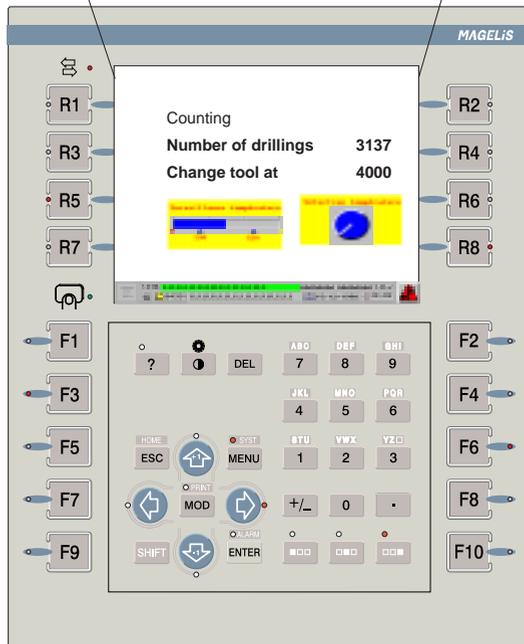
Page types

An application typically includes several types of pages.

- **Template pages:** The designer has page templates at his disposal. These are background pages containing text and static graphic objects that can be used as a starting point for application page development. Four types of page templates can be configured:
  - Application template page
  - Alarm template page
  - Help template page
  - Recipe template page

  From the basic models, the application developer can create new models using the default basic models.

  During editing of the application, alarm, or help pages, the objects of the template will appear to be greyed out and cannot be modified. General rules to follow when configuring an application:
  - One and only one template is associated with each page.
  - A dialog application may contain several templates.
  - Any given template can be associated with several different pages.
  - A template type (application/alarm/help template) is associated with a page type (application/alarm/help page). For example, an application template is used to start an application page.
- **Application pages:** Used to monitor system status, control, command, and control system parameter modification (see Section 1.3).
- **Alarm pages:** Used to display control system fault and the corrective actions indicating with display priority (see Section 1.4).
- **Help pages:** Used to display information associated with an application or alarm page (see Section 1.5).
- **Form pages:** Used to print out printout forms (see section 6).

NOTE: *Form pages cannot be displayed on the terminal. They are used for printing only.*

- **System pages:** Used to to configure the terminal (language, date, printer link, etc.).

1.3 Application pages

1

The application pages represent the basic dialog architecture and are used to:

- Monitor the control system
- Perform operations on the control system
- Maintain the control system

Structuring the pages

It is advisable to organize the application pages so that they reflect the various stages of the **control process**. The XBT-L1000 software allows you to do this.

1.3.1 Composition of the application pages

An application page consists of 3 parts:

- Application region (Figure 1-10)
- Status line,
- Alarm strip

Figure 1-10: Application Page
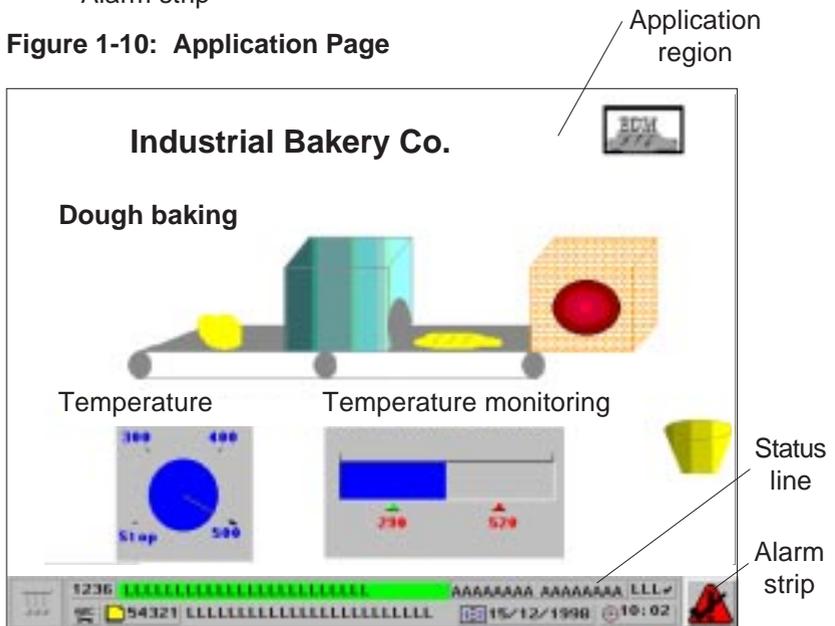
The application region may contain the following:

- **Static alphanumeric texts**
- **Variable fields**
- **Static graphic objects**
- **Dynamic graphic objects**
- **Dynamic function keys**
- **Optional alarm bar** showing the last activated alarm

Details concerning variable fields and dynamic graphic objects
When creating an application with XBT-L1000, PLC variables are
associated with the variable fields and the dynamic graphic objects.

For XBT-F
Whatever the protocol, the accessible variables are single words,
double words, floating words, and word bits.

For TXBT
In the case of XWAY protocols, the accessible variables are:
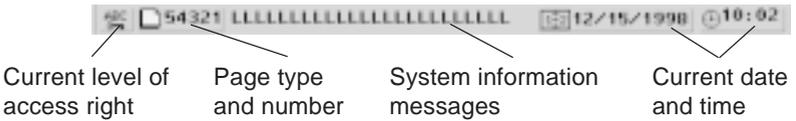
- Single words, double words, floating words, word bits
- Local and remote input/output bit
- System bit
- Step bit
- Step macro bit
- Step input step bit
- Step macro output step bit

In the case of a protocol other than XWAY, the accessible variables
are single words, double words, floating words, and word bits.

1

Status line

This status line appears by default in the page template and may be optional. When it is present, the status line is always on the last line of the display. It provides the user with contextual information and identifiers (Figure 1-11).
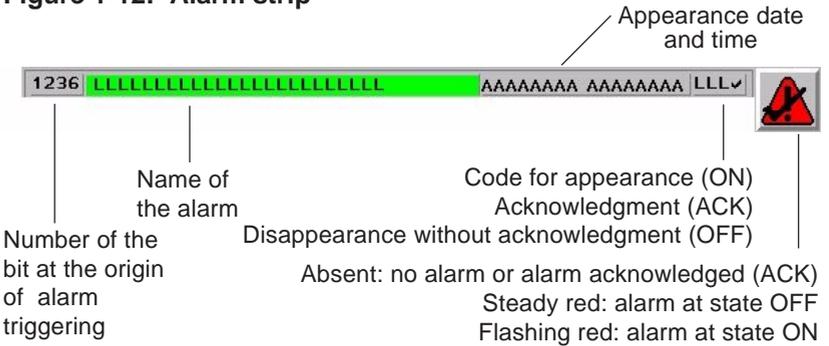
Figure 1-11: Status Line

| Current level of access right | Page type and number | System information messages | Current date and time |

Alarm strip

The alarm strip is displayed by default in the page model. It can be moved or deleted. It mainly displays the message of the last alarm displayed (Figure 1-12).

Figure 1-12: Alarm strip

Appearance date and time

Name of the alarm

Number of the bit at the origin of alarm triggering

Code for appearance (ON)
Acknowledgment (ACK)
Disappearance without acknowledgment (OFF)

Absent: no alarm or alarm acknowledged (ACK)
Steady red: alarm at state OFF
Flashing red: alarm at state ON

TXBT screen printout
On the TXBTs, the SHIFT + PRINT keys enable you to print out screen hardcopies.
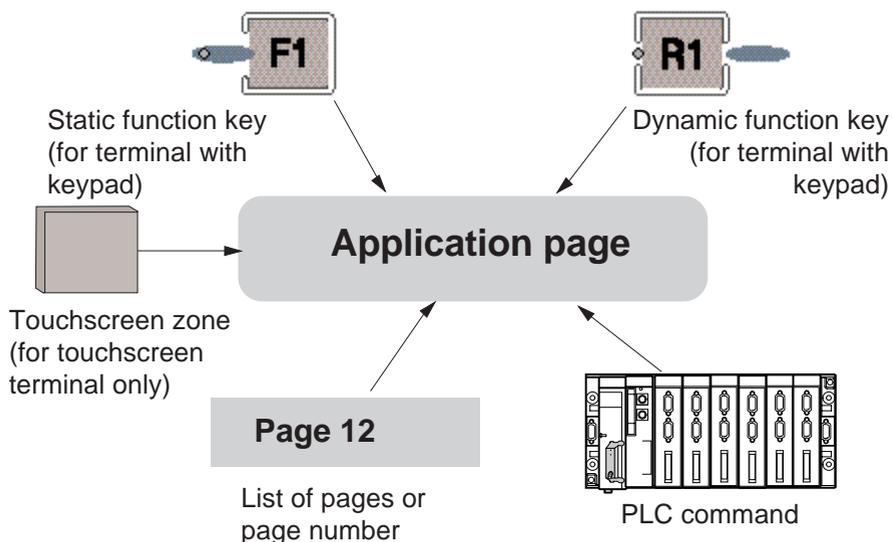
1.3.2   Accessing the application pages

The application pages can be accessed by:

- Pressing a dynamic function key (when configured)
- Pressing a static function key (when configured)
- Selecting a page from the list of pages
- Selecting the page number
- A command from the PLC

Depending on the selected configuration, certain application pages may only be accessible in a protected mode. Protected mode management is controlled by page access passwords (Figure 1-13).

Figure 1-13: Accessing the applications pages

Static function key
(for terminal with
keypad)

Dynamic function key
(for terminal with
keypad)

Application page

Touchscreen zone
(for touchscreen
terminal only)

Page 12

List of pages or
page number

PLC command

1

1.3.3 Displaying the alarm list

A list of active alarms may be accessed from any application page.

Access from terminals with keypad

An indicator light and the alarm symbol on the service line indicate that it is possible to access the list of alarms.

The list of alarms can be displayed by pressing the ALARM key (SHIFT+ENTER).
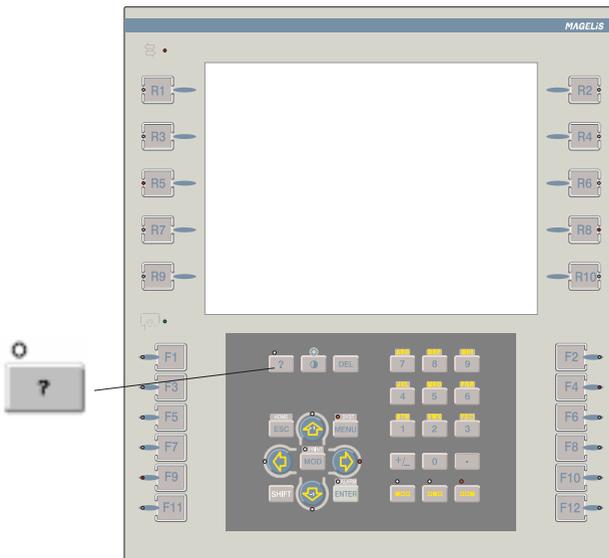
Access from touchscreen terminals

The list of alarms can be displayed by pressing this icon on the status line.

1.3.4 Getting help

The availability of help is indicated by the " **?**" key indicator light on the keypad. You can display the help page by pressing this key.

Press the ESC key to exit the help page and return to the page from which you asked for help (Figure 1-14).

Figure 1-14: XBT Keys

Press the **ESC** key (or press the ? key again) or leave a one-minute time-out to exit the help page and return to the page from which you asked for help.

then

The help page on a touchscreen terminal can be accessed by pressing the help icon to call up the help page.

Help pages can be associated with application pages or alarm pages.

1.3.5   Recipe pages

A recipe page is created from a page model used for a specific application.

It is mainly used to:

- "record" a process status at a given moment,
- manually adjust the setup parameters,
- locally store these values on the terminal,
- re-use the statuses stored.

The main advantage of a recipe page is that it can store up to 5000 variable values in 1 to 125 recordings thus avoiding repetitive entries for the user.

1.4 Alarm pages

1

The purpose of the alarm pages is to display a control system's fault indications and a list of possible corrective actions. The advantage of an alarm page is to provide an event-related display. Each alarm page is associated with:

- a description of 32 characters maximum,
- one or several control system word bits. If one of the word bit is set to 1, the alarm is displayed. Control system bits can also be associated with the alarm page on a TXBT.

(example: A sensor fault occurs. The bit associated with the sensor fault changes to 1 in the control system).

Sensor fault

PRESSURE SENSOR FAULT

Alarm indication from an application page

- The status line indicates the last alarm (see Figure 1-10).
- The alarm strip displays the message of the latest alarm activated (see section 1.3.1).
- Alarm indicator light: The "Alarm" indicator light indicates the status of the alarm list to the operator at all times:

(keyboard)

- Off: the current list of alarms is empty.
- On: the list contains alarms that have already been displayed.
- Flashing: the list of alarms contains new alarms.
- Flashing: the list of alarms contains the latest alarms since last display of the list of alarms by the operator.

ALARM
(touchscreen)

> # ⚠ **WARNING**
>
> **UNINTENTIONAL EQUIPMENT OPERATION**
>
> The XBT does not support any type of processor nor machine control in association with alarms. It is the designer's responsibility to consider programming PLC logic to account for programmed alarms.
>
> **Failure to follow this instruction can result in death, serious injury, or equipment damage.**

## Composition of the alarm pages

An alarm pages consists of 3 parts:

- Application region
- An alarm strip
- Status line

Application region

The application region of an Alarm page can contain the same objects as an application page (i.e., static alphanumeric texts, variable fields, static graphic objects, dynamic graphic objects, dynamic function keys, and an optional alarm bar). (You cannot access the applications region of an alarm page using a function key).

Example of an alarm page

1
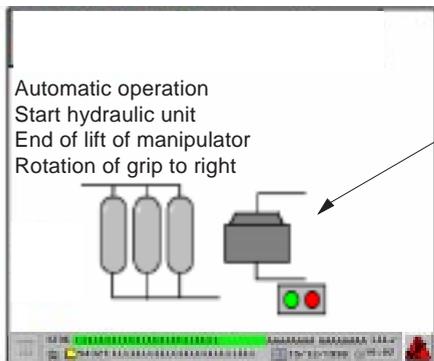
Figure 1-15: Properties Page

The XBT-L1000 software allows you to define the properties of the alarm pages (Figure 1-15).

Status line

It is identical to the one displayed on the application pages (see Application pages).

Alarm indicating

- It is possible to force the operator to acknowledge the alarms so that they can be erased from the list of active alarms; this is useful for transient alarms.
- The terminals have a relay output whose contact is closed when an alarm appears. This function can be configured for each alarm page.

Advantages of alarm pages

- It is possible to assign a priority to an alarm page (1 to 16, with 1 as the highest priority).
- It is possible to record (log) alarm pages to help control system troubleshooting.
- The alarms are time-stamped.

- Alarms may be configured to require an operator to acknowledge an alarm before continuing process operation; this is useful for transient alarms and troubleshooting.

NOTE: *This relay opens upon a power loss. The relay's contacts are normally open (N.0.).*

- The terminals have a relay output whose contact closes when an alarm appears. This function can be configured for each alarm page.

Group of alarms

A group of alarms is a set of alarms identified by different color attributes. Each defined group may have its own unique colors that indicate the status of the alarm. The alarm active, alarm cleared, and alarm acknowledged colors make the alarm's status easily recognized by the operator. There are 16 groups of alarms. Each group is identified by an 8-character name enabling rapid identification by the operator.

Getting help

The availability of help is indicated by the " **?**" key indicator light on the keyboard. Press this key to display the help page.
Press the ESC to exit the help page.

Printing

You can print the alarm page or the alarm log by means of:

- PRINT key,
- PLC command.

The print function from the alarm list page or alarm history page on the touchscreen terminal is accessed by pressing the status icon and then by pressing the print icon.

then

1.5 Help pages

1

Help pages can be associated with an application page or with an alarm page (Figure 1-16). The help page associated with an application page can be used for:

- Information about elements of the page
- Information about process control

The help page associated with an application page can be used to provide operator information about control system faults and a list of corrective actions. A help page consists of three parts:

- Application region
- An alarm strip
- Status line

Figure 1-16: Help Page

Application region

It can include the following:

- Static alphanumeric texts
- Static graphic object

Status line

The status line is identical to the one displayed on the application pages (see section 1.3.1).

Alarm strip

The alarm strip is identical to the one displayed on the application pages (see section 1.3.1).

+

TXBT screen printout
The SHIFT + PRINT keys enable you to print out screen hardcopies.

1.6   Form pages

The form pages are used for printing only.
They are used for creating measurement and production follow-up reports, labels, etc.

A form page can include:
- texts,
- alphanumeric variables,
- frames for designing tables,
- control codes specific to the printer used (bar codes printing, bold printing, etc.).

1.7   Managing the control system

The control system can be managed from the terminal using the static or dynamic function keys. There are two possible types of commands:

- Momentary contact command
- "Push-on/push-off" toggle command

Momentary contact command

A control system bit is activated by pressing a function key. The bit is set to a "1" while the function key is pressed and reset to "0" when the function key is released.
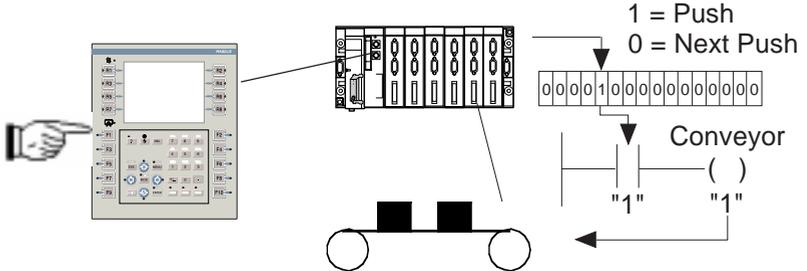
Example: Controlling a motor

1
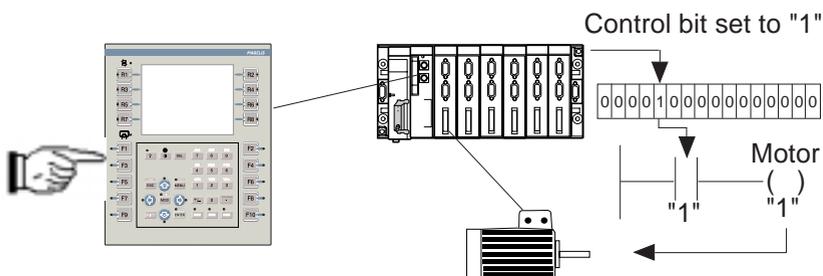
"Push-on/push-off" toggle command

The control system is activated by pressing the function key. The control bit associated with the function key is set to a "1" on the first press. The next press of the function key resets the bit to "0".

Example: Conveyor belt advance command.

1 = Push
0 = Next Push

Conveyor

"1"   "1"

The XBT-L1000 software allows you to assign the desired command to each function key.

1.8 Static and dynamic function keys

Static function keys

The static function keys are global and their configuration is defined for the entire application. They may be configured to perform the following functions:

- Access a page
- Momentary contact command
- " Push-on/push-off" toggle command

Dynamic function keys

The dynamic function keys are associated with a page. Their configuration and function can therefore change from one page to another (Figure 1-17). Dynamic function keys may be configured to perform the following functions:

- Access a page
- Momentary contact command
- "Push-on/push-off" toggle command
- Selecting an entry field
- Startup of a Windows 95 application (TXBT only)

The function key's configuration is defined by means of the XBT-L1000 software, and may not be modified in run mode.

Figure 1-17: Configuration of Dynamic Key

XBT   TXBT

Graphic Magelis

1
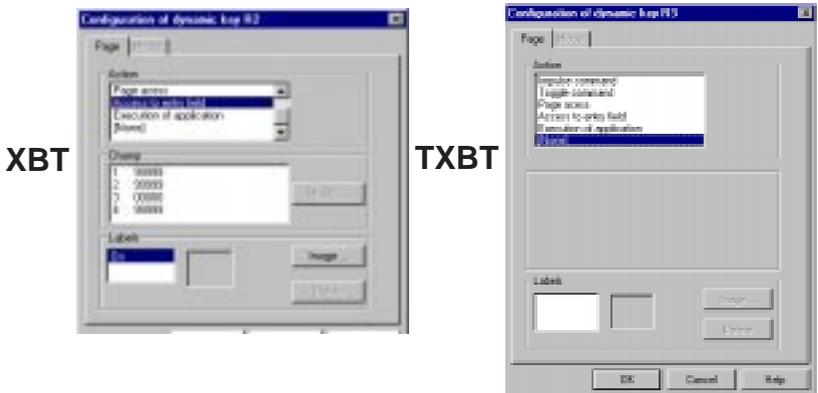
The function keys for the touchscreen terminal application pages are replaced by touch icons. They are defined in the same manner as the dynamic function keys for the keypad terminals using the XBT-L1000 software and perform the same function:

- access to a page,
- bit control,
- positioning on an entry field.

Example of graphics

An icon is associated with each page access or switch to entry type dynamic key.

1.9 Variable adjustment of the PLC register reference value

The TXBT can be used to adjust the register reference value of the connected PLC. Adjustment is available for the following communication protocols:

- UniTelway
- Fipway
- EthWay
- Fipio
- Modbus
- Modbus+

See Chapter 3 for additional information.

XBT

The adjustment page is used to display and modify the register reference values of the connected PLC. The page is directly created on the terminal by selecting the requested variables. Once created, the page is refreshed on a cyclic basis.
The page is locally stored on a PCMCIA card and can thus be re-used even if the terminal has been switched off.
Adjustment of the register reference value is available for all communication protocols.

See section 3.14 for more details.

1.10   PLC/terminal communication dialog

The man/machine communication dialog between the terminal and the PLC consists of an exchange of data between the two devices. Various types of data can be exchanged.
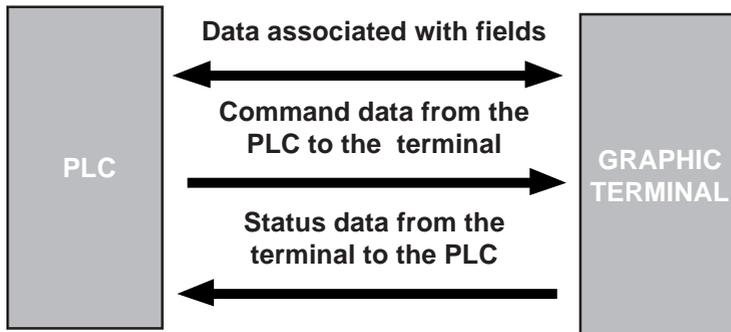
⚠ **WARNING**

UNINTENTIONAL EQUIPMENT OPERATION

If communications between the XBT and PLC are lost, the operator's control over the machine may be lost partially or completely. It is the designer's responsibility to consider programming the PLC logic to account for this situation. One good technique is to monitor Wn+3 of the dialog table from the PLC table.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

1

Data associated with the fields

The exchange principle for the data associated with the fields depends on the protocol chosen as a function of the type of PLC. The variables read or written are the single words, double words and word bits.

Master or client terminal

The terminal controls the following transfer exchange regardless of whether or not the terminal is defined as a master or slave:

- Updating of the fields (reading the values in the PLC)
- Entry and modification of fields (writing the values to the PLC)

No PLC communication program needs to be written.

Server or slave terminal

The PLC application is responsible for updating the displayed variables by constantly writing the values of the variables that have changed to the terminal.

Principle of terminal "command and status" exchanges

To simplify the communication dialog, the data is grouped together in a memory zone: **the dialog table located in the PLC.**

- Commands from the PLC to the terminal
- Status data from the terminal to the PLC

Consisting of "n" consecutive words (16-bit words), this table is divided into two parts.

Status table
Status data from the terminal
to the PLC

Command table
Commands from the PLC to the
terminal
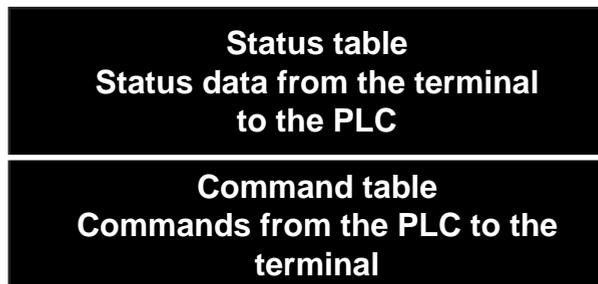
The number of words in the table depends on the status data and the commands you choose to process during the dialog. The XBT-L1000 software allows you to make this choice (Figure 1-18).
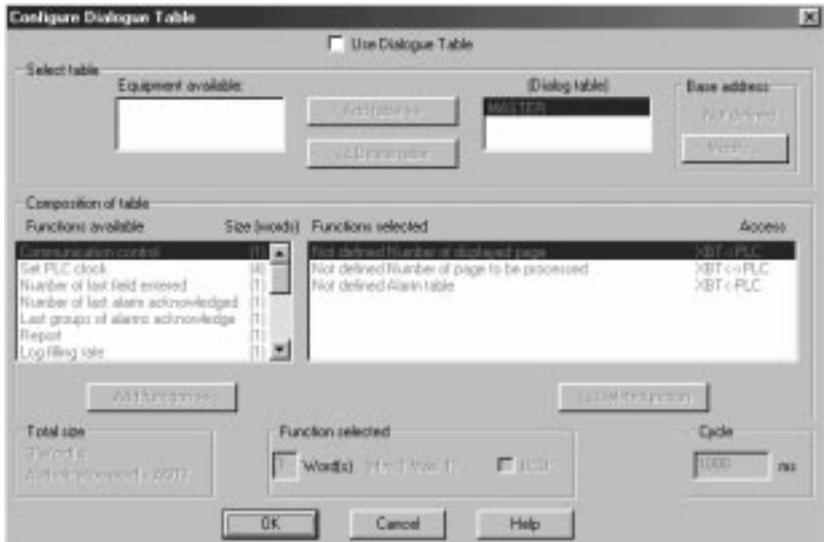

⚠ **WARNING**

UNINTENTIONAL EQUIPMENT OPERATION

The PLC memory zone allocated for the XBT dialog table must NOT be used for anything else. It is the designer's responsibility to properly program the PLC logic.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

Figure 1-18: Configure Dialog Table

1

1.11 Loading of extension tasks when transferring the application

On a TXBT terminal, you can add functions on top of the basic XBT-F functions. These extra functions are called **extension tasks**.

The extension tasks supplied as standard for configuring a TXBT are as follows:

- The OLE Automation server (see TXBT manual, Chapter 8)
- The Variables setting module
- The Program diagnostic and dynamic display module

1.12 Starter kit for the Graphic Magelis application

Development hardware kit

- 1 XBT-F 5", 9.5", or 10.4", TXBT 9.5" or 10.4".
- 1 PC Pentium or equivalent
    - SVGA screen or higher resolution.
    - 1 serial port operating at 19200 bauds (speed required when transferring)
    - 1 mouse
    - V2.2
- 1 XBT-Z915 cable and 1 adaptor XBT-Z962 for XBT/PC exchanges and printing
- 1 printer, if necessary

Development software kit
- Windows 95 or Windows NT
- XBT-L1000 V3.x (graphic Magelis application development software). The downloadable protocols depending on the type of PLC:
  - XBTL1UTW01 for Télémécanique PLCs
  - XBTL1MOD01 for April, Modicon and April AEGApril PLCs
  - XBTL1AEG01 for AEG PLCs
  - XBTL1SIE01 for SIEMENS PLCs
  - XBTL1AB01 for Allen Bradley PLCs
  - XBTL1OMR01 for Omrom PLCs

  Several protocols can be installed on the PC at the same time.

Operating hardware kit
- 1 Magelis/PLC cable

- TSX07/37/57	Console connector	XBTZ968
- TSX17	Console connector	XBTZ958
- TSX7	SCI connector	XBTZ948
- SCM2116	UTW connector	XBTZ918
- TSXSCA62		XBTZ908

  Others: refer to the service instructions for the corresponding protocol
- 1 XBT-Z915 cable for printing
- 1 printer, if necessary
- 1 TCCX CB 20002 cable supplied with the TXBTs

Graphic Magelis

2

Chapter 2

Application Development

The purpose of this chapter is to present a method for implementing an application. It provides information on how to use the XBT-L1000 software. The XBT-L1000 software's menu, submenu, and tool palette structure gives you every latitude when developing your application. **The software's on-line help and the instruction manual provides detailed information to assist you in using the XBT-L1000 software.**

This chapter includes the following sections:

2

Contents

2.1   Application requirements specification

The requirement specification is the starting point for developing the man/machine dialog application.

It must include all the user's requirements. To achieve this, it is recommended that the requirements be broken down according to certain criteria:

2

- **the criteria linked to the users**
    - Production monitoring
    - Controlling the control system
    - Preventive maintenance
    - Corrective maintenance
    - ...

- **the criteria linked to the control system**
    - Man/machine interface
    - Intervention level
    - ...

- **the criteria relative to developing the dialog application itself**
    - Program structure
    - Data structure
    - Debugging
    - Updating

The specification requirements must indicate:

- Dialog architecture as seen by the end user (navigation, etc.)
- Volume of data to be exchanged between the PLC and the terminal
- Type of data
- Terminal/PLCs network architecture

Use the specification requirements to validate the development.

2.2 Development method

Phase 0: Control system structure

From the control system structure, define:

- the communication protocol used by the terminal,
- the list of equipment items accessible to the terminal.

Phase 1: Commands from the terminal to the control system

For each command from the terminal to the control system, define the operator's action mode:

- static function key,
- dynamic function key (define the associated application page).

Phase 2: Commands from the control system to the terminal

Define all the actions performed from the control system to the terminal:

- page call-up by the PLC,
- display of LEDs,
- key locking,
- triggering of curve plotting, etc.

Phase 3: Design of pages

Based on the requirements, design all the pages mentioning for each of them:

- the purpose,
- the type (application, recipe, alarm, help, printout forms),
- the data to be processed.

Phase 4: Dialog table

Phases 0 to 3 are used to determine all the words - exclusive of any other words - which are necessary for the dialog table.

It is recommended to perform this operation <u>before</u> initiating the PLC program as any addition or cancellation of a word in the dialog table modifies its structure.

2

Phase 5: Model pages

Identify the data which are identical on each type of pages: application, help, alarm.

This data can be:

- text, frames, logos, drawings, etc.,
- variables (alphanumeric and/or graphic),
- the status line and/or the alarm strip (displayed by default).

It is recommended to use the model pages for:

- simplifying and clarifying the development,
- providing an easy-to-use man/machine interface by the creation of similar "environments",
- structuring the space available in the terminal memory.

Phase 6: Definition of application pages

Create the application pages and then define navigation. It can be performed via:

- dynamic function keys: for a navigation organized in menus,
- static function keys: for direct access to a page of the structure.

Provide the necessary controls for access to the pages and variables available for entry (see section 2.4 for all details). The zones protected by a password can be configured in specific menus.

Phase 7: Definition of alarm pages

- Define the equipment items of the control system structure which can be at the origin of alarm triggering.
- Define the size of the alarm tables for all these equipment items. A table includes 1 16-bit word minimum, i.e. 16 alarms maximum per word. Define as many words as necessary.
- Divide the alarms pages into groups according to the control system structure, technologies involved, etc. See section 6.3 for all details.
- Classify the alarms and assign a priority to each of the (1 to 16).
- For each alarm, define whether it must:
  - be printed (to keep a hard copy of the faults as soon as they are detected),
  - be recorded in the history (for sequential analysis of the faults: occurrence, cancellation, acknowledgement),
  - be displayed (some pages may not be displayed to the operator),
  - be necessarily acknowledged by the operator (ACK),
  - trigger energizing of a relay associated with a horn, a lighting column, etc.

Phase 8: Definition of help

- Define the help pages. If necessary, the same help page can be associated with several application or alarm pages.
- Define the help windows for variables requiring a comment, an advice, an explanation, etc.
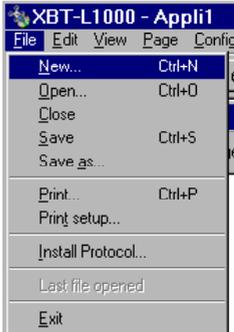
Phase 9: Translations

State the application languages (3 maximum) and translate the text objects.

2.3 Application development with the XBT-L1000 software
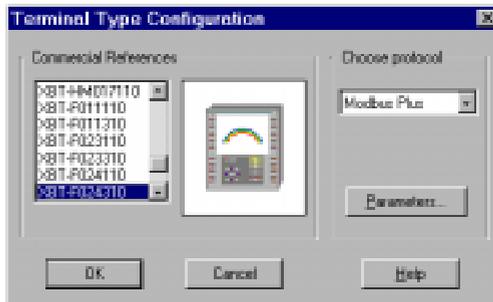
2.3.1 Creating the application

Select the **File/New** menu.

Figure 2-1: File/New Menu

Indicate the **type of terminal.**

Figure 2-2: Type of Terminal Dialog Box

Select and configure the **protocol (baud rate, format, etc.).** This is the terminal to PLC communications protocol.

When creating an application, it includes by default:

- an empty application page (1: Application page 1),
- an application page model by default (1: Application Model 1),
- a recipe page model (2: Recipe model 2),
- an alarm page model by default (1: Alarm Model 1),
- a list of system pages in the language in which XBT-L1000 is installed.

2.3.2   Creating the equipment list

Select the **Configuration/Equipment symbols** menu.

Figure 2-3:   Configuration/Equipment Symbols Dialog Box

Define the list of equipment items addressed by the terminal.

2.3.3   Loading the PL7 or Concept symbols file

(special case of Modicon TSX Micro, Premium and Quantum PLCs):

To create a symbols file in PL7:

1. Open the variables editor.
2. Select the **File/Export** command.
3. Select the disk and/or directory in which the file is to be stored.
4. Enter a filename: for example Appli.**SCY**.
5. Select the "all types" export mode and validate.

To create a symbols file in Concept:

1. Select the **File/Export** command.
2. Choose the target file format. Variables: Text delimited.
3. Choose the separator (by default: ",").
4. Click on **Ok**.
5. Select the **Drive** and/or **Folder** where the file will be stored.
5. Enter a filename: for example Appli.**TXT** and click on **Ok**.

2

Use the PL7 or Concept symbols file under XBT-L1000:

1. Select the **Configuration/Equipment Symbols** command.
2. Choose the device corresponding to the variables file.
3. Click on "Modify".
4. Select the **Variables file/Add** command.
5. Select the directory in which the symbols are stored, then
   click on **Open**.

For a Concept file, choose the same separator as that defined in
Concept.

NOTE: *The dialog application under XBT-L1000 must be updated
each time the symbols file to be used is updated. To do this,
repeat operations 1 to 3, select the **Variables file/Delete**
command and then repeat operations 4 and 5.*

2.4 Configuring the communications dialog table

When you have defined the various pages, you willl have to define
the content of the communications dialog table (Figure 2-4). Chapter
4 provides the information on the various bits and words in the
dialog table.

Select the **Configure/Dialog table** menu.

Figure 2-4: The Dialog Table
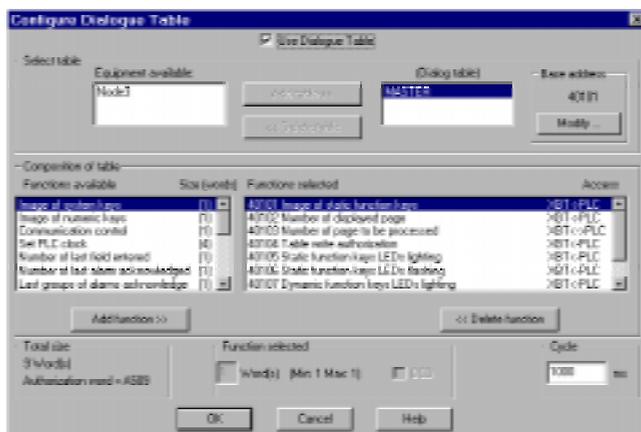
Base address

Indicate the address of the beginning of the table (address of the
first word in the dialog table).

Composition of table

Add or delete the various elements to/from the table as needed.
Use of the dialog table is optional in applications that do not use
alarm pages. Alarm pages require the creation of an alarm table
that is defined by the dialog table. For further information on the
various dialog table components, consult the XBT-L1000 software
on-line help or chapter 4 of this manual.

Cycle

The terminal's read/write period for the dialog table is used to
optimize the terminal/PLC exchanges (see chapter 4, section 4.3).

Dialog table security

A word is used in the table for security purposes: the "Authorization" word. Using this word ensures PLC/terminal dialog security.
When this word is not at the correct value, the terminal cannot write any words in the PLC and cannot execute any commands.
It is systematically present in the default dialog table proposed by XBT-L1000 (see chapter 4, section 4.2). The authorization word may be removed from the dialog table if you choose.
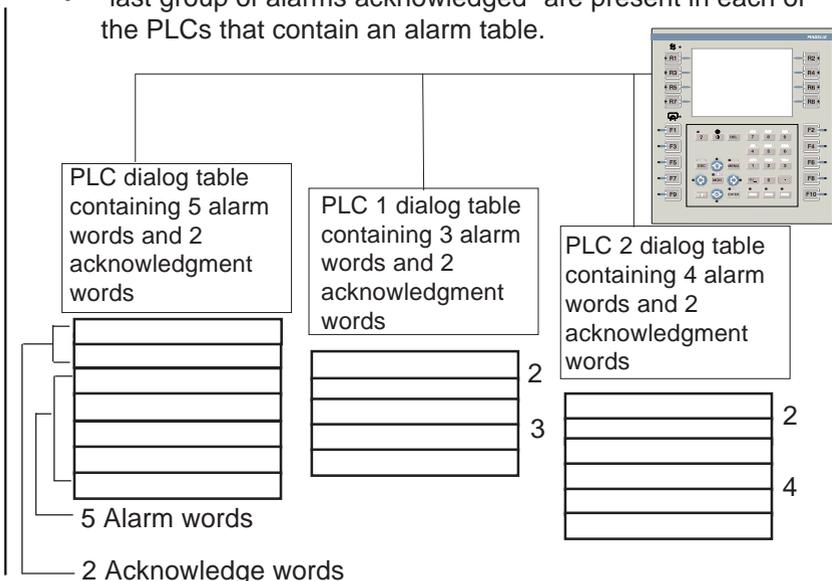
2

Alarm table

A word bit is associated which each separate alarm. All these words make up the alarm table which is part of the dialog table.

- A terminal can process the alarms from several PLCs.
- The alarm table can be distributed between several of the automated process's PLCs.
- Each PLC in a networked application may have its own alarm table.
- The alarm table associated with a PLC allows the latter to transmit alarms to the terminal (see Chatper 3, Section 3.6)

The dialog table words (see chapter 4, section 4.2)

- "last alarm acknowledged" and
- "last group of alarms acknowledged" are present in each of the PLCs that contain an alarm table.

Ex.

PLC dialog table containing 5 alarm words and 2 acknowledgment words

PLC 1 dialog table containing 3 alarm words and 2 acknowledgment words

PLC 2 dialog table containing 4 alarm words and 2 acknowledgment words

2

3

2

4

5 Alarm words

2 Acknowledge words

2.5   Creating pages

2.5.1   The main window

The main window that you use to make up the various pages has the following structure (Figure 2-5).

Figure 2-5: Main Window
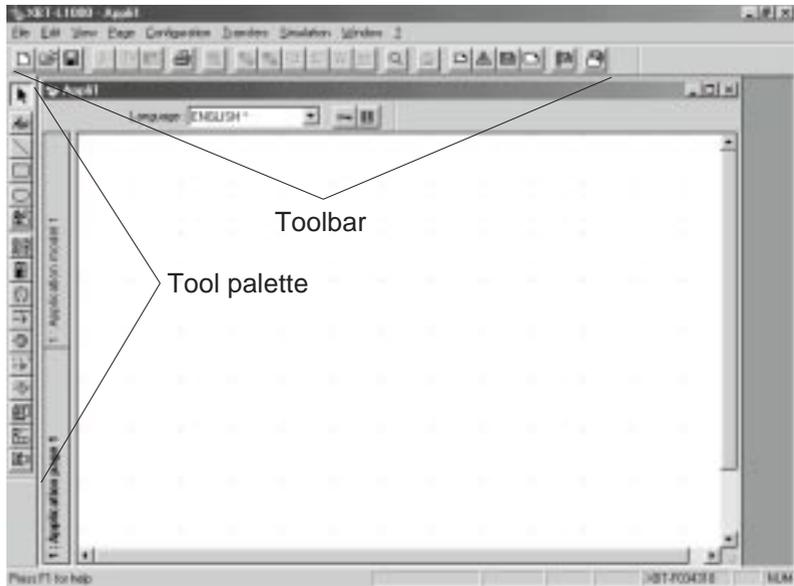
The toolbar allows you to perform various software functions (Figure 2-6).

Toolbar

Figure 2-6:   Toolbar

Objects

To configure an object onto a page, select the object on the Object Selection Bar and drag the cursor to the desired application page location. Click on the mouse button, drag and highlight the desired object window size, and release the mouse button. To define an object's properties, double click the object.

Animating objects

2

Certain static objects (i.e., text, etc.) can be animated. Animation consists of making an object's color attributes change as a function of the value of an associated PLC variable. This variable must be declared when configuring the object (i.e., 40100). The basic principle consists of drawing up a list of possible values and, for each value, assigning a color to the animated object.

The next page presents the different objects:

- Static object: S
- Animated object: A
- Dynamic object: D (this object shows the change in a variable in alphanumeric form or a graph)

S: static object   **A**: animated object
D: dynamic object showing changes to a variable in alphanumeric or graphic form.

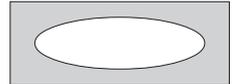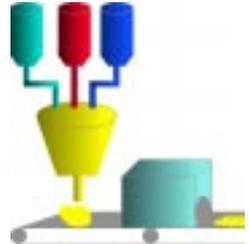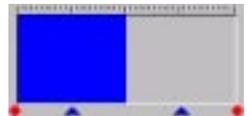| Objects	Usage	Representation
Text (S,A)	To provide qualitative information.	Maintenance
Line **Rectangle** **Ellipse** (S,A)	Graphical representation of an application.	
Bitmap (S)	To insert file images for graphical representation of an application (BMP, WMF, PCX) (a symbols library is available in directory \XBT-L1000\SYMBOLS)	
Alphanumeric variable field (D)	To display values reflecting the control system status. To enter values defining parameters for managing the the control system. Four limits with the possibility to filter the values entered by the operator (Min and Max thresholds only) and to display process overshoots (by changing color).	Temp: 455 °C
Bar-graph (D)	To represent the control system data in a graphical form (i.e.,: tank level). Characteristics: • Vertical • Horizontal • Minimum, maximum, high and low limits.	

Graphic Magelis

S: static object   **A**: animated object

D: dynamic object showing changes to a variable in alphanumeric or graphic form.

Objects	Usage	Representation
Volume meter (D)	Provides a graphical representation of the control system data (i.e., power supply voltage control). Minimum, maximum, high and low limits.	
Linear slider potentiometer **Rotary potentiometer** (D)	To modify the control system variable, graphically (i.e., limit setting). Minimum, maximum, high and low limits.	
Linear slider switch **Rotary switch** (D)	To modify the control system variable, graphically (i.e., choice of a type of production using the rotary selector).	
Image box (D)	To display different images according to the value of a variable. Image file: BMP, WMF, PCX	
Graphical curve (D)	To monitor control system data changes in real-time (i.e., monitoring a temperature)	
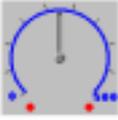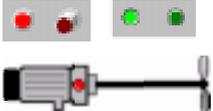
2
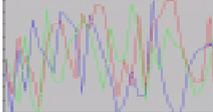
Main characteristics of curve objects

- A curve object can display up to 4 different curve plottings. These plottings are called pens.

  If the address of the object is %MWn (IEC syntax):
  - the address of the first pen is   %MWn
  - the address of the second pen is %MWn+1
  - the address of the third pen is   %MWn+2
  - the address of the fourth pen is   %MWn+3

- A new curve point is displayed:
  - periodically every 5, 10 or 30 seconds or every 1.5 or 10 minutes,
  - when a bit is uploaded in the dialog table (see index on "Triggering of curve plotting" and "Curve plotting OK").

- Curve write starts:
  - from the right: each new sampling moves the former values to the left, or,
  - from the left: each new sampling moves the former values to the right.

- Curve objects can be refreshed (Options tab):
  - on a cyclic basis: at the specified sampling period but only when the page including the curve is displayed (there is not any plotting on the curve when it is displayed),
  - on a permanent basis: at the sampling period, including when the object is not displayed.

This option generates permanent data interchange with the PLC and can entail an increase in the response times. Consult section 3.2 for more details.

Function key objects

Static function keys
Static function keys can be defined
for the application to be used as:

- Access to a page
- Momentary contact
  command
- "Toggle" command

Dynamic function keys
Dynamic function keys are associated
with the page displayed (Figure 2-7).
They can have the following functions:

- Access to a page
- Momentary contact command
- "Toggle" command
- Positioning on an entry field
- Running a Windows 95 executable program (TXBT only)

Figure 2-7: **Configuration of Dynamic Key**

2

Touch zones
There are no static and dynamic function keys on touchscreen
terminals.They are replaced by touch zones which have the same
functions and properties as the dynamic function keys of the
terminals with keyboard.

Carry out the following operations:

- click on the button,
- click and slide on the area to determine the location and the
  size of the touch zone. With the default grid you can create
  touch zones including the pitch suitable for the physical
  division of the touchscreen pad,
- double-click on this zone and enter the configuration
  parameters in the same way as for a dynamic function key of
  a terminal with keyboard.

Parameters to be defined
Defines the type of function key action
(for terminals with keyboard only).
Type of action:

- Page access: selects an application page
- Momentary contact or "toggle" command: assignment of a
  command bit in the dialog table (see chapter 3) or elsewhere
  in the PLC for the dynamic function keys

- Running a Windows 95 application on a TXBT terminal (definition of executable program path)

Label for the dynamic function keys
This allows you to associate a label with the function key.
- Page access: 1 label (an image)
- Momentary contact or "toggle" command: a label for each status of the associated bit (values 0 and 1, associated with two images representing a released and pressed pushbutton)

By default the size of these images is adapted to the size of the keys (so they can be positioned opposite each other).

Recommendations concerning the use of function keys
- The dynamic function key word bits can be distributed between all the installation's pieces of equipment without any restrictions.
- The static function key word bits are grouped together and defined by the dialog table.

The communication dialog between the terminal and the equipment have better performances if static function key commands are used.

NOTE: *It is recommended to use static function keys for control functions, and dynamic function keys for moving around the pages and for entering data.*

Running a Windows 95 application on a TXBT terminal

The TXBT terminal enables you to run Windows 95 applications installed on the terminal (such as the calculator). If the Magelis application is running, it will continue in the background, with pages refreshed and alarms monitored.

Executable program path
This is the path (disk, directory/sub-directory) on the TXBT terminal and not the path on the PC on which XBT-L1000 is installed. If the executable program's location on the TXBT is changed, startup will not work.

Example: D:\WINDOWS95\CALC.EXE

2.5.2 Model pages

The designer has page models at his disposal. These are background pages containing text and static / animated / dynamic graphic objects that can be used for several application, help or alarm pages.

Characteristics

- a dialog application can contain several models,
- one and only one model is associated with each page.

2

Select **Page/New Model**. Select the **Application, Alarm** or **Help** model type. Configure the model using the editor tools.

NOTE: *The model pages can be locked using the "**lock icon**" icon. This prevents unintentional modifications of pages.*

Figure 2-8:   New Model Dialog Box
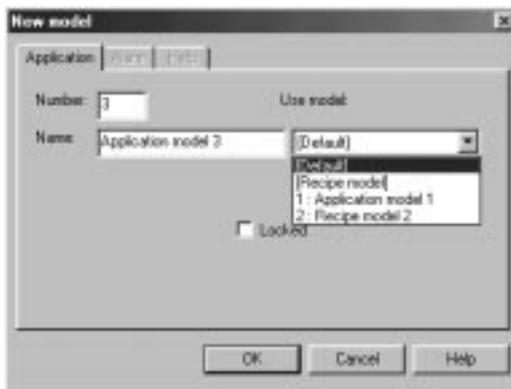
It is possible to change a model from a page by double-clicking on the "Application page" tab (for instance) or by selecting the **Page/ Properties** menu.

An object or an object selection within a page can be moved:
- to the model associated with the page (provided that it is not locked),
- to a new model to be created.

Carry out the following operations:
- select the object(s),
- right click on the mouse or select the **Edit/Move** menu.

2.5.3 Application/Alarm/Help pages

Creating the page architecture

The designer has page models at his disposal. These are background pages containing text and static graphic objects that can be used as a starting point for multiple application, help, or alarm pages. The following are general rules:

- One and only one page model is associated with each page.
- An application can contain several page models.
- Any given model can be associated with several different pages.
- A model type (application/alarm/help) is associated with a page type (application/alarm/help). For example, each page type has its own model type.

Tool bar buttons:

Keyboard shortcuts:
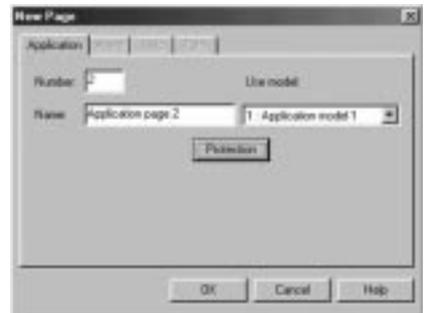
F7 (Application)
Shift + F7 (Alarm)
Ctrl + F7 (Help)
Ctrl+Shift+F7 (Form)

Application page

Figure 2-9: Application New Page Dialog Box

Indicate:

- Name and/or number of the new page
- Page model to be used
- Password (protection) if necessary (Figure 2-9)

Select Page/New Page/Application

Indicates:

- the name and/or number of the new page,
- the page model,
- the protection level if necessary.

The application pages correspond to the "usual" man-machine dialog during normal operation of the terminal. A specific model of the application page can be used to create "recipe" pages. A recipe page represents a file including recordings of the control system setup parameters or variables used to perform a specific type of action.

2

For instance, an industrial bakery can produce:

- viennese bread and buns: chocolate-filled pastry, croissants, brioches,
- bread: farmhouse bread, whole-wheat bread, rye bread, sticks of French bread,
- cakes: strawberry tarts, lemon tarts.

To make bread corresponds to the selection of a recipe. To make rye bread corresponds to the selection of a recipe recording.

The following four dynamic function keys or touch zones are available by default on the recipe page model:

- a key for freezing/unfreezing the display on the terminal,
- a key for storing the recording displayed on screen in the PCMCIA card,
- a key for restoring and displaying the recordings previously saved in the PCMCIA card,
- a key for transferring the recording displayed to the control system.

All the application page objects can be used for the recipe pages.

Alarm page

The actual display of an alarm depends on the priority that has been assigned to it. Alarms occurring in the process are stored in the "Alarm list".

When configuring an alarm page, you must indicate:

Figure 2-10: Alarm New Page Dialog Box

- Name and/or number of the new page (the name of alarm page is the text displayed in the alarm bar)
- Alarm page model to be used (Figure 2-10)
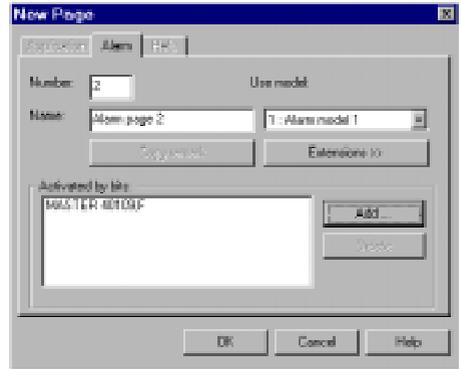
Purpose of alarm pages
An alarm page is used to indicate:

- control system faults
- corrective actions

The advantage of the alarm page is the event-linked display. A control system word bit is associated with each alarm page. If the word bit is in state 1, the alarm is triggered.

Operation advantages

- When a fault appears, it is often the consequence of other faults. The terminal's priority system allows the most serious fault to be displayed first (for example, the fault which has been defined as the most hazardous for the control system).
- The occurence of each fault is time-stamped.

Maintenance advantages

- The terminal store the occurence of faults sequentially (log) thus making it possible to find the origin of the fault.
- Several alarms may therefore occur simultaneously in the process.

The **Add** button allows you to assign a dialog table alarm bit to the alarm page being configured (Figure 2-11).

- **On the XBTs**, these alarm words are consecutive and make up the alarm table. In the event of an alarm, the rank of the word bit (in the dialog table) which triggered the alarm is displayed in the alarm strip (see chapter 3, section 3.6.2).

Figure 2-11: Add Alarm Bit Dialog Box

2
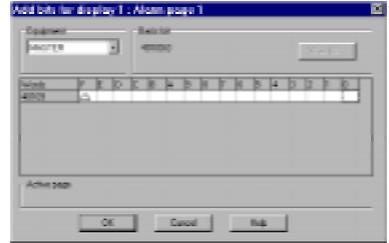
- **On the TXBTs**, this same principle exists, but it is also possible to assign any bits (internal bit, word bit, etc.)
- If using any other bit as an alarm bit, the field assigned to the "bit rank" in the alarm strip takes value 1.
- In the PLC\terminal exchanges, the bit is dealt with like a numerical field.
- The 2 types of operation can be used in the same application.

The **Extensions** button is used to enter the characteristics specific to an alarm page (Figure 2-12):

- Alarm page priority
- Assignment to a group of alarms
- Alarm relay action and operator ackowledgment
- Type of alarm page appearance

(See chapter 3, section 3.8).

Figure 2-12: Alarm New Page Properties Dialog Box

Help page

Help pages typically include information on the operation being monitored or controlled. When configuring a help page, indicate:

- Name and/or number of the new page
- Help page model to be used

Associating a help page with a page

Select the **Page/Associate Help Page**... menu.

This menu allows you to (Figure 2-13):

- Associate an existing help page with the selected page
- Associate a new help page with the selected page
- Change the help page associated with the selected page

The "New" button allows you to create a new help page.

Figure 2-13: Associate Help Page Dialog Box

2.5.4   Configuring a form page

Select Page/New Page/Form.

Indicate the name and/or the number of the new page.

The form pages can include the following elements:

- text objects,
- semi-graphic characters,
- printer control codes.

2

Text objects are static texts and alphanumeric variable fields.
These elements are intended for printing only.

Semi-graphic characters are used to create simple or double frames
for highlighting printed data (table of values, etc.).

The printer control codes {a} (ex : {1}, {2}, etc.) are used to define
printer control sequences (printing of bar codes, bold characters,
change of colors, etc.).

2.5.5 Tree structure control

The software allows you to display the application's structure in a window (Figure 2-14). The pages are listed in increasing page number order. The Application and System pages have a tree structure. The alarm pages have a "flat" structure.

Figure 2-14: Page Tree Window
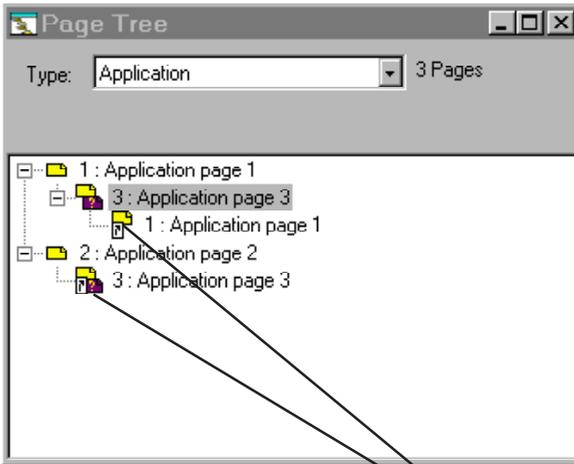
The terminal keys allow you to move around the tree structure.

The page types are indicated by various icons. When the mouse pointer is positioned on an icon, a message is displayed indicating the type of page and its characteristics.

Examples

Unprotected application page, with an associated help page.

Application page protected by a password, with an associated help page.

Alarm page with an associated help page.

Unprotected system page.

2.6   **Translation of the application**

Configuration/Application languages menu.

Add, delete or modify the application languages (3 maximum).

To translate the application, select the required language using the "Language" combo-box. Then, double-click on each text object and list-type alphanumeric field of the page to be translated.

It is possible to translate system page texts into a language different from one of the five languages available under XBT-L1000.

Graphic Magelis

2.7　Configuring the terminal parameters

Select the **Configuration/Terminal parameters** menu (Figure 2-15).

Figure 2-15:　Configure Terminal Parameters Dialog Box
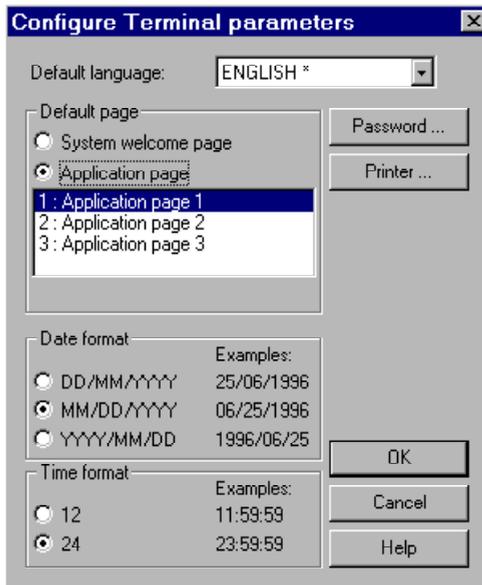
Configure the terminal parameters.

2

Page number displayed by default at power up

The 2 possibilities are:

- An application page
- A system title page

See chapter 3, section 3.1

Passwords

The "Password" button allows you to configure three passwords - A, B and C . Each password must consist of four alphanumeric characters. See chapter 3, section 3.5.

Default language

The language to be used by the terminal (system messages).

Date format to be used

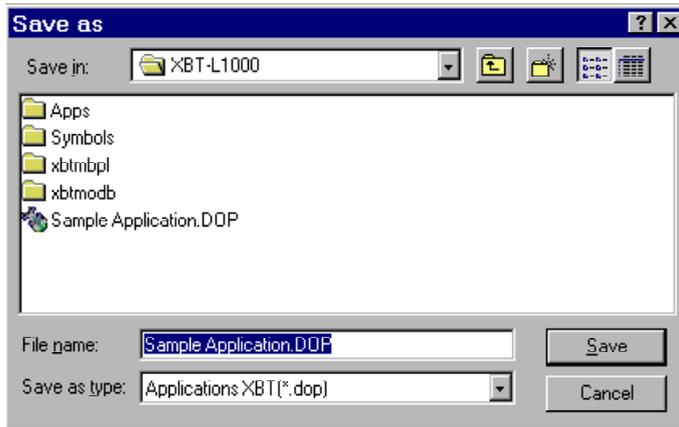|	
dd/mm/yyyy	(for example, 25/06/1996)
mm, dd, yyyy	(for example, 06/25/1996)
yyyy, mm, dd	(for example, 1996/06/25)Time format to be used
11 :59 :59	
23 :59 :59	

Printer setup

2.8   Saving the application

Select the File/Save menu (Figure 2-16).

Figure 2-16: Save As Dialog Box

2

2.9 Application simulation

Simulation enables the XBT-L1000 application designer to test the real effect of his application without requiring a complete hardware configuration. This function is accessible via the Simulation menu.

Items simulated:

- Application and alarm pages
- Page sequences
- Variables input (with thresholds, etc.)
- Dialog table and alarms table

NOTE: *Help pages, keyboard LEDs, printouts, alarm relay and external application startup (TXBT-F) are not simulated. Monochrome screen terminals are simulated with the standard color palette.*

2.9.1 Terminal simulation window

The window simulates the information on the terminal's screen. When this window is active, the PC keyboard simulates the terminal's keyboard.

Key equivalents:

Terminal	PC
R1.....	F1.....
F1.....	Shift F1.....
Home	Home
Esc	Esc
Syst	Page Up
Menu	Page Down
Mod	Insert
Alarm	Fin
Enter	Enter
Left/Right/	Arrow Left/
Up/Down	Right/Up/Down
+1	Shift + Up
-1	Shift + Down
Del	Del
Alphanumeric	Alphanumeric
Keypad	Keypad

2.9.2   PLC simulation window

Three tabs can be used to simulate:

- The displayed page variables (initially, a random value is allocated)
- The alarm tables
- The dialog table. Refresh of this window can be inhibited, to enable input of a page change, etc.

2

2.10 Transferring the application to the terminal

2.10.1 XBT-F terminals

1. Install the terminal.
2. Connect the terminal to the PC as shown in the service instructions (XBT-Z915-V2.2 cable and adaptor XBT-Z962).
3. Turn the power on to the terminal.
   When the terminal is switched on, the operating mode is selected automatically depending on the type of cable connected to the terminal:
   - Terminal connected to the PC with the XBT-L1000 software: save mode.
   - Terminal connected to the PLC: operating mode (with the possibility of switching to password protection mode).
4. Open the application to be transferred.
5. Select the **Transfers/Export** menu.
6. Answer the questions the software asks. The application is transferred.

2.10.2 TXBT-F terminals

1. Install the terminal as recommended in the TXBT manual.
2. Connection for transfer on a TXBT terminal; two types of transfers are possible:

   - **Local transfer**: The Magelis graphic application is loaded into the TXBT via a direct link to a PC equipped with XBT-L1000 <-> TXBT; the port used is COM1 (XBT-Z915 V2.2 cable and XBT-Z962 adapter).

   - **Remote transfer**: If the terminal and the PC containing XBT-L1000 are connected on the PLC network, and if this network is of the **Unitelway** or **Fipway** type, then transfer can take place via this network.

     The Setup R1 function on the home screen gives access to the parameter settings screen (see chapter 3.3 of the TXBT manuals for selection of the transfer type).

TXBT network address
The TXBT network address is entered locally on the TXBT using the network configuration utilities supplied (**Magelis Tools Unitelway, Fipway, Isaway**). The Start/Program/ Magelis Tools menu gives access to the Magelis Tools Group, which contains these various utilities.   See section 4.3 of the TXBT manual for addressing.

Declaration of remote transfer address with XBT-L1000
When the address is configured in the TXBT, the remote transfer address must be declared in XBT-L1000.

2

3. Switch on the terminal.
   When switched on, the terminal will look for the graphic Magelis application on the **PCMCIA** card and then on the hard disk in the **C:\TXBT\APPLI** directory. If the terminal detects an application, it will be automatically started. If the terminal fails to detect an application, the home screen appears, and the terminal waits for a transfer (see TXBT manual, section 4.1).

   • **Loading extension tasks when transferring the application**
      On a TXBT terminal, it is possible to add functions on top of the basic functions of an XBT-F. These extra functions are called **Extension tasks** (see TXBT manual, section 4.5).

   • **Loading the PL7 symbols file**
      During the transfer, it is possible to load the PLC application variable symbols file and subsequently use the symbols associated with the variables to modify them when using the extended settings function (see TXBT manual, section 4.7).

   • **Loading extra files when transferring the application**
      During the PC -> TXBT transfer, it is possible to load extra files into the TXBT (see TXBT manual, section 4.4).

4. Select the **Transfer/Export** menu.

2.10.3   Import/export file

If a PCMCIA card unit is available on a PC that has been loaded with the XBT-L1000 software, the application can be directly written on the card provided for the terminal. The Transfer/Import-export file menu is used to select the name of the PCMCIA unit.

XBT-L1000 -> PCMCIA card export
To export the application, select the **Transfers/Export/ to import/ export folder** menu. Insert PCMCIA card at the location provided on the terminal.

PCMCIA -> XBT-L1000 card import
To import the application, insert the PCMCIA card into the PC and then the **Transfers/Import/from import/export folder** menu. Use the **Export/to import/export folder** function to import the application.

2.11   Updating the application

When an application that has been saved under an earlier version of the XBT-L1000 software is opened using a later version, the user will be prompted to have the software update the application to the later version.

This operation is used to update new system page formats and enables the designer to incorporate the enhanced functions of the new version into the existing application. Therefore, It is strongly recommended that the user perform the update.

2

NOTE: *The model pages for application, alarm and help pages are not updated automatically. Thus, the alarm strip and the status line may have been re-located, deleted or modified by the designer.*

Updating the model pages:

1. Perform the updating proposed by XBT-L1000.
2. Create a new model for each type of page (application, alarm, help).
3. Delete the required elements (alarm strip, status line) from the existing models.
4. Cut/paste the elements required from the new models to the existing ones.

2.12   Running the application

Refer to chapter 3.

3

Chapter 3

Operating the Terminal

This chapter includes the following sections:

3

3.1 Keys and indicator lights
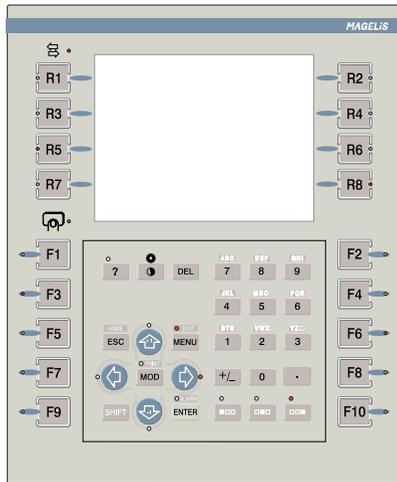
This section describes the function of the terminal's various keys. Each key function is described in the following paragraphs, and the corresponding keys are indicated (Figure 3-1).

NOTE: *Some functions (example: SYST) can be accessed by simultaneously pressing SHIFT and the associated key (example: SHIFT + MENU => SYST)*

Figure 3-1:   Keys and Indicator Lights

3

XBT

TXBT
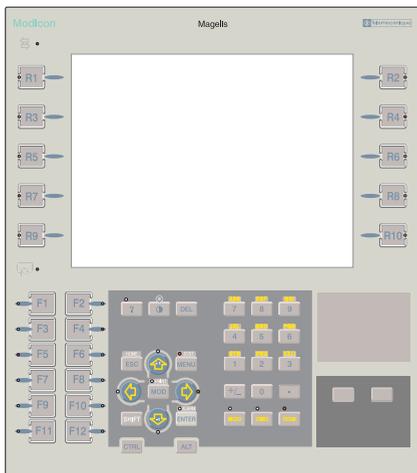
Touchscreen terminals

Touchscreen terminals do not have a keypad. An equivalent touch icon is provided for each of the keypad function keys.

Pressing this touch zone called the **service touch icon** provides access to a context "keyboard". Depending on the presence of some functions, the "keyboard" may or may not display the corresponding "buttons".

Keys and indicator lights	Function of the keys and indicator lights
ENTER: To confirm a choice or an entry, acknowledge an alarm. Press the ENTER touch icon on the touchscreen terminal to access this function.
Acknowledge an alarm on touchscreen terminals.
MOD: Switch to entry mode on all the applicable fields or graphic objects.
ESC: To cancel an entry, or suspend or stop an action in progress. To display the preceding pages successively. To exit from alarm display. Press the service and ESC touch icons to access this function on touchscreen terminals.
SHIFT: To access a key's second function. No equivalent touch icon is available on touchscreen terminals.
MENU: To access a menu that contains the run-time functions that cannot be accessed directly by means of a key: • application page selection,   • the "secondary" run-time functions.   Press the service and MENU touch icon to access this function on touchscreen terminals.

Graphic Magelis

Keys and indicator lights	Functions of the keys and indicator lights

3

HOME: To return to the page displayed when the terminal is switched on.
Press the service and HOME touch icons to access this function on touchscreen terminals.

SYST : To access the confidential mode that contains the operating functions:

Status of the indicator lights associated with the SYST key:
- Off: the terminal is in running mode.
- On: the terminal is in confidential mode.
- Flashing: PC <-> XBT transfer in progress or no application in the terminal.

Press the service and SYST touch icons to access this function on touchscreen terminals.

For touchscreen terminal
● ALARM

ALARM : To display the alarms
Status of the indicator light associated with the key:
- • Off: the current list of alarms is empty.
- • On: the list contains alarms that have already been displayed.
- • Flashing: the list of alarms contains new alarms.

Press the service and ALARM touch icons to access this function on touchscreen terminals.

PRINT: Print command.
Status of the indicator lights associated with each key:
- Off: no printing possible
- On: printing possible (list of alarms, etc.)
- Flashing: printing error.

Press the service and PRINT touch icons to access this function on touchscreen terminals.

The left and right arrow keys are used to:
- • To select an object in a page.
- • To move during an entry in an alphanumeric field.
- • To change the cursor position on a switch or a potentiometer.

Status of the indicator lights associated with each key:
- - Off: key inactive.
- - On: indicates the possibility of moving around in a page from field to field.

Graphic Magelis   3 - 7

Keys and indicator lights	Functions of the keys and indicator lights

- Flashing: indicates the possibility of moving around in the selected variable alphanumeric field or of changing a cursor position.

The up/down arrow keys are used to:
- To move around in a page.
- To select a value in a list of values.
- To change the cursor position of a swtich or a potentiometer.

Status of the indicator lights associated with each key:
- Off: key inactive.
- On: indicates the possibility of moving around in a page from field to field.
- Flashing: indicates the possibility of moving around in the selected alphanumeric variable field, changing the cursor position or selecting a value in a list.

For **touchscreen terminals**, press the object icon to select an object in a page. If data entry or cursor moving is valid for the object, touch icons corresponding to the object context are displayed (for example: a numeric pad for entering a numerical value, increment/decrement arrows for a potentiometer, etc.).

Communication indicator light
- On: no cable or incorrect wiring,
- Off: cable correct, no exchange with the PLC,
- Flashing: exchanges with the PLC.

Keypad indicator light
- Off: no keys pressed, on the keypad or on the touchscreen pad.
- On, green: when pressing any key or a touch zone.
- On, red: the terminal is in standby mode. Press any key or the touchscreen pad to exit this mode.

Functions of the keys and indicator lights

Entering data in the various fields

The up/down arrow keys combined with the **SHIFT** key are used to increment or decrement the value in a variable field if the "access" parameter of the object entered has been configured to immediate write (or immediate read/write). The value is entered in the control system each time the SHIFT + arrow up/down key is pressed.

3

Status of the indicator lights associated with each key:

- Off: key inactive.
- Flashing: indicates the possibility of modifying the value of each digit.

To delete the character to the left of the cursor.

Alphanumeric entry keys

To reverse the sign of the variable field being entered
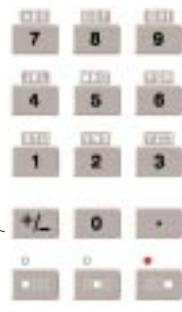
Decimal point

Combined with the alphanumeric keys, these keys give access to the character situated on the left, in the middle, on the right of the group of letters.The indicator lights indicate if letter entry is possible.

Keys and indicator lights	Functions of the keys and indicator lights

Contrast and brightness adjustment
Contrast adjustment: press and hold the adjustment key and make the adjustment by means of the up and down arrow keys.

NOTE: *The contrast cannot be adjusted on the XBT-F10" color and TXBT 10" color terminals.*

Brightness adjustment: press and hold the adjustment key and **SHIFT**, and make the adjustment by means of the up and down arrow keys.

For **touchscreen terminals**, adjustment can be made on the "Terminal parameters" system page.

Static keys (see chapter 1, section 1.7).

Dynamic keys (see chapter 1, section 1.7).

Extra keys for TXBT
Access to Windows 95 functions
A PC keyboard equipped as standard for Windows 95 comprises two additional keys; the START and MENU keys. To access the same functions on the TXBT, use the following equivalents:

- **Start** key: Obtained by pressing Ctrl+Esc on the TXBT, used to start up an application.

- **Menu** key: Obtained by clicking the mouse right-hand button on the TXBT, used to access the most common functions associated with an icon.

Functions of the keys and indicator lights

"Mouse" function with touchscreen pad and right/left click buttons
Used to select a field or an item in a list (for example: list of pages).
Cannot be used to modify a graphic variable field. Gives access to the Windows 95 functions.

External keyboard

3

An external keyboard can be connected to the DIN 8-pin connector.
The 2 keyboards remain active.
The front of the 2 terminals have QWERTY keyboards. Any external keyboard should also be a QWERTY keyboard.

TXBT and external keyboard equivalents

TXBT keyboard keys	External keyboard keys
Rx	Fx
Fx	ALT+CTRL+Fx
?	
DEL	DEL
HOME	HOME,
ESC	ESC,
+1	SHIFT + arrow up
SYST	SYST
MENU	PageDown
PRINT	ALT+PrtScrn
MOD	INSER
SHIFT	SHIFT
-1	SHIFT + arrow down
ALARM	SHIFT + ENTER or END
ENTER	ENTER
CTRL	CTRL
ALT	ALT

3.2 Operating principle

3.2.1 Basic principle

The terminals have 3 operating modes:

- **Application transfer**: This mode enables transfers between the XBT-L1000 and the terminal. (XBT-L1000 <-> XBT transfer: application and protocol) (Figure 3-2).
  Case of XBTs: local transfer XBT-L1000 <-> XBT
  Case of TXBTs: local transfer XBT-L1000 <-> XBT or remote transfer via the PLC network (**Unitelway, Fipway or ISAway**).

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Connect the serial link and printer link to the XBT with the power OFF.

Failure to follow this instruction can result in injury or equipment damage.

Figure 3-2:   Application Transfer

XBT-L1000
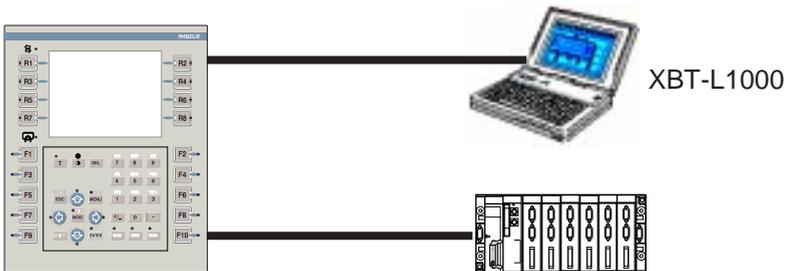
- **Operating mode**: This mode is used for on-line control of the control system (Figure 3-3):
  - PLC control
  - Displaying information, variables, alarms
  - Entering values
  - Discrete command
  - Print, log consultation functions, etc.

Graphic Magelis

Figure 3-3:   Operating Mode

or

XBT-L1000

3
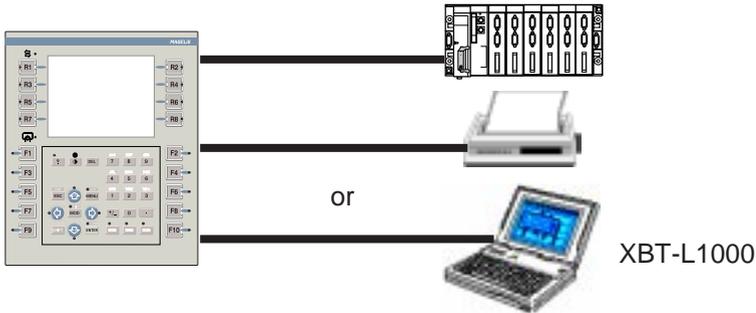
Figure 3-4:   Confidential Mode
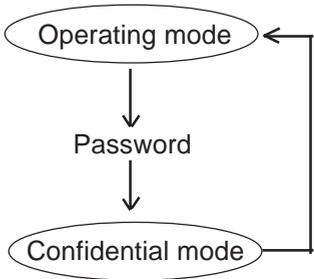
- • **Confidential mode**: Besides providing access to the running mode functions, this allows you to access advanced functions requiring a password (Figure 3-4).
    - - Access to pages that are protected in run-time mode
    - - Access to system pages

3.2.2   Application transfer

In this mode, 2 types of transfers are possible (Figure 3-5).

Figure 3-5:   Transfer Mode

Downloading the Man/Machine dialog application and the protocol for communicating with the control system.

RS232 serial link or PLC network (TXBTs)

PC with the XBT-L1000 software

Uploading transfer of an application from the terminal to a PC with the XBT-L1000 software.
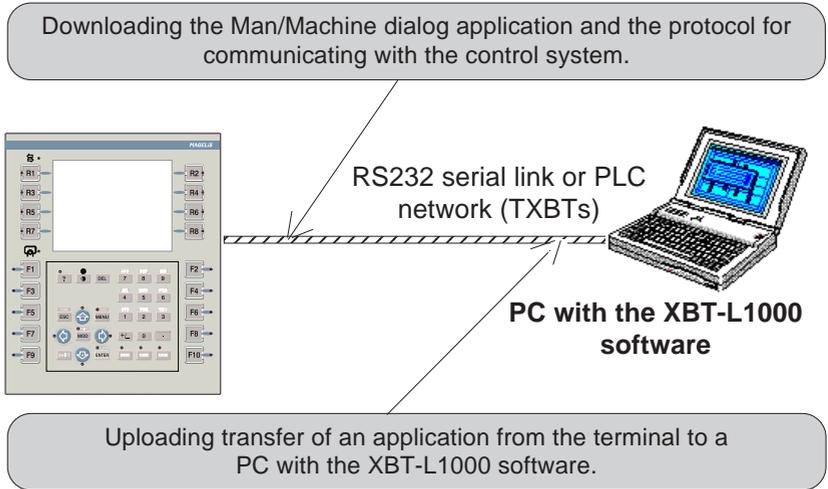
SYST indicator light: the SYST indicator light flashes during the transfer.

XBT-L1000/Terminal transfer procedure
Transfer from XBT-L1000 -> Terminal: select the **Transfers/Export/ To Terminal** menu.
Transfer from Terminal -> XBT-L1000: select the **Transfers/Import/ From Terminal** menu

Wiring: Refer to the terminal instructions for the XBT in chapter 2 of the TXBT Magelis Product Line Reference Manual.

Remote transfer for the TXBT

On a TXBT terminal, 2 types of transfers are possible:

- **Local transfer**: The Magelis graphic application is loaded into the TXBT via a direct PC link equipped with XBT-L1000 <-> TXBT; the port used is COM1.

- **Remote transfer**: If the terminal and the PC containing XBT-L1000 are connected on the PLC network, and if this network is a **Unitelway, Fipway or Isaway**, transfer is possible via this network.

The Setup R1 function on the home screen is used to configure the transfer (see chapter 3.3 of the TXBT Magelis Product Line Reference Manual for the choice of transfer type.)

Configuration of the TXBT address
The TXBT address on the network is entered locally on the TXBT using the network configuration utilities provided (Magelis tools: **Unitelway, Fipway, Isaway, ModBus+**).
The Program menu gives access to the Magelis Tools Group, which contains these various utilities. The XWin32 utility can be used to test the XWAY network.
Remarks:

- If a configuration has already been set up with XBT-L1000, it will be ignored.
- The FPP20 thumbwheel settings are ignored.
- Any coding in a Unitelway is ignored (SCA62).

Refer to Chapter 4.3 of the TXBT Magelis Product Line Reference Manual for addressing.

Entering a remote address in XBT-L1000

This address can be used to export an application to a TXBT via the XWAY network already in place, instead of the XBTZ915 + XBTZ962 transfer cable.
When the address is configured in the TXBT, the remote transfer address must be declared in XBT-L1000. To do this:

1. Select the **Transfers/Remote Address** menu.
2. Define the remote address with:
    - the address configured locally on the TXBT,
    - the socket (channel) number chosen or dynamically allocated at transfer SETUP.

Refer to chapter 4.4 of the TXBT Magelis Product Line Reference Manual for more information.

3
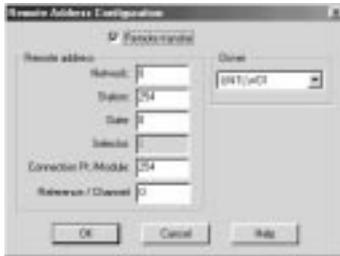
Other possible loading operations for the TXBT:
See section 14 and 15 in this chapter.

3.2.3　Operating mode

Operating mode is used for on-line control of the control system:
- Page display
- Entry/Modification of the process's parameter values
- Process control (discrete)
- Print
- Printing of form pages,
- Consulting and acknowledging alarms
- Consulting the alarm log
- Accessing the terminal configuration (printer link, time-stamp link, link with the control system, languages)
- Accessing the terminal's self-diagnostic functions (keypad, display unit, etc.) (TXBT only).

<div style="border:1px solid">

⚠ **CAUTION**

EQUIPMENT DAMAGE HAZARD

Pressing the MENU key allows the inexperienced and untrained operator to accidentally display the wrong page, modify the terminal configuration, or lose the messages and alarms on the screen. This can lead to confusion, panicking, and, as a consequence, loss of control over the machine. It is strongly recommended that the PLC be programmed to lock the MENU key as well as the other currently unused keys in order to prevent this from happening.

Failure to follow this instruction can result in injury or equipment damage.

</div>

Operating configuration

NOTE: *See chapter 4, section 4.3, on service instruction from the terminal and communication protocol in use.*

Running with a PLC's RS 485 type console connector
(Figure 3-6)

- Terminals with UNITELWAY protocol
- PLC: TELEMECANIQUE PLC with an RS485 type console connector interface (type TSX07, TSX37, TSX57 ...)
- Type of link: RS485 single-point
- Protocol: UNITELWAY

Figure 3-6:   PLC's RS 485 Console Connector

RS485

3
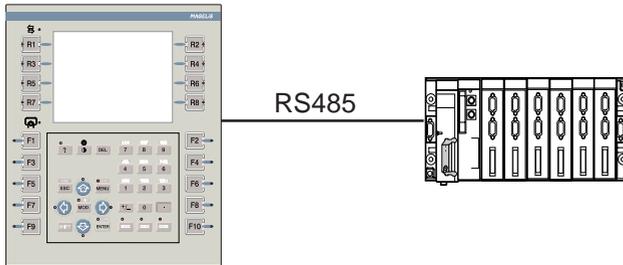
Running on a PLC communication network (Figure 3-7)

- PLC: PLC supporting the terminal's communication protocol,
- Type of link: RS422 or RS485 (multipoint),
- Protocol: multipoint protocol (UNITELWAY, FIPWAY) (refer to the TXBT manual).

Figure 3-7:   PLC Communication Network

RS485

Other equipment

Graphic Magelis   3 - 17
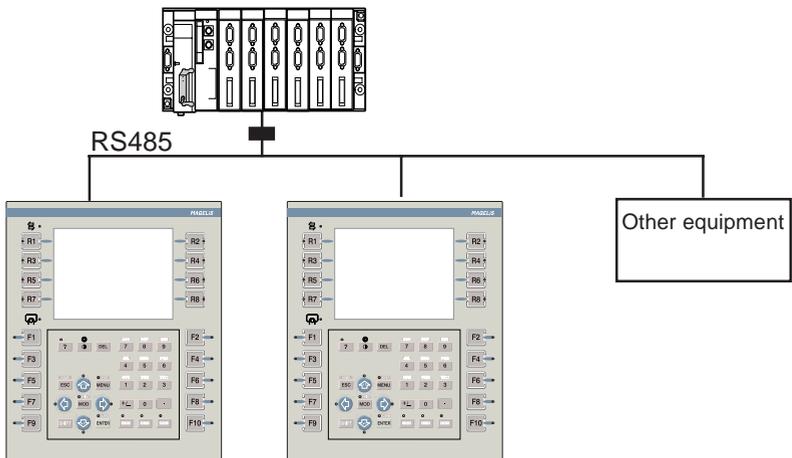
Running with direct point-to-point link to the control system (Figure 3-8)

- The control system designates a system other than the PLC.
- Type of link:
  - RS422 or RS485
  - RS232.
- Protocol: depending on the control system.

Figure 3-8:   Direct Link to Control System
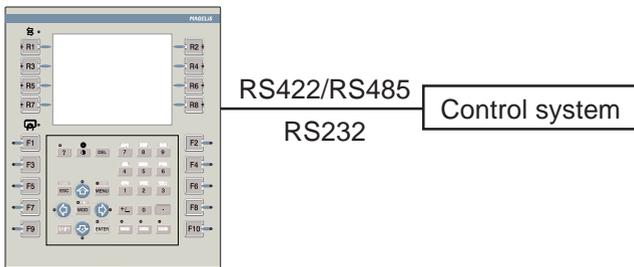
Running on a PLC using Modbus Plus (Figure 3-9)

- PLC: Any PLC supporting Modbus Plus
- Type of Link: Modbus Plus
- Protocol: Modbus Plus

Figure 3-9:   PLC using Modbus Plus
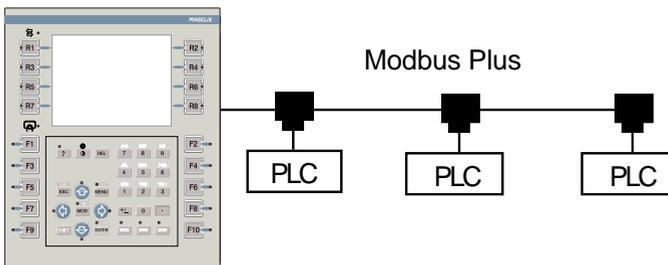
3.2.4   Confidential mode, password management

To restrict reading and writing of certain data to only those authorized, you can protect access to pages or fields by means of passwords.

⚠ **CAUTION**
EQUIPMENT DAMAGE HAZARD
The XBT should only be installed and used by the authorized personnel that have been assigned the appropriate confidential mode PASSWORDS by the project manager.
Failure to follow this instruction can result in injury or equipment damage.

3

If the right passwords are not entered, this protection system will then:

- Prevent access to application or system pages. The protected pages are no longer accessible from a static or dynamic function key (the associated labels no longer appear on the terminal screen) and they do not appear in the list of pages.

- Inhibit writing in dynamic variable fields: alphanumeric variable field, linear/rotary potentiometer, linear/rotary switch, image box. The protected fields are displayed as if they were configured in read only mode. The labels associated with the dynamic function keys and enabling access to these fields are no longer displayed on the terminal screen.

NOTE: *When a page is protected, access to all the fields of this page is non-protected. The protections that could have been defined with XBT-L1000 are ignored.*

There are three different passwords: A, B and C.

The value of these passwords is defined in XBT-L1000, **Configuration/Terminal parameters**. When the **Configure Terminal parameters** window appears, select the Password button to show the **Passwords** dialog box (Figure 3-10).
Each password is a string of 4 alphanumeric characters (default value 1111).

Figure 3-10: Passwords Dialog Box
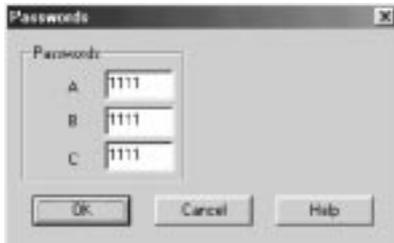
Exit from the confidential mode can be either manual or automatic:

- manual: the operator explicitly requests an exit from the confidential mode,
- automatic: a timer which can be programmed to a value between 1 and 60 minutes is used by the terminal to automatically exit the confidential mode.

Configuration of the parameters for automatic exit of the confidential mode can be performed via the terminal system page "Passwords/advanced properties".
When exporting an application to a terminal, the properties are set to the following values: automatic exit from confidential mode: NO.

NOTE: *To ensure that your passwords remain confidential, there is* ***no*** *way of consulting the value from the Magelis terminal. The only way of finding out the value of a lost or forgotten password is to consult the application using XBT-L1000.*

Operating principle

A page or field can be protected by password A and/or B and/or C. Depending on whether the user has filled out passwords A, B or C on the terminal, he will be able to access the corresponding pages and fields.

Page or field number	Protection defined in XBT-L1000
1	none
2	A
3	B
4	A, B
5	A, C
6	A, B, C

- If only A has been entered, the user will be able to access pages or fields 1, 2, 4, 5 and 6.
- If only B has been entered, the user will be able to access pages or fields 1, 3, 4, and 6.
- If C has been entered, the user will be able to access pages or fields 1, 5, and 6.

3

This operating principle enables protection perimeters to be defined completely free (Figure 3-11).

Figure 3-11: Hierarchy Principles

Examples:
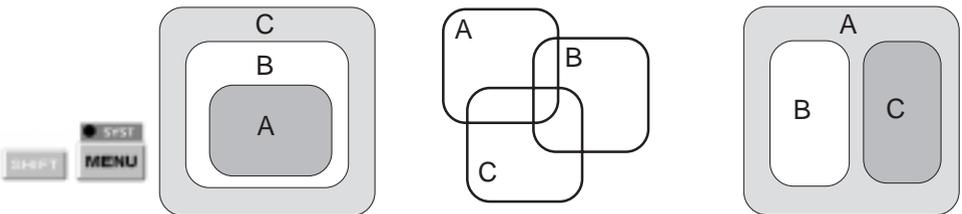
The status line informs the user of the passwords entered.

Password entry

Press the **MENU** or **SYST** key to display the system page on terminals with keyboard and press the status touch zone then **MENU** or **SYST** for touchscreen terminals (Figure 3-12).

Figure 3-12: System Page
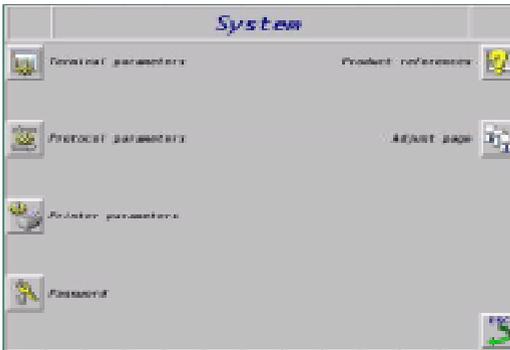
Press the dynamic key (or the touch zone) associated with the
Password icon, to display the **Password** system page.

Press the dynamic key associated with the Password icon or press
the corresponding touch zone on touchscreen terminals.

- Enter the password using the alphanumeric
  keys and then confirm with ENTER.

The password level appears in the lower strip.
The SYST indicator light comes on.

Disabling the password manually
- Go to the password system page.
- Press the dynamic key corresponding to
  locking/unlocking of protection mode
  (barred key).

The SYST indicator light goes out.

NOTE: *Manual disabling of password is available even if automatic
exit from confidential mode has been configured.*

3.3 Page display

3.3.1 Display at power up

For the XBTs

When the terminal is switched on, it automatically displays the following information:

- Reference and version of the embedded software,
- Reference of the software downloaded by XBT-L1000.

Then, depending on the configuration chosen when the application was created with XBT-L1000, the terminal will display either:

- an application page that can be selected with XBT-L1000 (see below),
- the **MENU** page.

This page, displayed at power up, will then be accessible using the **HOME** keys.

For the TXBTs

When the terminal is switched on, the home screen appears if the terminal contains no Magelis graphic application.

Customizable screen background

- **Home screen background**
  The screen background can be replaced by simply replacing the TXBT.BMP file in the ....\TXBT\TOOLS directory. The file definition must be 640x480, 256 colors).

  The functions possible from the home screen are started using **dynamic keys**.

- **Running the Magelis graphic R2 application**.
  The Magelis graphic application is run with key R2. Depending on the configuration chosen when creating the application with XBT-L1000, the terminal displays either:
  - An application page, or
  - A home system page.

System

Terminal parameters

Product references

Protocol parameters

Adjust page

Printer parameters

3

Password

ESC
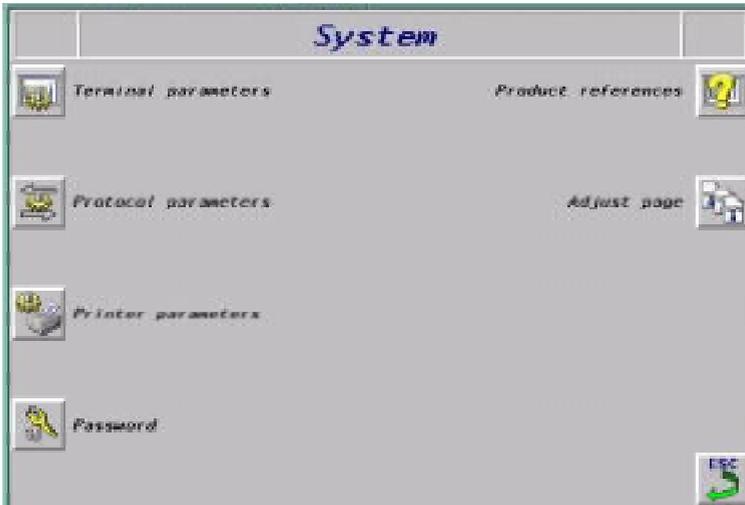
- **Access to Windows 95, running an application**
  The CTRL+ESC keys are used to start an application.

- **Closing the home screen**
  The home screen cannot be iconized and keys ALT+R4 are
  used to close it.

- **Setup:** The home screen specifies the type of transfer, which
  can be configured: see TXBT Manual, section 3.3.

**Selection of the default page
to be displayed with XBT-L1000**
To select the default page, the
procedure is as follows:

- Select the **Configuration/
  Terminal Parameters** menu
- Select the default page
  to be displayed.

Configure Terminal parameters

Default language: ENGLISH

Default page
- System welcome page
- Application page

1 : Welcome
2 : Navigator
4 : Filter System Overview
5 : Filter System Detail

Password ...

Printer ...

Date format
- DD/MM/YYYY   25/06/1996
- MM/DD/YYYY   06/25/1996
- YYYY/MM/DD   1996/06/25

Time format
- 12   11:59:59
- 24   23:59:59

OK

Cancel

Help

3.3.2 Displaying a page using the directory of pages

 Display the Menu system page using the **MENU** key
(Figure 3-13) or the status touch zone then the **MENU** zone on
touchscreen terminals.

Figure 3-13: Displaying a Page Using Directory of Pages

Press the dynamic key (or touch zone) associated with the **List of pages** icon.
Select the required page with the up and down arrow keys.

Confirm access to the page with the right arrow key.

3.3.3 Displaying a page using its number

Go to the list of pages (see section 3.3.2).

Press the dynamic key associated with the **Page number** text or select the touch icon on touchscreen terminals.

or

Display the list of pages by pressing the **MENU** key (Figure 3-14).

Go to the page number entry field by pressing the **MOD** key.

Enter the page No. and press **ENTER** to confirm.

Figure 3-14: Displaying a Page Using its Number
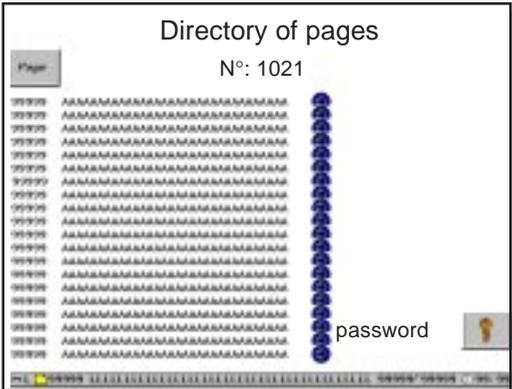
NOTE: *You can return to the previous page (main menu) by pressing **ESC**.*

3.3.4 Displaying a page by means of a dynamic function key

The dynamic function keys (Rx) are associated with a page and can be configured to make the terminal change from one page to another. The function key is configured using the XBT-L1000 software and allows a page to be displayed directly (Figure 3-15)

Figure 3-15: Displaying a Page Using Dynamic Function Key
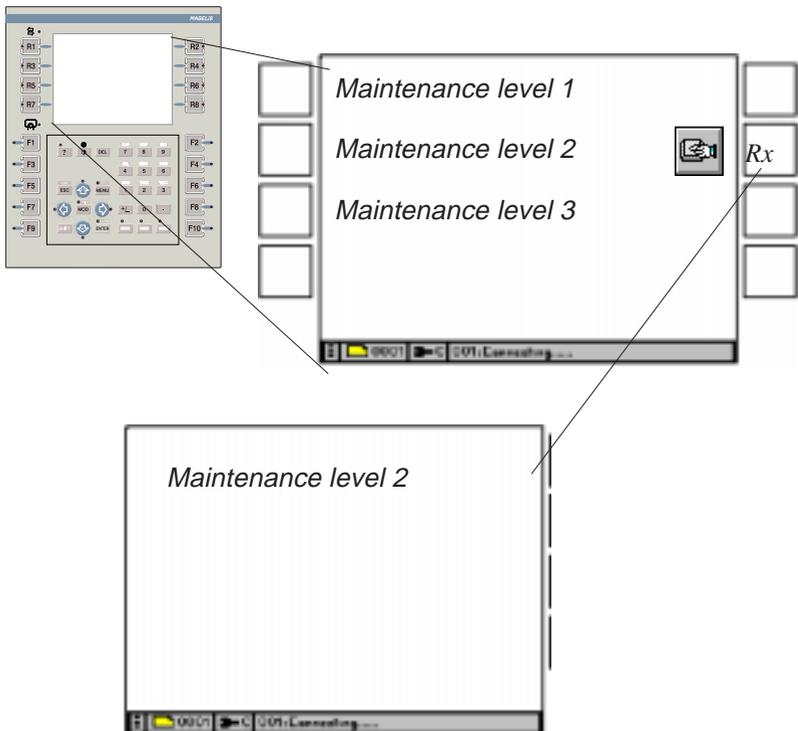
On touchscreen terminals, a page can be selected by directly pressing on a touch zone associated with this page.

3.3.5 Displaying a page by means of a static function key

A static function key (Fx) remains the same for all the application pages. The function key is configured using the XBT-L1000 software and allows a page to be displayed directly (Figure 3-16).

Figure 3-16: Displaying a Page Using a Static Function Key

3
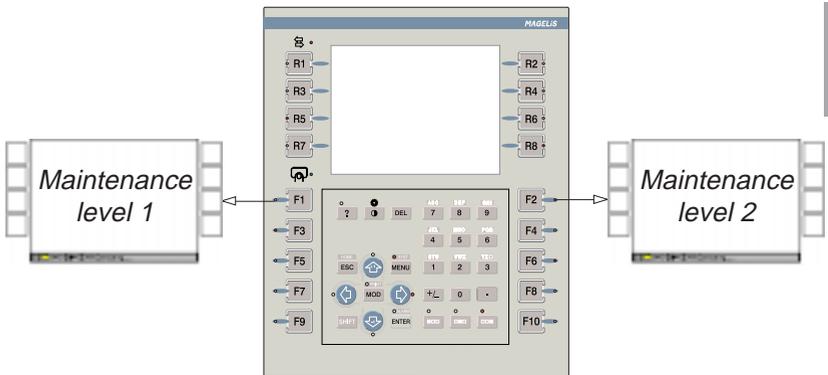
3.3.6   Displaying a page using a word from the PLC

It is possible to display a page using a word in the PLC. A PLC word must be allocated in the dialog table. In this table, a word is reserved in which the program writes the number of the page to be displayed. Refer to Chapter 2, Section 2.2 for the word coding procedure.

Example:
Display of the Maintenance page (application page No. 25) by the PLC
The terminal periodically reads the dialog table in the PLC and displays the desired page; no program has to be written in the PLC to manage communications (Figure 3-17).

Figure 3-17: Display of the Maintenance Page by the PLC

PLC Program
If input 10025 is at 1, display Maintenance page (page No. 25)

Dialog table

25   "Page number to be processed" word
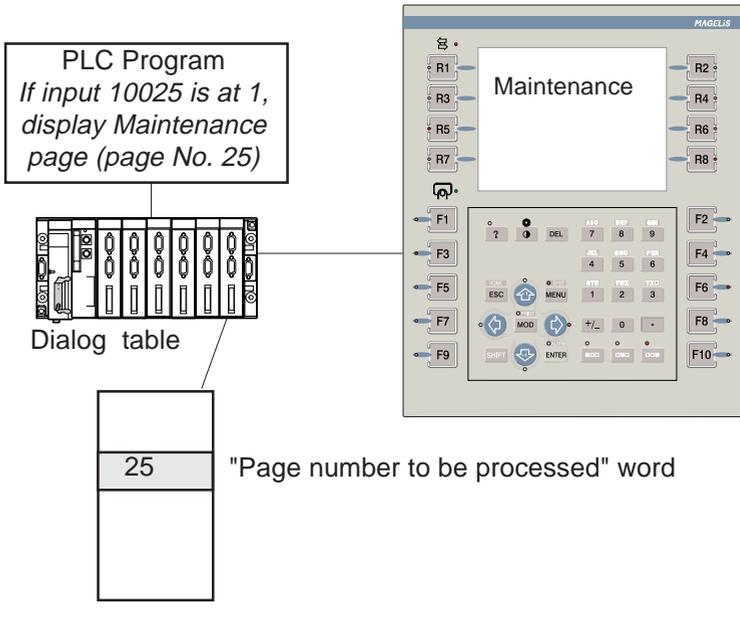
3.4   Variable fields

See also: Variable adjustment on TXBT, Section 3.12.
Variable fields are zones enabling:

- the display of values reflecting the control system status: status of a word bit, single or double word, floating word, character string, or,
- the entry of parameters allowing the control system to be controlled: modification of word bits, single, double or floating words, character string.

The display format may be binary, decimal, hexadecimal, numbered list, or an ASCII character string.

3

Temperature =
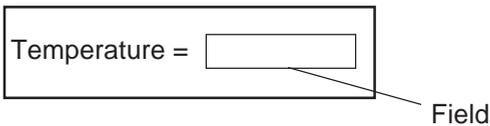
Field

When creating the application with XBT-L1000, controller variables are associated with the variable fields and the dynamic graphic objects.

For the XBT-Fs

Whatever the protocol, the accessible variables are single words, double words, floating words, and word bits.

For the TXBTs

In the case of XWAY protocols, the accessible variables are:

- single words, double words, floating words, word bits
- local and remote input/output bit
- system bit
- step bit
- step macro bit
- step macro input step bit
- step macro output step bit

In the case of a protocol other than XWAY, the accessible variables are singlel words, double words, floating words, and word bits.

The XBT-L1000 software makes it possible to define different field properties (Figure 3-18).

Figure 3-18: Properties of Alphanumeric Field Dialog Box
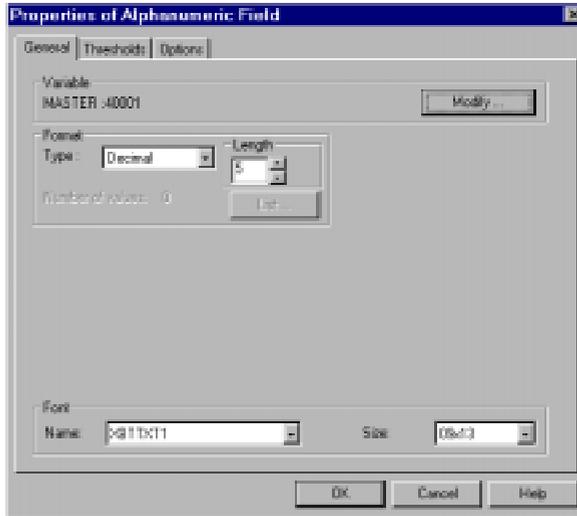
3.4.1 Accessing a field

Accessing the various fields in a page

The **MOD** key allows you to select:

- The first field on the page
  or
- The last field entered (the last field whose entry was confirmed by **ENTER**).

The selected field is framed with a dotted box and the cursor is displayed in the variable field.

The arrow keys allow you to move from field to field.
When you are positioned in the desired field, press the **MOD** key to enable the input mode.

On touchscreen terminals, press the touch icon of the selected field for accessing the fields directly.

NOTE: *When configuring touch zones with XBT-L1000, the objects must be aligned on the XBT-L1000 default grid, otherwise the operator may be unable to select certain objects. If nothing has been entered after one (1) minute, the input mode is cancelled.*

NOTE: *The order in which the page fields go to entry mode depends on the object alignment under XBT-L1000.*

Accessing a field by means of dynamic function keys

3

It is possible to select a field on a page by configuring a dynamic function key (Rx) associated with the page to select the field.

The same application procedures has access to an application page using the Rx key.

Access to a field using the TXBT mouse

A field can be selected using the TXBT mouse by positioning the pointer on the field and clicking.

Request for entry on the initiative of the PLC

The PLC can request an entry in a page variable field (example: request for a set point).
The word "Field number to be entered" is reserved in the dialog table. The program writes the number of the field to be entered in this word. This number is provided by XBT-L1000, Display/Field number menu.
Refer to section ??, for coding of this word.

NOTE: *Each field is automatically numbered by XBT-L1000. Numbering starts by number 1 for each page. The PLC program must thus check that the number of the page displayed is correct before requesting a field entry.*

3.4.2 Field entry

Operating mode

Numeric fields

Use the 0 to 9, A to Z and +/- (+/- select, + by default) keys to enter alphanumeric values.

Use the ENTER key to confirm the input value within the fields and send the results to the PLC.

Use the horizontal arrow keys to move from one digit to another within the field.

Deleting characters

The DEL key deletes the character to the left of the fixed digit.

Canceling the entry

You can cancel the entry in progress by pressing **ESC**; no modification is made to the field.

Entering graphic fields

Modification of a graphic field

Once positioned on the object required, press the **MOD** key to switch to entry mode or press the touch zone of the object.

Use the up, down, right and left arrows (LEDs flashing) to modify the value of a field.

Press the **ENTER** key to validate field entry.

3.4.3 Field Characteristics

Protecting fields

Depending on the selected configuration, certain fields of the application page may not be write-accessed in confidential mode. Access management for entry to a variable field is ensured by a system with several levels of protection. The XBT-L1000 software can be used to define the various properties of the field (Figure 3-19).

Figure 3-19: Alphanumeric Properties Dialog Box
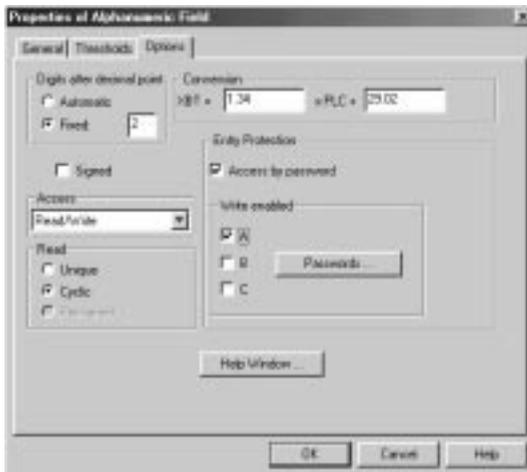
Variable display rules

- A value that cannot be displayed is represented by **#** characters (overflow value).
- A value not filled out by the PLC is represented by **?** characters.
- A write-only variable is represented by * characters.

Numbered list

The XBT-L1000 software allows a string of text to be assigned to each value of the variable associated with the field (Figure 3-20).

Figure 3-20: Numbered List Dialog Box
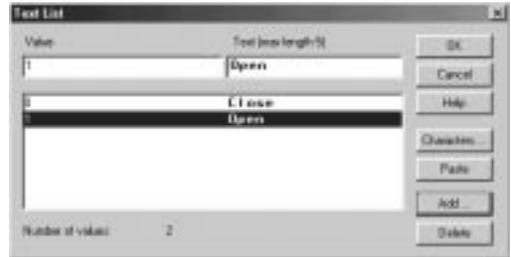
Example: A field (%MW10) that accepts two values with two associated strings of text (0: CLOSE 1: OPEN).
If you select OPEN using the arrow keys, and confirm by pressing ENTER, the %MW10 word will take the value 1 in the PLC.
Inversely, if the PLC writes the value 1 on %MW10 the OPEN text will be displayed.

Data types

Word bits, single words, double words, floating point words, character strings.

Alphanumeric display format

Binary, integer, decimal (five digits maximum after the decimal point), hexadecimal, ASCII, text numbered list.

Thresholds

Four thresholds can be set for a variable field: Min (minimum), L (low), H (high), and Max (maximum).

The value of these thresholds can be:

- constant,
- variable: the value is read when the page is displayed (read-only).

Min and Max are the absolute display limits for the variable, L and H are its intermediate thresholds (pre-alarm, etc.).

The value of a variable can be in one of five posssible value zones:

- Value > Max
- H < Value < Max
- L < Value < H
- Min < Value < L
- Value < Min

For each of these zones, the object is given a particular color according to what was defined in XBT-L1000: variable color for alphanumeric objects, dial color for vu-meters, etc. (Figure 3-21).

Figure 3-21: Alphanumeric Properties Dialog Box

3

Color red: max. limit

Color blue: correct value

Color red: min. limit
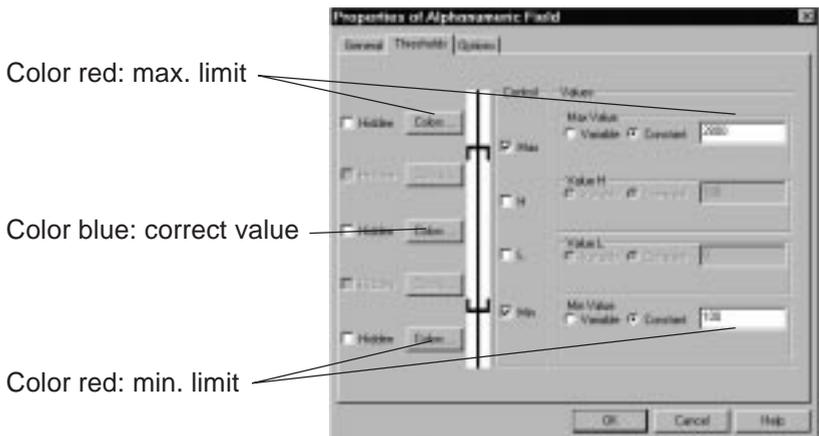
If the operator enters a value which is > Max or < Min, it is not sent to the controller and a warning message appears.

Immediate write

Immediate write in a field consists in incrementing or decrementing the field value. It is performed by pressing the shift + "up arrow" key or shift + "down arrow" key on terminals with keyboard or by pressing the touch zones +1 and -1 on touchscreen terminals. The value is transmitted to the PLC each time the key is pressed.
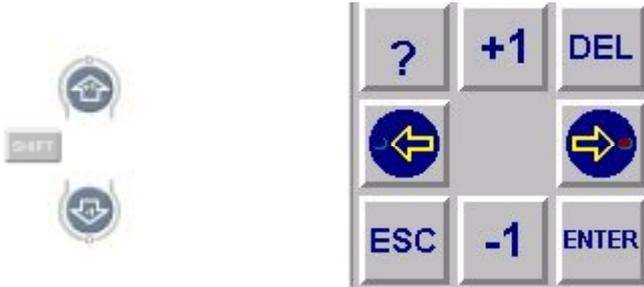
To configure the variables with XBT-L1000, select the Option/ Access tab.
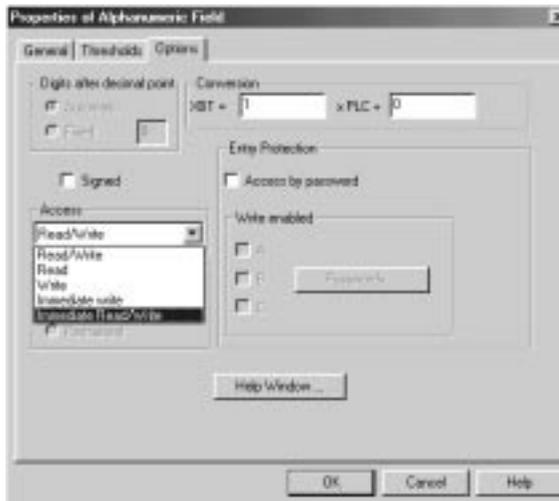
This entry mode is used by the operator to modify a field value in a continuous manner in order to:

- prevent sudden skipping from one value to another,
- view the result of an action "in real time" (adjustment, positioning, etc.).

3.5 Alarms

3.5.1 Principle

Alarms are triggered and then displayed when a word bit in the PLC(s) is ON.
Several alarms may be active simultaneously, and are stored by the terminal in the alarm list.

⚠ **WARNING**

UNINTENTIONAL EQUIPMENT OPERATION

The XBT does not support any type of processor nor machine control in association with alarms. It is the designer's responsibility to consider programming PLC logic to account for programmed alarms.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

3

Example: display on an XBT-F terminal:

| 1236 | LLLLLLLLLLLLLLLLLLLLLLL | AAAAAAAA AAAAAAAA | LLL✓ | ⚠ |

Refer to section 3.7 for the detailed description of the alarm list.

Alarm indicating

● ALARM on touchscreen terminals

- "Alarm" indicator light. The "Alarm" indicator light keeps the operator constantly informed of the alarm list status:
- Off: the current list of alarms is empty.
- On: the list contains alarms that have already been displayed.
- Flashing: the list of alarms contains new alarms.
- On the application pages
  The designer can place an alarm bar, corresponding to the last alarm that has occurred, in the alarm pages. This bar is updated whenever a new alarm occurs, whatever its type (with or without a required acknowledgement) and priority. If several alarms occur simultaneously, the highest priority alarm is displayed; if there are no alarms, the bar remains displayed but is empty.

```
1236 LLLLLLLLLLLLLLLLLLLLLLLL        AAAAAAAA AAAAAAAA LLL✓
```

Name of the
alarm

Appearance date and time

Code for appearance (ON),
Acknowledgment (ACK),
Disappearance without acknowledgment (OFF)

Number of the bit at
the origin of alarm
triggering

Absent: no alarm or alarm acknowledged (ACK)
Steady red: alarm set to OFF
Flashing red: alarm set to ON

Printing on line: See section 3.10.3.

Direct display of the alarm indicated in the strip (without displaying
the alarm list) is performed by pressing the keys shown opposite.
On **touchscreen terminals**, press directly the alarm strip.

- **On-line printing**: see section 3.10.4.
- **Alarm bit**: see chapter 3, section 3.3.3.2.
- **Alarm relay**: see section 3.5.6.

3.5.2   Alarm page parameters

Alarm pages have various parameters:

- A 32-character maximum message. This message will be
  displayed in the alarm strip, the alarm list and the history that
  will be printed,
- Text, variable fields, static graphic objects used to indicate the
  fault and the relevant corrective actions.

Conveyor fault
Turn power off
Remove jammed part
Restart

- - Variable fields
- - Static graphic objects
- - A priority
- - A request for acknowledgment
- - An alarm relay command
- - Assignment to a group of alarms
- - A type of alarm page appearance
- - Printing on line

NOTE: *The alarm page can remain empty on request of the de-*
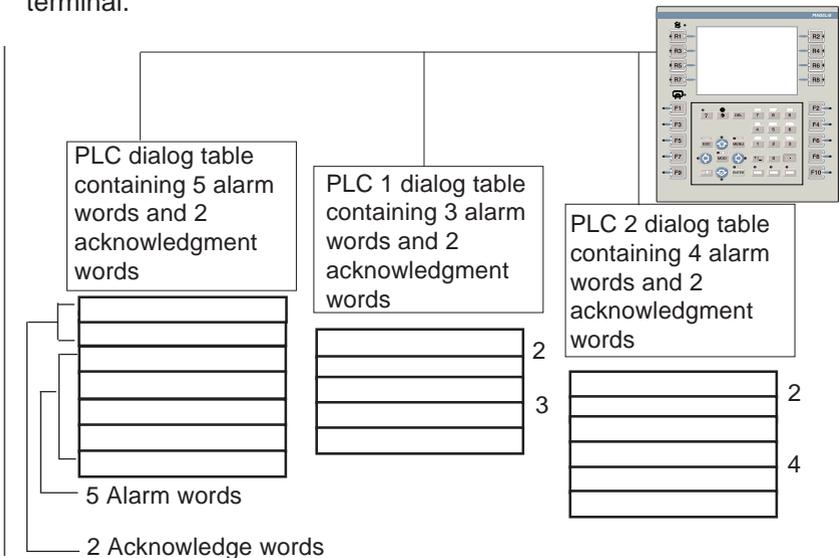*signer. The management of alarms is then provided by*
messages only.

- a priority,
- a request for acknowledgement,
- an alarm relay command,
- an assignment to a group of alarms,
- a type of action on alarm appearance (display, printing, storage).

Alarm table

- A word bit is associated which each separate alarm. All these words make up the alarm table which is part of the dialog table.
- A terminal can process the alarms from several PLCs.
- The alarm table can be distributed between several of the automated process's PLCs.

For each PLC, the alarm bits are distributed in packets of 16 alarms, i.e., "n" words of 16 bits per PLC.
The terminal can accept up to 32 words depending on the type of terminal.

PLC dialog table containing 5 alarm words and 2 acknowledgment words

PLC 1 dialog table containing 3 alarm words and 2 acknowledgment words

PLC 2 dialog table containing 4 alarm words and 2 acknowledgment words

5 Alarm words

2 Acknowledge words

Any given alarm may be triggered by several different bits that may belong to different PLCs.

3.5.3   Alarm group

Alarm groups can be configured in order to group together alarm pages in modules.

An alarm group is a set of alarms identified by **different color attributes per group** for the appearance, disappearance and acknowledgment statuses. There are 16 groups numbered 1 to 16. Each group is identified by an 8-character name allowing quick identification by the operator of a part of the machine or of the installation.

Example:

Group1: *cracker1*
colors defined:
- appearance: flashing red
- disappearance: steady green
- acknowedgment: flashing cyan

Group2: c*onvoy.4*
colors defined:
- appearance: steady yellow
- disappearance: flashing magenta
- acknowledgment: flashing blue

According to the colors, the user can quickly identify the control system unit in which the fault has occurred (example: cracker1).

In the list of alarms, it is possible to select:

- display of the alarms from a single group out of the 16.
- display of the alarms from the 16 groups.

The dynamic key or the touch zone associated with the **ACK ALL** icon is used to acknowledge the alarms of the group(s) present on the screen (see section 3.5.7).

3.5.4   Display priority in the alarm list

A priority can be allocated to each alarm page using the XBT-L1000 software.

The alarm pages can take different priorities. 16 levels are possible from 1 to 16, with the lowest display priority being priority No. 16.

Alarm list storage principle:

1. Alarms not acknowledged and then alarms already acknowledged, i.e. alarms which were already present the last time the list of alarms was displayed.
2. Alarm priority (1 at the top, 16 at the bottom).
3. When the alarm priority is the same, they are stored in such a way that the oldest one is displayed first. The possible cause of a series of faults can thus be identified rapidly.

3

The list of alarms is displayed after pressing the **SHIFT + ENTER** keys or the status touch zone and then **ALARM** for **touchscreen terminals**.

The latest alarm displayed appears in the "latest alarm" strip.

Alarm display principle

When an alarm appears:

- The **ALARM** indicator light flashes. The alarm is stored in the alarm list. The alarm can be acknowledged by the operator directly on the application page by pressing the **ENTER** key or for **touchscreen terminals**.
- The alarm relay is closed (if this function is selected).
- The alarm strip is updated.

The alarm can be consulted in the alarm list (see Section 3.5.7).

3.5.5   Acknowledging alarms

When designing pages, it is possible to define whether the alarm page should be systematically acknowledged or not. These 2 types of alarms are managed in the following way:

1 - Alarms which must be acknowledged

An alarm which must be acknowledged remains in the list of alarms until it is acknowledged by the operator, even if the cause of the fault is no longer present (the alarm bit is back to 0). Its status is then OFF.

Advantage: transient faults are isolated (instability of a discrete sensor for example).

2 - Alarms with optional acknowledgment

An optional acknowledgment alarm disappears from the list as soon as the cause of the fault is no longer present (the alarm bit is back to 0), whether the alarm has been acknowledged or not.

Advantage: the display is not exclusively dedicated to faults that are considered minor for the application.

Alarm acknowledgement from the alarm strip

Press the **ENTER** key on the terminal or the touch zone on **touchscreen terminals** to acknowledge the alarm displayed in the alarm strip.
The alarm message switches to ACK status.

NOTE: *The alarm strip can be displayed on alarm pages. Acknowledgement will thus be effective on the strip alarm and not on the alarm displayed.*

Alarm acknowledgement from the list of alarms

Press the **ENTER** key on the terminal to acknowledge the alarm selected in the list. The alarm message switches to ACK status. The dynamic key or the touch zone associated with the **ACK ALL** icon is used to acknowledge the alarms from the group(s) displayed.

3.5.6 Alarm relay command

The alarm relay option is available for each alarm.
The alarm relay energizes as soon as an alarm defined with the "alarm relay" option is triggered.
The relay deenergizes as soon as all the active alarms defined with the "alarm relay" option have been acknowledged by the operator(ACK), or have disappeared.

NOTE: *In the event of a power loss to the termial, the alarm relay deenergizes.*

3.5.7 Description of the alarm list

The alarm list includes:

3

- the active alarms which are present but not acknowledged by the operator (ON),
- the active alarms acknowledged by the operator (ACK),
- alarms with mandatory acknowledgement and which have not been acknowledged but for which the triggering cause is no longer present (OFF).

The alarm list is refreshed whenever an alarm appears or disappears. The alarm list remains displayed awaiting a user action.

Name of the alarm

Appearance date and time

Code for appearance (ON)
Acknowledgment (ACK)
Disappearance without acknowledgment (OFF)

Number of the bit at the origin of alarm triggering (see alarm bit Section 5.1)

Absent: no alarm or alarm acknowledged (ACK)
Steady red: alarm set to OFF
Flashing red: alarm set to ON

The function key associated with the "group" icon is used to select an alarm group or all the alarms.

The status line indicates the alarm group and the equipment connected (PLC) which triggered the alarm selected in the list.

Possible actions in the alarm list

ENTER : to acknowledge an alarm, the alarm status becomes ACK.

ACK ALL: allows overall acknowledgment of all the alarms or those of the selected group.

Up and down arrows: to navigate in the alarm list.

SHIFT + up and down arrow or double up/down arrows on touchscreen terminals: previous page/next page.

Right arrow:to display the alarm page corresponding to the selected alarm.

PRINT: to print the alarm list.

3.5.8   Alarm display by the PLC

The dialog table enables the dialog between the PLC and the terminal. This table contains words which are reserved for alarm display. Refer to chapter 4, section 4.2 for the coding of these words.

3.6 Alarm history log

3.6.1 Principle

The terminals can manage an alarm page log. The alarm descriptions and state, the equipment data, the date and time status are stored in this log. The alarms are stored one after the other, and when the log is full, the oldest alarms are overwritten by the most recent ones.The log recording capacity is **500** events.

Each alarm event:

- Appearance
- Acknowledgment
- Disappearance

is recorded and time-stamped.

3

The following functions can be performed:

- On the PLC's initiative:
  - Printing the alarm log
  - Clearing the alarm log

- On the operator's initiative:
  - Displaying the alarm log
  - Printing the alarm log
  - Clearing the alarm log (in confidential mode)

The log is useful for analysing the sequence of events which has led to a given machine state.

3.6.2 Displaying the alarm history log

The alarms are shown with the most recent alarm displayed first.
The events relative to each alarm are: appearance,
acknowledgment, clearing.

MENU: To access the alarm log.

Up and down arrows: To scroll through the alarm log.

**SHIFT + up and down arrow or double up/down arrows on
touchscreen terminals**: previous page/next page.

PRINT: To print the alarm log.

ESC: To return to the previous page.

3.6.3 Clearing the alarm history log

- **At the operator's initiative**
    1. Prior display of the history.
    2. Press the key or the touch zone **Delete history**.
    3. Validate history clearing: the complete history is cleared.

NOTE: *History clearing can be restricted to confidential mode. For
this, protect the system page "Delete history" by a password.*

- **On the PLC initiative**

The alarm history is cleared by means of the history reset command
word in the dialog table (see chapter 4, section 4. 2).

3.6.4 Printing the alarm history log

- **On the operator's initiative**
Press the **PRINT** key and select "Log".
The alarm log is printed sequentially, with the most recent
alarm printed first.

- **On the PLC's initiative**
The alarm log is printed by means of the print command word
in the dialog table (see chapter 4, section 4.2).
The alarm log is printed sequentially, with the most recent
alarm printed first (Figure 3-25).

Figure 3-25: Print Format

```
--------------------------------------------------------------------------------
ALARM HISTORIC        !ON (Valid)    !ACK            !OFF (Invalid)  !EQUIPMENT !GROUP
--------------------------------------------------------------------------------
24/07/97
--------------------------------------------------------------------------------
1024:Text  of  alarm . !2407 12:00:00 !     -      !      -         !MASTER    !CONVEYOR
1024:Text  of  alarm . !2407 12:01:00 !2407 12:01:00!       -       !MASTER    !CONVEYOR
*1024:Text  of  alarm . !2407 12:04:00 !      -      !2407 12:05:00  - !MASTER    !CONVEYOR
```
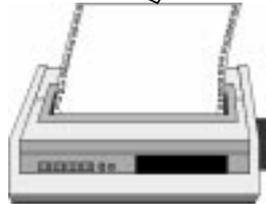
The recommended print format is 132 columns. The following are printed on a single line for each alarm:

- alarm number and page name
- appearance (ON), acknowledgement (ACK), disappearance (OFF) date and time, alarm group.

An asterisk * at the beginning of a line indicates that information has been lost in the previous line. This happens when the log overflows, in which case the oldest events are overwritten by the most recent events.

3.7 Process control using function keys

The terminals are used to control the control system using the static (Fx) or dynamic (Rx) function keys on terminals with keyboard and the touch zones on touchscreen terminals. There are two types of commands:

- Momentary contact
- "Push on/push off" toggle

3.7.1 Momentary contact command

The system is actuated by pressing a function key or the touch zone, which starts an action; if the key or the touch zone is released the action stops.

Example: Controlling a motor

Control bit set to "1"

0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0

Motor

"1"   "1"
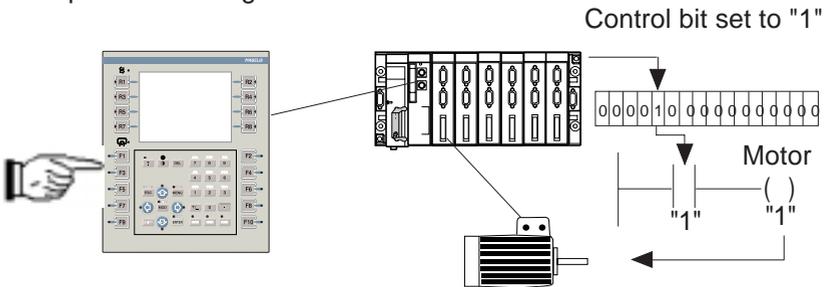
3.7.2 Push on/Push off toggle command

The control system is actuated by pressing the function key or the touch zone and the action runs; the action is stopped by pressing the function key or the touch zone again.

Example: Conveyor belt advance command

1 = Push
0 = Next Push

0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0

Conveyor

"1"   "1"

Graphic Magelis
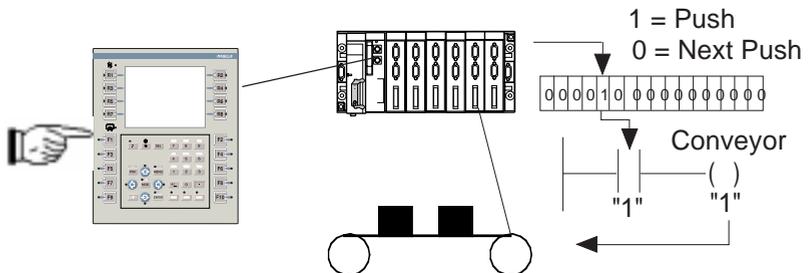
Control using static function keys

When creating the application, a word bit, defined automatically by the dialog table, is associated with each momentary contact and "push on/push off" toggle static function key. This word bit will be in the Master PLC.

Control using dynamic function keys

When creating the application, the following are associated with each momentary contact and push on/push off dynamic function key:

- One label comprised of 1 or 2 graphics,
- A word bit whose PLC address must be declared when configuring with XBT-L1000.

Dynamic function keys may be configured to communicate with any PLC attached to the terminal.

3

Command using the TXBT mouse

The dynamic function keys can be controlled by positioning the pointer on the corresponding key label and clicking.

Assigning static function keys in the dialog table

The dialog table enables the communication between the PLC and the terminal. In this table, one word is reserved for providing the status of the function keys in the form of a word bit (bit at 1 = key pressed), refer to chapter 4, section 4.2 for the word coding procedure.

See chapter 5, section 5.3.6.

3.8 Running Windows 95 applications on the TXBT

The TXBT terminal can be used to run Windows 95 applications installed on the terminal (for example the calculator). If the Magelis application is already running, it will continue to work in the background, the pages are refreshed and the alarms monitored; The software can be started up in 2 ways.

Startup with a Windows 95 command

Program startup

1. Click on the Start button (or use the CTRL+ESC keys), then select Program.
2. Select the program to be executed

Program startup using the Run command

1. Click on the Start button (or use the CTRL+ESC keys) and then Run.
2. In the Open zone, type in the location and name of the program you want to start.
   If you cannot remember the location or name of the program file, click on Browse.

Running using the Rx dynamic function keys

The executable program can be run by pressing an Rx key (for example the calculator).

Configuration with XBT-L1000

For example: starting the calculator with key R4 as soon as the measurement is displayed.

1. Select the page linked to the dynamic key in the Page Tree Structure window.
2. The configuration screen appears.

3. Select the dynamic function key to be assigned.

R4

The configuration dialog box appears.

3

4. Select **Run Application.**
5. Type in the executable program path in the "Open" editing field.

NOTE: *Executable program path*
This is the path (drive, directory/sub-directories) on the TXBT terminal and not the path on the PC equipped with XBT-L1000.
If the location of the executable program on the TXBT is changed, startup will be impossible.
Example: D:\WINDOWS95\CALC.EXE

3.9 Key locking by the PLC

In order to prevent the operator from performing certain functions depending on the control system status, the PLC is able to lock out the terminal. There are 3 reserved words in the dialog table that allow various keys to be locked. These keys are:

- static function keys
- system keys
- numeric keys

Word bit at 1 = key locked
Refer to chapter 4, section 4. 2 for the word coding procedure.

⚠ **CAUTION**
EQUIPMENT DAMAGE HAZARD
Pressing the MENU key allows the inexperienced and untrained operator to accidentally display the wrong page, modify the terminal configuration, or lose the messages and alarms on the screen. This can lead to confusion, panicking, and, as a consequence, loss of control over the machine. It is strongly recommended that the PLC be programmed to lock the MENU key as well as the other currently unused keys in order to prevent this from happening.
Failure to follow this instruction can result in injury or equipment damage.

Example:
Locking the F1 and F2 static function keys in the application example, will start up an action in the PLC.

- The function keys must be locked when the following pages are displayed:
  - Menu
  - Dough preparation (preparation help)
  - Dough baking (baking help)
- The function keys must be unlocked when the maintenance page is displayed.

The terminal periodically reads the dialog table in the PLC and locks the keys whose word bit is at 1.

3

Dialog table

1 1

F1 and F2 locked (bit = 1)
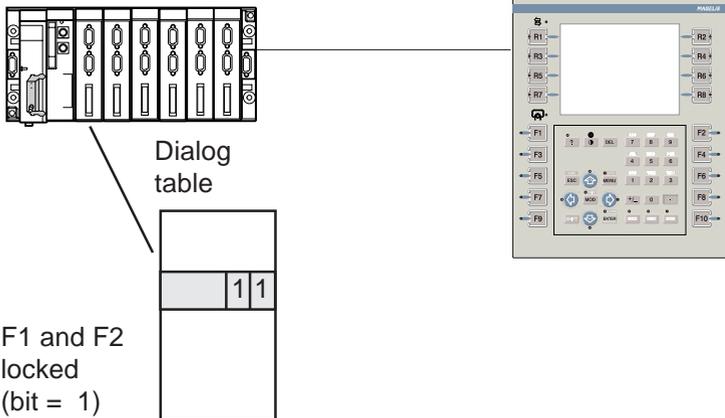
See chapter 5, section 5.3.7.

3.10 Printing

3.10.1 General

The following information can be printed:

- **Printing at the operator's initiative**
  - Alarm log
  - List of active alarms.
  - Form pages,
  - Screen hardcopies (TXBT only),
  - Terminal references.

  The **PRINT** key is used to send the command.
  - Active window capture (TXBT only)
    The SHIFT+ALT+PRINT keys are used to send the command.
- **Printing at the PLC's initiative**
  - Alarm log
  - Free format printing
  - On-line alarm printing
  - Form page printing.

NOTE: *The recommended printing format for the "Alarm history printing", "On-line alarm printing" and "Alarm list printing" functions is 132 columns. On a 80-column printer, the "alarm group" and "equipment" information is not printed out.*

3.10.2 Print set-up

Case of XBT Terminals

- Printer selection
  A serial printer must be used and no declaration in XBT-L1000 is required. For connection, refer to the service instructions.
- **Printer set-up**
  Printer setup is performed with XBT-L1000 or locally in the terminal. The System menu is used to consult and configure the printer parameters. The printing formats are entered on XBT-L1000 via the Configure/Parameters menu of the Printer terminal.

NOTE: *If the printer has been configured with fewer columns than the required printing format, the result will be truncated. Characters whose ASCII code is < 32 and > 125 will be replaced by "." characters when printed. Except for free format and form printing.*

Case of TXBT terminals

- Printer selection
  A parallel printer must be used.

1. Select the **Start** menu (you can use the **CTRL+ESC** keys to call up the Start menu).
2. Select the **Settings/Printers** command
3. Click on the **Add printer** icon.
4. Execute the Windows 95 procedures and choose LPT1 as the printer port. For connection, refer to the TXBT manual.

3

- **Printer setup**
  On the TXBT, printer setup is that of Windows 95.

  The printing setup screen can be accessed:
  - Either directly with Windows (Start menu, etc.)
  - In the Magelis application, using the "System menu" (SHIFT-MENU) then "Printer parameters" (R5)

3.10.3   Stop printing

This function is accessed with the system menu. Any printing in progress (log, continuous, etc.), even if the printer is faulty, will be stopped without any request for confirmation; i.e. the print buffer will be emptied and the print queue will be cancelled.

3.10.4 Continuous printing of an alarm page

The option must be selected when the page is created using
XBT-L1000 by selecting the "print" option (Figure 3-26).

Figure 3-26: Properties Dialog Box
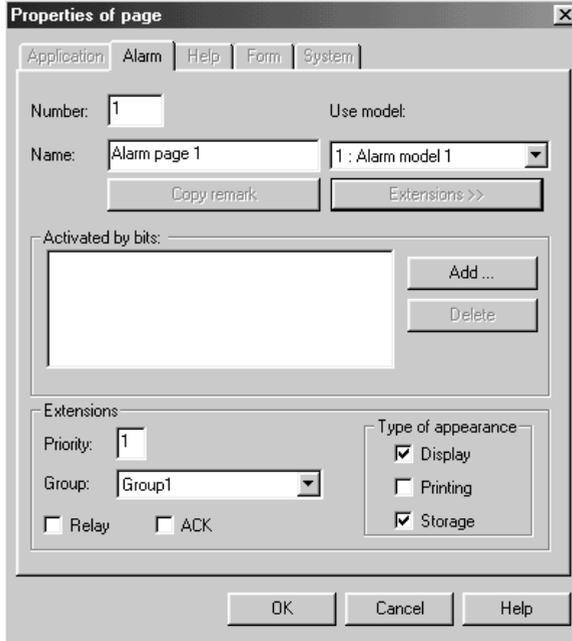
At each dialog table read cycle, the "printable" alarms are printed
with the alarm name.
A header is printed containing the page number and name, and the
printing date and time (Figure 3-27).

Figure 3-27: Print Format

```
-------------------------------------------------------------------------------
ALARM                   !ON (Valid)    !ACK            !OFF (Invalid)   !EQUIPMENT !GROUP
-------------------------------------------------------------------------------
24/07/97 12:01:30
-------------------------------------------------------------------------------
1024:Text  of  alarm .  !2407 12:00:00 !     -         !       -        !MASTER    !CONVEYOR
1024:Text  of  alarm .  !     -        !2407 12:01:00!        -         !MASTER    !CONVEYOR
1024:Text  of  alarm .  !     -        !     -         !2407 12:04:00  - !MASTER    !CONVEYOR
```


3.10.5   Printing the list of active alarms

Press the "Print" key or the PRINT touch zone on display of the "List of alarms" page.

The list of alarms is printed as it is at the time the operator requests the printout. If alarms occur during printing, they will not appear in the list (Figure 3-28 on the next page).

Figure 3-28: Print Format

```
-------------------------------------------------------------------------------
ALARM                   !ON (Valid)  !ACK           !OFF (Invalid)  !EQUIPMENT !GROUP
-------------------------------------------------------------------------------
24/07/97
-------------------------------------------------------------------------------
1024:Text  of  alarm .  !2407 12:00:00 !    -        !     -         !MASTER    !CONVEYOR
1031:Text  of  alarm .  !2407 12:01:00 !    -        !     -         !MASTER    !CONVEYOR
1025:Text  of  alarm .  !2407 12:04:00 !    -        !     -         !MASTER    !CONVEYOR
```
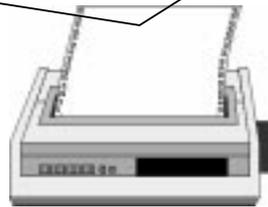
3.10.6   Printing a form page

When form page printing is requested by the user or the control system the object values included in the form page are refreshed and sent to the printer.
Control codes specific to the printer (bold, italic, etc.) can be defined in form pages to enhance their format.

3.10.7   Printing the alarm Log

See section 3.7.4.

3.10.8   Free format printing

Free format printing consists of sending the data contained in the free format printing table, located after the dialog table:

- To the terminal's printer port
- On the PLC's initiative

A dialog table word is used to manage the dialog. Refer to chapter 4, section 4. 2 for the word coding procedure.

Graphic Magelis

3.11   **Terminal configuration**

The terminal configuration parameters can be modified on the terminal directly. They are then saved in the PCMCIA card without using XBT-L1000. However, any modification performed in the terminal cannot be retrieved by XBT-L1000 when importing an application.

The terminal configuration function is accessible from the system menu and is used for consulting or modifying the following parameters:

- terminal data and time and format,
- language,
- screen parameters,
- printer parameters,
- Printer <-> Terminal line parameters.

Press the **SYST** key or the status touch zone then SYST on touchsreen terminals to display the system menu. If access is protected by a password, enter it (see section 3.2.4).

3

Figure 3-29: Configuration Screen
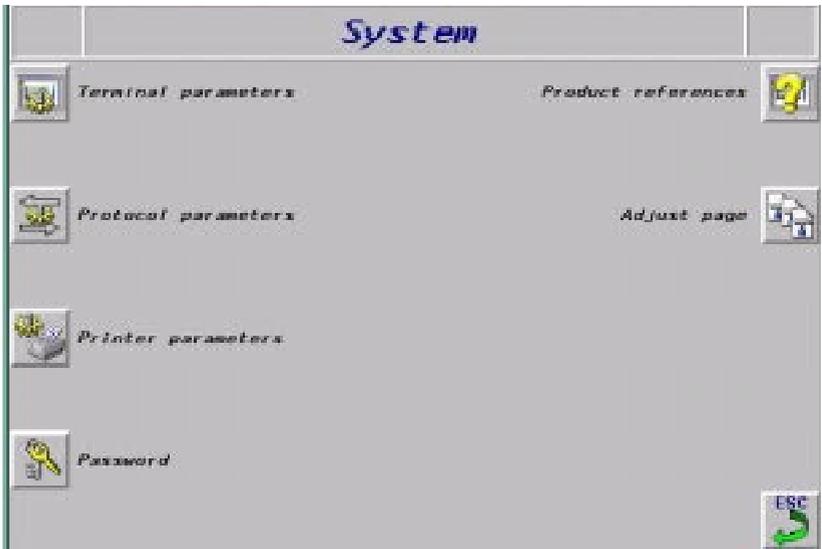
Parameter modification principle

1. Select the parameter by dynamic function keys or pressing the touch zones.
2. Depending on the type of parameter, the modification is performed using:
   - Numeric keys
   - Arrow keys (for parameter lists)
   - Context keyboards displayed on touchscreen terminals.
3. Press **ENTER** to confirm the modification.

⚠ **CAUTION**

EQUIPMENT DAMAGE HAZARD

Since all alarms are always time/date stamped and the control program may rely on the XBT's real time clock, it is important to set or verify the XBT's date and time after every installation, repair, disassembly, shipment, or battery change.

Failure to follow this instruction can result in injury or equipment damage.

Terminal parameters

Terminal date and time
Time format: 24.mn.ss or 12:mn:ss,
Date format: DD.MM.CCYY or MM.DD.CCYY or CCYY.MM.DD.

Language
To change language: Select the language with the "up" and "down" arrow keys and confirm by pressing **ENTER**.

Screen
The brightness and contrast of the screen can be adjusted. For terminals with keyboard, the adjustments are identical to those performed using the keyboard keys.
On touchscreen terminals, brightness and contrast can be adjusted using the touch zones (depending on screen technology).

Clear screen

A clearing page is provided on touchscreen terminals for de-activating the touchscreen pad in order to clear the screen surface. Simultaneously press the two opposite touch zones to re-activate the pad and exit the clearing page.

Printer

The printer setup parameters, except for the printer control codes used for the forms, can be modified.

Standby

Screens can be damaged if a steady image is displayed for a long time. It is thus recommended to select the following in the "Terminal parameters" system page:

- Standby: YES
- Wait: 60 minutes.

NOTE: *These parameters are initialized to the above values after exporting an application from the PC to the terminals.*

3

Parameters of the operations line

- **Case of the XBT terminal**
  The parameters displayed depend on the protocol and some may ormay not be modifiable.

  Example: Case of the UNI-TELWAY protocol:
  Bit rate: 300 bauds
  Parity: even
  Address: Master
  Error ounter No. 1: 0
  Error counter No. 2: 0
  Error counter No. 3: 0
  Error counter No. 4: 0
  Counter reset by dynamic key.

- **Case of the TXBT terminal**
  Protocol parameters
  The following parameters are displayed:
  - Protocol name
  - Controller names and addresses (max. 15) and status of communications with them (if possible)

- TXBT local address
- Four error counters
- Last communication error that appeared
- Counter reset by dynamic function key

- **Application parameters**

The following parameters are displayed:
- Application reference and protocol used
- Currently running application path: the application can be on the disk in this directory ....\TXBT\APPLI (default directory which can be changed) or on the PCMCIA memory card
- Size of PCMCIA memory card (if installed)
- The text of the last error which appeared (excluding communication error)

- **Password**

Declaration of password A, B or C

Printer line parameters

The following parameters are displayed by default:

Printer
Number of columns: 132
Automatic line skip:YES
Automatic line feed: NO

XBT-Printer serial line
Baudrate (Bauds): 9600
XON/XOFF protocol: NO
Link: RS 232
Duplex :   Half Duplex
Stop bits: 1 BIT
Data bits: 8 BITS
Parity: ODD

Graphic Magelis

3.12　Variables adjustment on the TXBT

- **Principle**
  The TXBT can be used to adjust the variables of the
  connected PLCs.
  Adjustment is available for the following communication
  protocols:
  - UniTelway　　- Fipway
  - IsaWay　　　**-** Fipio
  - Modbus　　　**-** Modbus+
- **Accessible objects***XWAY Protocols*
  - Internal word
  - Constant word
  - Internal word bit
  - Internal double word
  - Internal bit
  - Local input/output bit
  - Remote input/output bit
  - System bit
  - Step bit
  - Step macro bit
  - Step macro input step bit
  - Step macro output step bit.

Modbus and Modbus+

The objects accessible for adjustment are input and output
 registers, input and output bits, bits extracted from registers.

Adjustment can be via the symbols if the symbol/identifier
association has been loaded into the TXBT from
XBT-L1000.

- Loading the PL7 symbols file

Creation of symbols file

To create a symbols file with PL7:
1. Open the variables editor.
2. Select the File/Export command.
3. Select the disk and/or directory in which the file is to be stored.
4. Enter a filename: for example Appli.SCY
5. Select export mode.

Symbols file transfer to TXBT

The resulting symbols file (e.g. Appli.SCY) must be positioned
 on the TXBT terminal. To do this:

1. Select the **Configuration/Enclosures menu...** then select **Files**.
2. Select the file(s) (e.g. Appli.SCY) to be loaded onto the TXBT:
   the file is now a part of the Magelis application and will be
   exported at each export operation.
3. Select the **Transfer/Export** menu. The application is then
   exported, along with the selected file(s).

NOTE: *The terminal does not check consistency between the PLC
application and the symbols file loaded. A change made to
this file will not be automatically accepted. For this, it has to
be deleted and added again.*

Access to adjustment

The adjustment function can be accessed using the dynamic
function keys in 2 ways:

From the system page

To display this page, press the **Menu** key and then press the
dynamic function key associated with the Adjustment item.

From an application page

The adjustment function can be run from an application page,
by assigning the variable adjustment tool startup function to a
dynamic function key associated with this page.

To configure this function with XBT-L1000:

1. Select the page linked to the dynamic key in the Page Tree
   Structure window.
2. Select the **Configuration/Function keys** menu and the terminal
   front panel appears.
3. Click (double-click) on the dynamic function to be assigned.
4. Select **Execution of Application**
5. Click on **Open** and enter **ADJUST.EXE.**

NOTE: *The complete file path is required if the executable program is not in the APPLI directory.*

- **Procedure**
1. Select the device.
2. Enter a variable (New/Edit R1),
3. Start continuous refresh (Refresh R6)
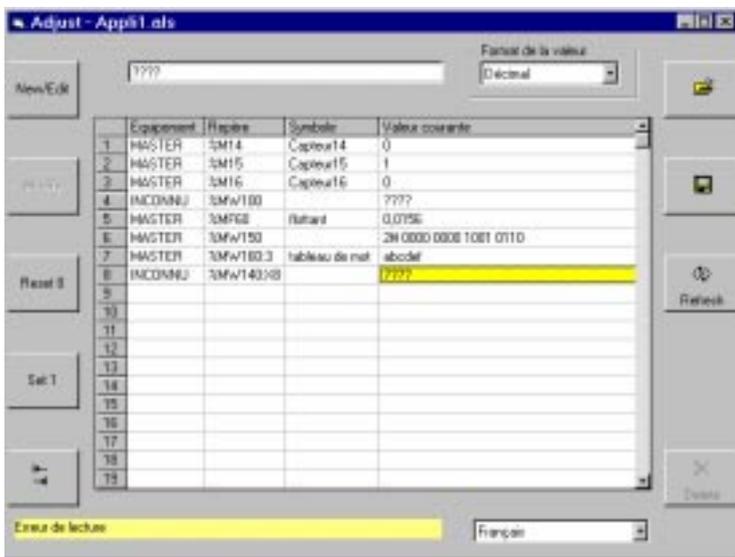
Modifying a value
1. Select the cell to be modified.
2. Enter the new value.
3. Confirm entry (Modify R3)

Deleting a variable
1. Select the row.
2. Delete the row (Delete R10).

Display format
The data read in the controller can be displayed in the following formats:

- Signed decimal integers
- Hexadecimal values (0 to 0xFFFFFFFF)
- Bit string
- One place floating point format
- ASCII character string. This contains 1 to 4 characters. The non-ASCII characters are represented by ".".

List of variables
The list of variables displayed can be saved with key R4 into a .ALS file and then called back with key R2. The list called up overwrites the current list.

NOTE:
1. If "???" are displayed, this means that the variable could not be accessed.
2. **ESC** goes back to the Magelis application previous page. Adjustment is not stopped, but its window moves into the background.
3. **Alt-R4** (or click on X) stops adjustment.
4. The variable adjustment page is not password protectable. Protection of the Adjust page from unwanted users can be accomplished by key-locking the system page.

3.13   Variable adjustment on the XBT

- **Principle**

  Adjustment is used to modify variables of connected PLCs from an XBT.

- **Accessible objects**

  - words,
  - double words,
  - word bits,
  - floating words.

- **Access to adjustment**

  The adjustment function is accessible from the system pages.

3

An adjustment page is used to display:

- From 26 variables maximum on a 10" touchscreen product to 28 variables maximum on a 10" keyboard product,
- From 5 variables maximum on a touchscreen product to 6 variables maximum on a 5" product.

Up to 16 adjustment pages can be defined, i.e. 416/448 variables maximum for a 10" product (touchscreen/keyboard) and 80/96 variables maximum for a 5" product (touchscreen/keyboard).

Example: Adjustment page on a 10" product.

Example: Adjustment page on a 5" product.

- **Creating or modifying the Adjustment page**
  When the Adjustment page is displayed, the operator can:

  1. Select the variable to be modified in the list or add a new variable to this page or delete a variable from this page.
  2. From the entry panel, modify the characteristics of the variable selected from the list, i.e.:

  - The variable type (in compliance with the protocol) which indirectly defines the variable format,

  - The variable address which must be comprised between:

    - [Min..Max] for the word, double word, word bit, floating word variables. The minimum and maximum limits depend on the protocol.
    - [0..15] for the word bit number.

  - The equipment, selecting it in the equipment list of the current application.

  NOTE: *XBT cannot be selected.*

  - The display format if it complies with the variable type:
    - word bit variable: possible display but binary only,
    - floating variable: possible display but decimal only,
    - string variable (Jbus protocol): possible display but in ASCII only,
    - double word variable: possible displays but decimal, hexadecimal and in ASCII only,
    - word variable: all types of display are possible.

The format displayed is a multi-language display.

NOTE: *For the character string type, another parameter can be used to set up the string length. By default, the length is 16 characters, which is the maximum length possible.*

3

- **Saving an adjustment**

  An adjustment page can be saved on the PCMCIA card only
  and cannot be imported to the XBT-L1000.

- **Loading an adjustment page**

  An adjustment page selected must be selected in the list of
  adjustment pages using the arrows.

NOTE: *The variable adjustment page is not password protectable.
Protection of the Adjust page from unwanted users can be
accomplished by key-locking the system page.*

3.14   Use of recipe pages

- **Freezing display**

  This icon is used to freeze display in the current state. The operator can thus edit the values displayed or enter new values.

- **Saving parameters**

  This icon is used to save the recording of the values displayed on screen to the PCMCIA card under a name selected by the operator.

- **Restoring a recording**

  This icon is used to access the list of recordings. Select the required recording using the arrow keys.

3

- **Transferring the recording to the control system**

  The values of the recording are transferred to the control system, in compliance with the transfer rules (see chapter 4, section 4.2 word %MWn+21: recipe transfer not allowed).

3.15 Loading extension tasks at application transfer

On a TXBT terminal, it is possible to add functions on top of the basic XBT-F functions. These extra functions are called **Extension tasks** (see TXBT manual, chapter 4.6).

3.16 Loading extra files at application transfer

On a TXBT terminal, when making a PC -> TXBT transfer, it is possible to load extra files into the TXBT (see the TXBT manual, chapter 4.5).

4

Chapter 4

PLC and Terminal

Communications Dialog

This chapter includes the following sections:

4

4.1 PLC/terminal communications dialog principle

The communications dialog between the terminal and the PLC consists of an exchange of data between one or several devices. In all communication situations, the following should be defined:

- Data to be exchanged
- Communication protocol

4.1.1 Data exchanged

Various types of data can be exchanged.
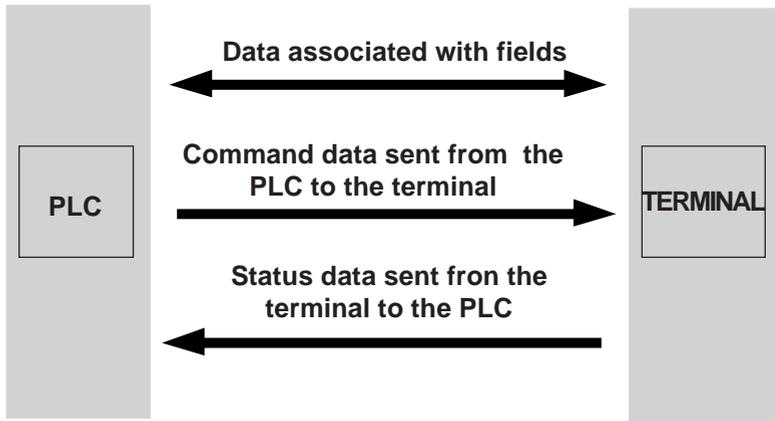
Data associated with fields

These are variables which may be:
- displayed on the terminal,
- entered or modified on the terminal.

Command data sent by the PLC to the terminal

This concerns the following commands:
- Display an application or system page,
- Display an alarm page,
- Lock keys,
- Request to enter a variable field,
- Print command,
- Command of indicator lights associated with function keys,
- Clear log command,
- Set time-stamp command,
- Triggers graph plotting.
- etc.

Status data sent by the terminal to the PLC

This concerns the following status:
- Terminal status
  - confidential mode,
  - terminal configuration mode,
  - confirmation of entries by pressing the ENTER key,
  - cancelled entry by pressing the ESC key,
  - cancelled entry after a time-out,
  - print fault.
- Number of the displayed page,
- Number of the last field entered,
- Image of the keypad keys,
- Time-stamp status (date and time),
- Log occupancy rate as a percentage,
- Communication monitoring,
- Number of the last alarm acknowledged,
- Application signature,
- etc.

4.1.2   Exchange principle for data associated with fields

The exchange principle for the data associated with the fields depends on the protocol chosen according to the type of PLC. The variables read or written are single words, double words and word bits.

The terminal can be master or slave on the bus but it is always considered as the client and the PLC(s) as the server(s).

This means that the terminal always initiate data interchange to:
- refresh the fields (reading of values in the PLC),
- enter and edit fields (writing of values in the PLC).

NOTE: *No PLC communication program needs to be written.*

⚠ **WARNING**

UNINTENTIONAL EQUIPMENT OPERATION

PLC memory zone allocated for the XBT dialog table must NOT be used for anything else. It is the designer's responsibility to program the PLC logic properly.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

4

4.1.3 Principle of the communications dialog table

To simplify the communications dialog, all of the following are grouped together in a dialog table:

This table is located in one of the architecture PLCs and composed of n consecutive words (16-bit words).
It includes two parts:

**Status table
Status data sent by
the terminal to the PLC.**

**Command table
Commands sent by
the PLC to the terminal**
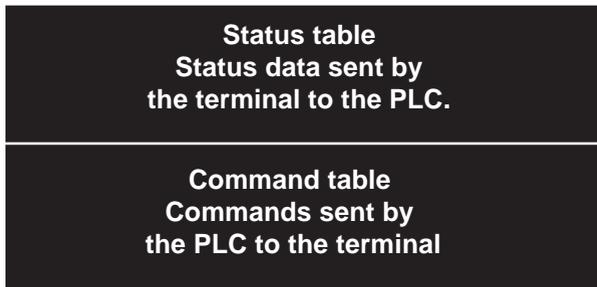
The number of words in the table depends on the choice of status data and commands that are to be processed during the dialog. The XBT-L1000 software allows you to configure the dialog table (Figure 4-1).

Figure 4-1:   Dialog Table Configuration
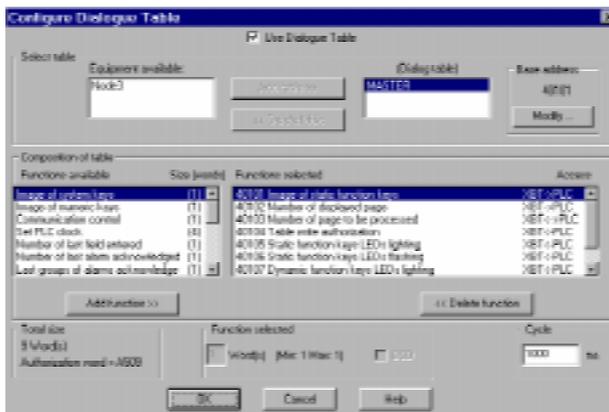
NOTE: *The words of the dialog table must only be **read** by the PLC. It is recommended not to write in this zone.*

When configuring the dialog table, you must define the dialog table's start address (basic address). The dialog table is in the PLC. The terminal periodically reads and writes to the table in the PLC.
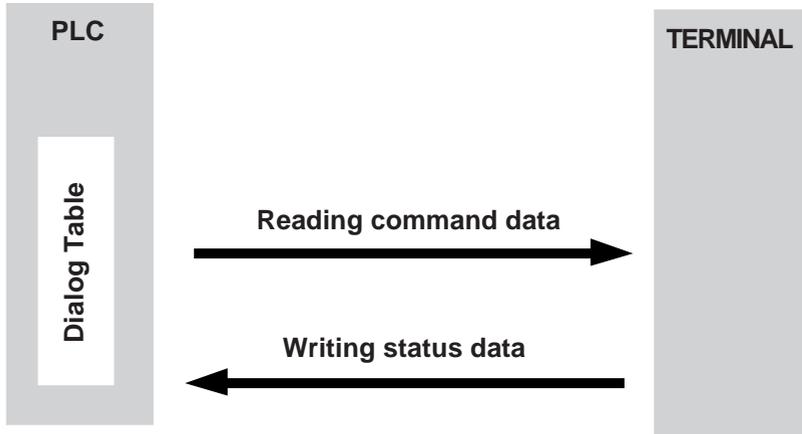
Secure use of the dialog table

A word is used in the table for security purposes: the "dialog table authorization" word.
The use of this word is a security for the PLC/terminal dialog.
When this word is not set to the correct value in the PLC, the terminal does not write any word in the dialog table and does not execute any command.
This value is indicated by XBT-L1000. The PLC program must assign this value to the word "Dialog table authorization" so that the dialog table be processed by the terminal.

4.2   Dialog table content

The number of words in the table depends on the choice of states and commands that are to be processed during the dialog. You may add or delete items as you choose.

Notation convention for describing the table

%MWn word of 16 bits with address n.
%MWn, i : bit i of word n.
The address n is taken as the table's start address.
The table comprises a maximum of 135 words.
The description below gives the content of the various dialog table words; refer to the XBT-L1000 software's on-line help for further information on the various words.
PLC <-- XBT: Terminal writes the corresponding word(s) in the PLC.
PLC --> XBT: Terminal reads the corresponding word(s) in the PLC.
PLC <--> XBT: Terminal and the PLC can modify the corrresponding word(s) in the PLC.

Word	Functions	Exchange	Page
%MWn+0	Image of static function keys	PLC <- XBT	13
%MWn+1	Image of system keys	PLC <- XBT	13
%MWn+2	Image of numeric keys	PLC <- XBT	13
%MWn+3	Communication control	PLC <- XBT	14
%MWn+4 to %MWn+7	Set PLC clock	PLC <- XBT	14
%MWn+8	Number of displayed page	PLC <- XBT	15
%MWn+9	Number of last field entered	PLC <- XBT	15
%MWn+10	Number of last alarm acknowledged	PLC <- XBT	15
%MWn+11	Last groups of alarms acknowledged	PLC <- XBT	15
%MWn+12	Report	PLC <- XBT	17
%MWn+13	Log filling rate	PLC <- XBT	17
%MWn+14	Graph plottings performed	PLC <- XBT	17
%MWn+15	Application checksum	PLC <- XBT	17
%MWn+16	Number of page to be processed	PLC <-> XBT	18
%MWn+17	Number of field to be entered	PLC <-> XBT	20
%MWn+18	Print command	PLC <-> XBT	22
%MWn+19	Activating graphs plotting	PLC -> XBT	23
%MWn+20	Table write authorization	PLC -> XBT	23

4

Word	Functions	Exchange	Page
%MWn+21	Recipe transfer not allowed	PLC -> XBT	24
%MWn+22	Clear Log	PLC -> XBT	24
%MWn+23	Static function keys LEDs llighting.	PLC -> XBT	25
%MWn+24	Static function keys LEDs flashing.	PLC -> XBT	25
%MWn+25	Dynamic function keys LEDs lighting.	PLC -> XBT	25
%MWn+26	Dynamic function keys LEDs flashing.	PLC -> XBT	25
%MWn+27	Static function keys locking	PLC -> XBT	26
%MWn+28	System keys locking	PLC -> XBT	26
%MWn+29	Numeric keys locking	PLC -> XBT	26
%MWn+30 to %MWn+90	Alarm table	PLC -> XBT	27
%MWn+91 to %MWn+94	Set terminal clock	PLC -> XBT	28
%MWn+95 to %MWn+134	Free format print table	PLC -> XBT	28

Detailed description

%MWn+0 : Image of static function keys

Images of the keypad keys sent to the PLC.
Bit at 1 = key pressed.
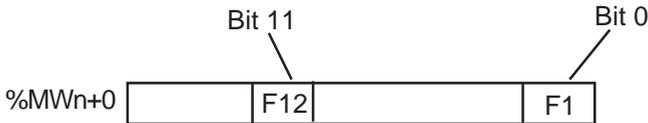
%MWn+1 : Image of system keys

%MWn+2 : Image of numeric keys

%MWn+1 : system keys	%MWn+2 : numeric keys
Bit 0 : Up arrow	Bit 0 : 0
Bit 1 : Down arrow	Bit 1 : 1
Bit 2 : Right arrow	Bit 2 : 2
Bit 3 : Left arrow	Bit 3 : 3
Bit 4 : MOD	Bit 4 : 4
Bit 5 : PRINT	Bit 5 : 5
Bit 6 : MENU	Bit 6 : 6
Bit 7 : SYST	Bit 7 : 7
Bit 8 : ALARM	Bit 8 : 8
Bit 9 : ESC	Bit 9 : 9
Bit 10 : HOME	Bit 10 : .
Bit 11 : +1	Bit 11 : +/-
Bit 12 : -1	Bit 12 : DEL
Bit 13 : ENTER	Bit 13 : ?
Bit 14 : Reserved	
Bit 15 : Reserved	

4

NOTE: *There are no images of the dynamic function and alphanumeric keys. See also keys description, chapter 3, section 3.1.*

Indication to the PLC that the F1 key is pressed
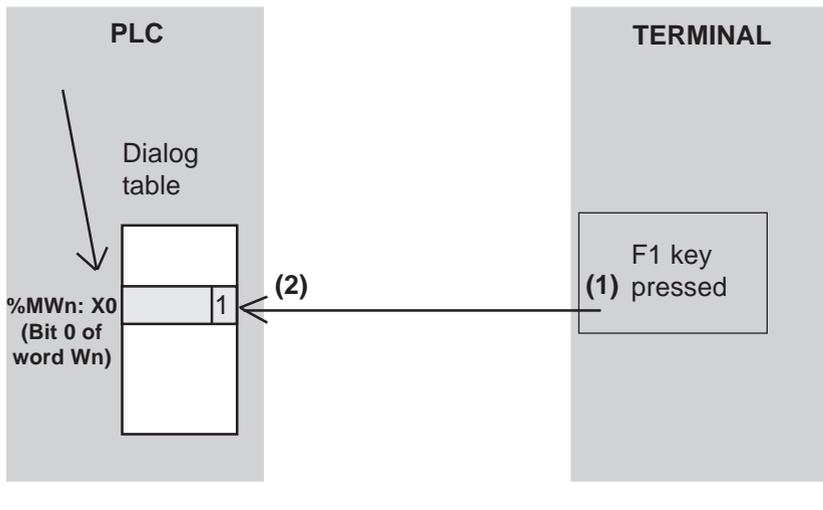
WARNING

UNINTENTIONAL EQUIPMENT OPERATION

If communications between the XBT and PLC are lost, the operator's control over the machine may be completely or partially lost. It is the designer's responsibility to consider programming the PLC logic to account for this situation. An effective method is to monitor Wn+3 of the dialog table from the PLC program.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

%MWn+3 : Communication control

Word incremented by 1 at each processing cycle and used by the PLC application to monitor the terminal for proper operation.

%MWn+4 to %MWn+7 : Set PLC clock

order of bits 15   8 7   0

%MWn+4	Seconds	Day of the week
%MWn+5	Hours	Minutes
%MWn+6	Month	Day of the month
%MWn+7	Century	Year

The terminal writes the time and date in the PLC with the dialog table cycle. There are 2 possible coding formats: Hexadecimal or BCD (choice made using XBT-L1000).
Day of the week: Monday = 1... Sunday = 7.

%MWn+8: Number of displayed page

See %MWn+16: Number of the page to be processed.
This word contains the page number displayed on the terminal.
When the terminal displays a system page the word "number of the displayed page " includes:

- in signed decimal: - 16 - N
- in non signed decimal: 65520 - N
- in hexadecimal: H'FFFO' - N

%MWn+9: Number of last field entered

See %MWn+17: Number of the field to be entered.
This word includes the number of the last field entered on the terminal and sent to the PLC. The entry logics is the following:

4

MSB	LSB
field number in model page	field number in application page

The field number is provided by XBT-L1000: Display/Field Number menu.

%MWn+10: Number of last alarm acknowledged

%MWn+11: Last groups of alarms acknowledged

See: %MWn+30 to %MWn+90, Table of alarms.
These two words are written together by the terminal when the operator acknowledges:

- a single alarm,
- a group of alarms,
- all the active alarms.

.%MWn+10: Number of the last alarm acknowledged, coded 1 to 1024.

.%MWn+11: Last group of alarms acknowledged with 1 bit per group of alarms (bit 0 = group 1 ...).

The same alarm can be triggered by several bits which may belong to different PLCs (equipment).
The terminal stores the origin of the alarm so that the data related to alarm acknowledgement by the operator can be sent to the proper PLCs.
Depending on the type of acknowledgement, the terminal writes the following values at next cycle:

Acknowledgement of a single alarm: ENTER or icon ACK for **touchscreen terminals**.

%MWn+10: Number of the last alarm acknowledged = No. from 1 to 1024.

%MWn+11: Last group of alarms acknowledged with 1 bit per group of alarms = H'FFFF'.

example: acknowledgement of alarm 5:

%MWn+10 = 5
%mWn+11 = H'FFFF'

Acknowledgement of a group of alarms: ACKALL.

%MWn+10: Number of the last alarm acknowledged = H'FFFF'

Only one group of alarms is selected in the list of alarms.

%MWn+11: Last group of alarms acknowledged with 1 bit per group of alarms = the bit corresponding to the group of alarms acknowledged it set to 0.

example: acknowledgement of group of alarms 2:

%MWn+10 = H'FFFF'
%mWn+11 = H'FFFD'

NOTE: *All the active alarms of a group must be triggered by the same PLC to increase the performance levels.*

Acknowledgement of all the active alarms: ACKALL.
All the groups of alarms are selected from the list of alarms.
%MWn+10: Number of the last alarm acknowledged = H'FFFF'
Only one group of alarms is selected in the list of alarms.
%MWn+11: Last group of alarms acknowledged with 1 bit per group of alarms = H'0000'

%MWn+12: Report

Bit 0: Confidential mode (Password selected A and/or B and/or C)
Bit 1: Reserved
Bit 2: ENTER on entry
Bit 3: ESC on entry
Bit 4: End of entry on TIME-OUT (1 min)
Bit 5: Printing in progress
Bit 6: Printing fault
Bit 7: Printing stopped
Bit 8: Recipe transfer in progress
Bit 9: Recipe transfer error
Bit 10: Terminal in stand-by
Bits 11 to 15: Reserved

4

%MWn+13: Log filling rate

See %MWn+22: clear history.
Alarm history filling rate on the terminal as a percentage, sent to the PLC.

%MWn+14: Graphs plottings performed

See word %MWn+19: Graph plotting activation.

%MWn+15: Application checksum

The word includes a check sum calculated on the dialog application and which characterises each application version.

%MWn+16: Number of page to be processed

See also %MWn+8: Number of the displayed page.
When the PLC wants to display a page, it indicates its number in word %MWn+16: Number of the page to be processed in compliance with the following:

- from 1 to 64999 for the application pages,
- one of the following values for the system pages:
  - in signed decimal: - 16 - N
  - in non signed decimal: 65520 - N
  - in hexadecimal: H'FFF0' - N

When the display command is executed:

- %MWn+16 = H'FFFF,
- %MWn+8: includes the number of the page displayed in compliance with the above mentioned rules.

⚠ **CAUTION**
UNINTENTIONAL EQUIPMENT OPERATION
The PLC application must check the content of word %MWn+16 (value H"FFFF") to ensure that the command has been processed and check the number of the displayed page to ensure that the command has been correctly executed.
Failure to follow this instruction can result in injury or equipment damage.

Display of page 25 by the PLC

(1) The PLC writes in the dialog table the number of the page to display, 25. (2) The terminal periodically reads the dialog table in the PLC and (3) displays the required page. Once the command has been processed, (4) the terminal writes H'FFFF' in the word "Number of the page to be processed" and (5) the number of the displayed page in the word "Number of the displayed page".
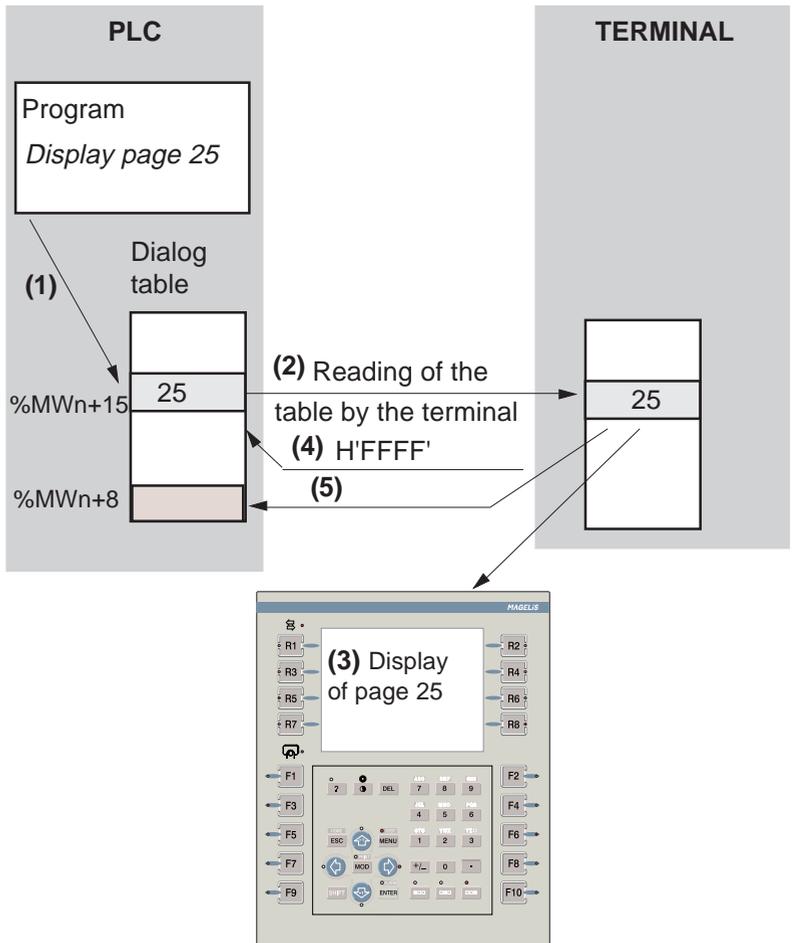
%MWn+17 : Number of field to be entered

See also %MWn+9 : Number of the last field entered,
%MWn+12: Report.
The entry fields are managed by means of 3 words which inform the
application of the operator actions:

- %MWn+9 : Number of the last field entered
- %MWn +12 : Report
- %MWn +17 : Number of the field to be entered

MSB	LSB
number of field in model page	number of field in application page

XBT-L1000 gives the number of field.

⚠ **CAUTION**

UNINTENTIONAL EQUIPMENT OPERATION

The PLC program must check that the page displayed is correct
before requesting an entry.

**Failure to follow this instruction can result in injury or
equipment damage.**

PLC request for entry

When the PLC requests an entry in a field, it indicates the number of
the field in word %MWn+17: Number of the field to be entered.
The terminal indicates reception of the entry request by resetting the
report bits 2, 3, 4 (%MWn+12).

If the entry field exists, the end of entry is indicated by %MWn+17 =
Number of the field to be entered H'FFFF'.

- When the entry is confirmed by ENTER, %MWn+9 "Number
  of the last field entered contains the number of the field
  entered.
- When the entry is cancelled by pressing ESC or due to a
  Time-Out , no modifications will be made.

The terminal sets one of the 3 status bits according to how the entry
was ended (Time-Out, ESC, ENTER).

If the requested field cannot be entered: (unknown field, etc.), the
end of the entry is given by 3 informations:

- %MWn+17: Number of the field to be entered = H'FFFF'.
- The 3 status bits (Time-Out, ESC, ENTER) remain at zero.
- The number of the last entry field is reset.

Operator request for entry
The status word and the number of the last entry field are updated
in the case of an operator request.

**Request by the PLC for a quantity to be produced. The value is
entered in field number 25**

4
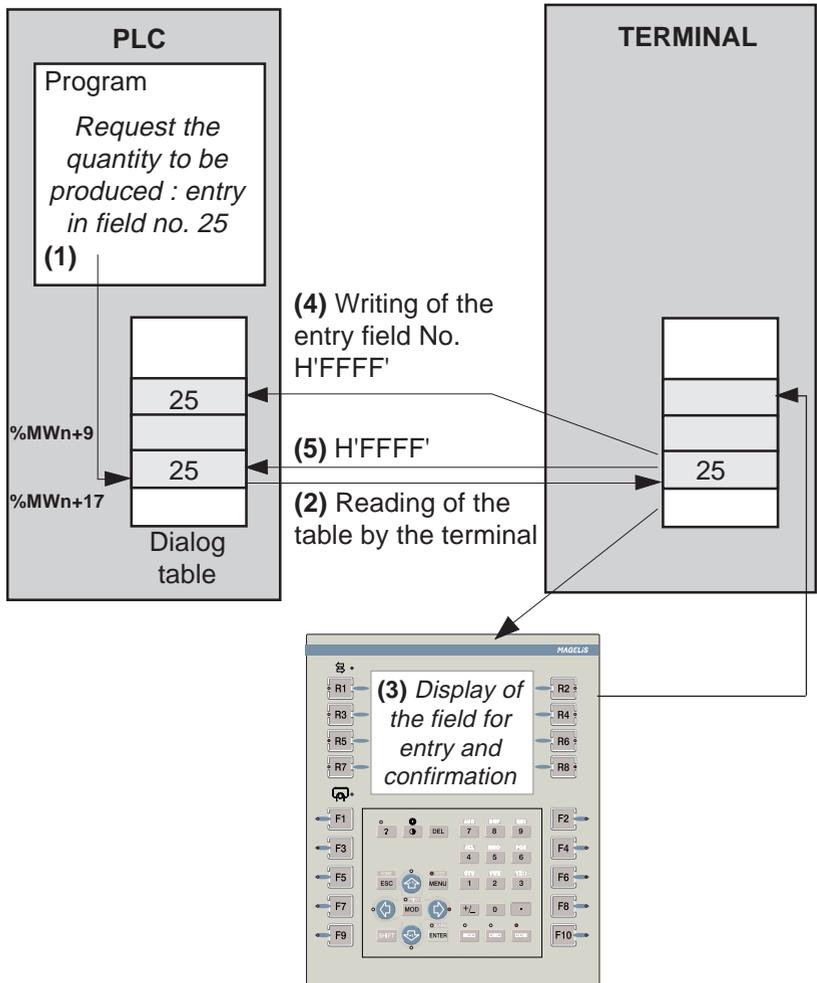
(1) PLC writes in the dialog table, the number of the field to be entered. (2) The terminal periodically reads the dialog table in the PLC and (3) sets the required field to entry mode. Once the entry has been configured by the operator, the number of the field entered is sent to the PLC (4) and the words "Field to be entered" and "Report" are updated(5).

%MWn+18 : Print command

15	8 7	0
Print code		Length of the print table
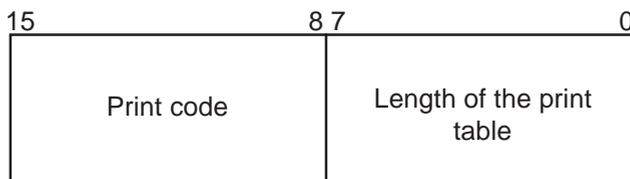
The "print command" word is written by the PLC.
A code is associated with each type of possible printing (MSB).

- Free format printout: H'01xx' (xx = table length in hexadecimal)
- History printout: H'02xx'
- Form printout: H'04xx'.
  For **form printout**, xx represents the number of the form to be printed.

Free format printing consists of sending on the initiative of the PLC, the data contained in the free format printing table, located at the end of the dialog table (%MWn+95 and following), in the least significant byte, the **length in bytes** of information to be printed (80 bytes maximum).

The word %MWn+18 "Print command" is written to H'FFFF' by the terminal to indicate the end of the print command (see bits 5, 6, 7, of %MWn+12 "Report").

%MWn+18: H'010A' printing of 10 bytes in the printing table .

%MWn+19 : Activating graphs plotting

See also %MWn+14: Graph plotting performed
The terminals can monitor the change of a control system data in real time (example: monitoring of an analog value). A curve has 1 to 4 pens with different colors.

The PLC can activate the recording of values and the 4 plottings of a graph simultaneously on a bit rising edge of word %MWn+19. The user can assign one of 16 bits of word %MWn+19 to a curve. He can thus activate 16 graphs (1 word = 16 bits). The bit of word %MWn+14 with the same order (graph plotting performed) is set to 1 when the graph is plotted (1 to 4 pens).

Word %MWn+14 (graph plotting performed) is used to inform the PLC of the result of the command (one graph = 1 word bit).

4

%MWn+20 : Table write authorization

This word serves as a security for the PLC/terminal dialog. When this word is not at the correct value, the terminal cannot write any words in the PLC and cannot execute any commands.

order of bits

15	8	7	0
Most significant = H'A5'		Dialog table length	
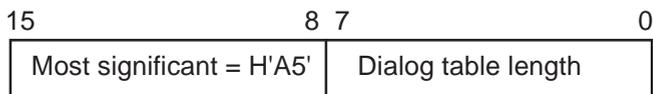
The value of this word is indicated (in Hexadecimal) in the dialog table configuration by XBT-L1000.

Example: For a table that is 20 words long, the PLC must write H'A514' in the authorization word.
A5 = authorization, 14 = number of words in the dialog table (in Hexadecimal).

%MWn+21: Recipe transfer not allowed

See also %MWn+8: Number of the displayed page and
%MWn+12: Report.
The transfer of configuration parameters from the terminal to the
process is a critical operation which must only be performed when
the PLC is ready to receive these parameters.

When word %MWn+21 "Recipe transfer not allowed" is set to 0 in
the dialog table, the recipe transfer is enabled.
If it is set to 1, transfer is inhibited.

⚠ **CAUTION**
UNINTENTIONAL EQUIPMENT OPERATION
A transfer in progress cannot be interrupted by a change in the status of word %MWn+21 "Recipe transfer not allowed".
Failure to follow this instruction can result in injury or equipment damage.

During a transfer, the recipe page is displayed on the terminal
screen. The PLC can thus identify the recipe being transferred using
word %MWn+8.

Bits 8 "Recipe transfer in progress" and 9 "Recipe transfer error" of
word %MWn+12 "Report" indicate to the PLC that the transfer is in
progress. The PLC can then be synchronised on the end of transfer
(bit 8 "Recipe transfer in progress" is set to 0) to restart the process
with the new parameters.
Bit 9 "Recipe transfer error'' of word %MWn+12 "Report" indicates
an error during transfer.

%MWn+22: Clear log

See also %MWn+13: Log filling rate.
The PLC must write H'00FF' in word %MWn+22 to clear the log.
  • The terminal clears the log and resets the log filling rate word
    %MWn+13.
  • The PLC must then reset the clear log command %MWn+22.

%MWn+23 : Static function keys LEDs lighting.

	Bit 11		Bit 0
%MWn+23	F12		F1

%MWn+24 : Static function keys LEDs flashing.

	Bit 11		Bit 0
%MWn+24	F12		F1

4

%MWn+25 : Dynamic function keys LEDs lighting.

	Bit 9		Bit 0
%MWn+25	R10		R1

%MWn+26 : Dynamic function keys LEDs flashing.

	Bit 9		Bit 0
%MWn+26	R10		R1

If for the same key, the lighting and flashing bit are at 1, the indicator is flashing.

%MWn+27 : Static function keys locking

Bit 11　　　　　　　　　　　　　　　　　　　　**Bit 0**

%MWn+27 | | F12 | | F1 |

%MWn+28 : System keys locking
%MWn+29 : Numeric keys locking

%MWn+28 : system keys	%MWn+29 : numeric keys
Bit 0 :　Up arrow	Bit 0 :　0
Bit 1 :　Down arrow	Bit 1 :　1
Bit 2 :　Right arrow	Bit 2 :　2
Bit 3 :　Left arrow	Bit 3 :　3
Bit 4 :　MOD	Bit 4 :　4
Bit 5 :　PRINT	Bit 5 :　5
Bit 6 :　MENU	Bit 6 :　6
Bit 7 :　SYST	Bit 7 :　7
Bit 8 :　ALARM	Bit 8 :　8
Bit 9 :　ESC	Bit 9 :　9
Bit 10 : HOME	Bit 10 : .
Bit 11 : +1	Bit 11 : +/-
Bit 12 : -1	Bit 12 : DEL
Bit 13 : ENTER	Bit 13 : ?
Bit 14: Reserved	
Bit 15: Reserved	

NOTE: *If the PLC locks the arrow keys, the terminal automatically switches off the indicator lights on those keys to indicate they are no longer active. **The dynamic function and alphanumeric keys cannot be locked.***

%MWn+30 to %MWn+90 : Alarm table

See also %MWn+10: number of the last alarm acknowledged (32 words maximum on XBT, 64 words maximum on TXBT).
%MWn+11: Last group of alarms acknowledged.
The display of alarm is commanded by the PLC by setting a word bit to 1.

order of bits	Bit 15		Bit 0
%MWn+30	AL16		AL1
%MWn+31			AL17

Activation of alarm No. 3.

4

(1) The PLC writes a 1 to bit 2 of %MWn+30 in the dialog table. (2) The terminal periodically reads the PLC's dialog table and (3) indicates the alarm in the alarm bar.
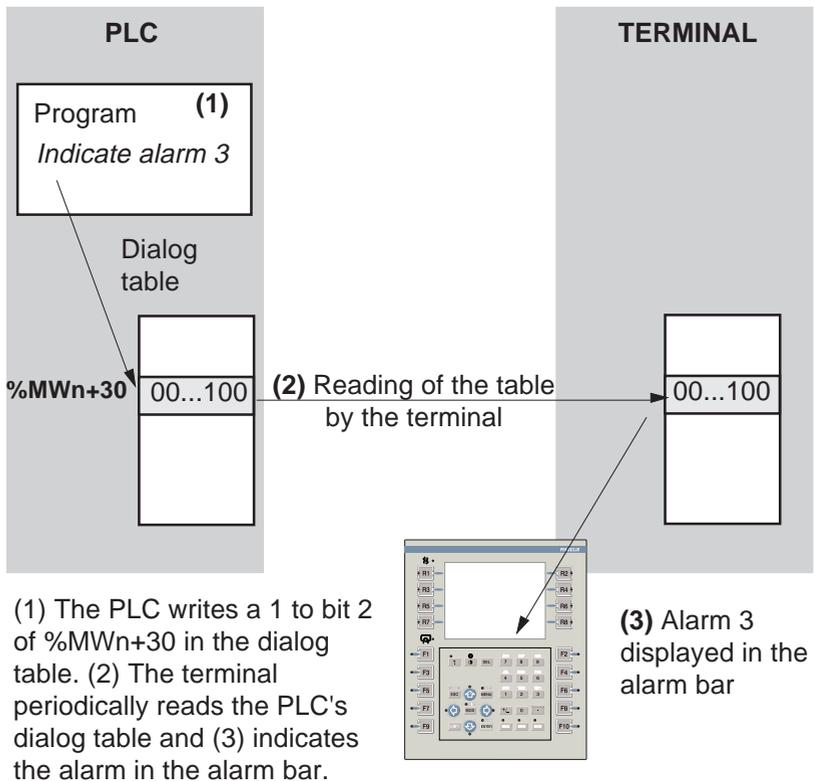
%MWn+91 to MWn+94 : Set terminal clock

order of bits	15	8	7	0
%MWn+91	Seconds		Days of the week	
%MWn+92	Hours		Minutes	
%MWn+93	Month		Day of the month	
%MWn+94	Century		Month	

Whenever one of these words is modified, the terminal is set to the date and time given in this table.
There are 2 possible coding formats: Hexadecimal or BCD (choice made using XBT-L1000).
Day of the week: Monday = 1 ... Sunday = 7.

%MWn+95 to %MWn+134 : Free format print table

See %MWn+18 : print command.

This table is used by the PLC to transfer a character string (80 maximum) to the equipment item (printer, etc.) connected to the terminal.

4.3 PLC/terminal communication dialog cycle

4.3.1 Processing by the terminal

Five types of transactions are carried out by the terminal, either intermittently or in a processing cycle:

Dialog table cycle
This comprises reading and writing by the terminal of the parameters selected from the dialog table, including the alarms table, at intervals specified in XBT-L1000.

Permanent variables refresh cycle, at intervals specified in XBT-L1000.

Displayed page variables refresh cycle

Single reading of variables when calling up a new page

Immediate writing of variable when the function key is pressed or a value entered.

4

4.3.2   **Optimization for communication**

The following recommendations enable terminal/PLC communica-
tions to be optimized, thus improving operator dialog response
times. They apply, regardless of the communication protocol used.

- make a careful allocation of the variables to single, cyclic or
  permanent reading, according to how they are used by the
  terminal,

- use contiguous addresses for the cyclic reading of variables
  on a page,

- use contiguous addresses for the single reading of variables
  on a page,

- do not overload the dialog table with words not needed by the
  application,

- adjust the dialog table period according to the traffic
  generated by the dialog application on the one hand and the
  other equipment items of the control system structure on the
  other hand.

NOTE: *The operator actions are processed immediately, indepen-
dent of the value of the dialog table period.*

As a rule, only the words which are useful for the application should
be selected to optimize communication.

4.3.3   Optimized communication

modif. variable

dialog table
period

variable refresh
period on the screen
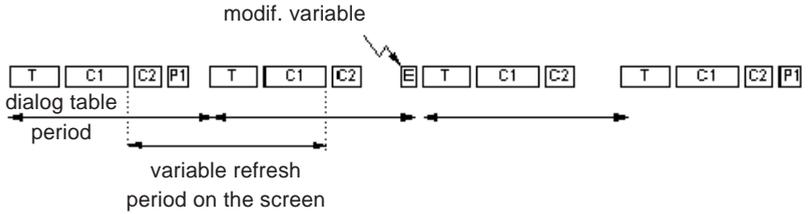
4.3.4   Non-optimized communication

(Dialog table period too short, variables too widely scattered for page animation).

modif. variable

4

dialog table
period

variable refresh
period on the screen
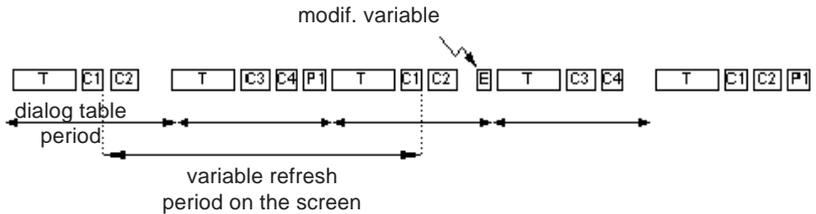
Key:

| T | dialog table read/write

| Ci | cyclic reading of n consecutive variables for animating the displayed page

| Pi | permanent reading of n consecutive variables for recording a curve

| E | immediate writing of a variable

5

Chapter 5

Example of application implementation

Graphic Magelis

*You will be guided step by step through the example, the goal being
to create rapidly your first application.
Chapters 2, 3 and the appendix respectively give all the information
on the implementation methodology, terminal operation and the
various handling procedures.*

5

⚠ **WARNING**

UNINTENTIONAL EQUIPMENT OPERATION

This example application will change register contents in remote devices. This may cause unanticipated change in device status. If this example is used in a functioning system, ensure that all effects of any register changes are fully understood before running this example.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

5

5.1 Expression of requirements

The Industrial Bakery Co. makes various types of bread. **Bread production** consists of two operations:

1. Preparing the dough
The operation consists in mixing water, flour and yeast in a kneader. Depending on the amount of dough to be made, the operator must indicate: the amounts of water, flour and yeast required.
The weight of the dough obtained must be indicated to the operator.
The operator will have to be assisted when entering the amounts of water, flour and yeast to be used according to the type of dough to be made.

2. Baking the dough
The operator selects the baking temperature.
The baking temperature range will be displayed.
If there is a problem (baking temperature too high or too low) an alarm will be activated and the operations to be performed will be indicated to the operator(Figure 5-1).

Figure 5-1:   Application diagram
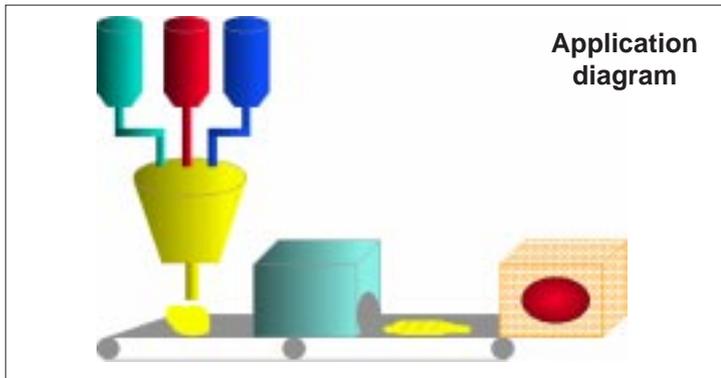
The following two operations are performed besides the production operations:

Installation maintenance
In order to guarantee the quality of the product, daily checks must be performed by the maintenance department. This operation, performed by authorized personnel (maintenance operator), consists in checking the kneader (On/Off). The production operators are not allowed to perform this type of operation.

Management of production
The client wishes to enter the amounts of water, flour, salt and yeast only once per type of bread (filing of these parameters for re-use). The application will be organized as follows:

```
                              ┌───────────────┐
                ┌─────────────┤  Maintenance  │
           Access            └───────────────┘
        authorization

  ┌──────────────┐
  │  Main menu   │
  │• Production  │
  │• Maintenance │
  └──────────────┘                    ┌─────────────┐   ┌────────────┐
                                      │    Dough    ├───┤ Recipe use │
                                      │ preparation │   │    help    │
                                      └─────────────┘   └────────────┘
                  ┌──────────────┐
                  │  Production  │
                  │    menu      │    ┌─────────────┐
                  │• Preparation │────┤    Dough    │
                  │• Baking      │    │   baking    │
                  └──────────────┘    └─────────────┘
```
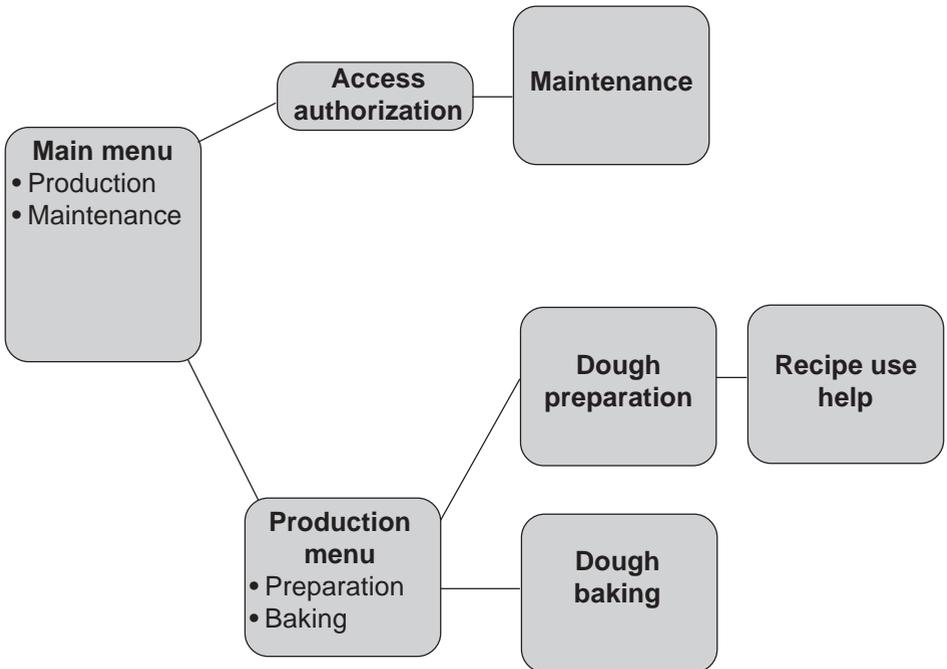
If there are any problems during baking (temperature too high or too low):

- the operator must be informed immediately, whatever screen is displayed,
- he must also be able to access the information indicating the operations to be performed in that case.

5

Additional information

The company wants its name and logo to be displayed on the following screens:

- Dough preparation,
- Dough baking,
- Maintenance.

Industrial Bakery Co.

Navigating between the various screens

The company wants navigation between the:

- main menu,
- maintenance,
- production menu,
- dough preparation,
- dough baking,

screens to be indicated to the operator by icons which will be associated with dynamic function keys on the terminal.

    Access to main menu.

    Access to production menu.

 Access to the Maintenance screen.

 Access to the Dough Preparation screen.

 Access to the Dough Baking screen.

Process control
The F1 static function key is used to start up the process.
Press this key to start the process and press it again to stop it.

Maintenance
For the maintenance operations you will have to:
1. Switch off the kneader by pressing the F2 function key.
2. Check the various parts of the kneader.
3. Switch the kneader back on by pressing F2 again.
Access to the Maintenance screen is protected by a
password: PW01.

Locking the Kneader On/Off key
The F2 static function key is locked when the following pages are
displayed:

- Menu
- Dough preparation and dough preparation help
- Dough baking and dough baking help

and is unlocked when the Maintenance page is displayed.

5.2 Analyzing the expression of requirements

5.2.1 Application tree structure

Analysis of the requirements is used to structure the application in several types of pages:

5
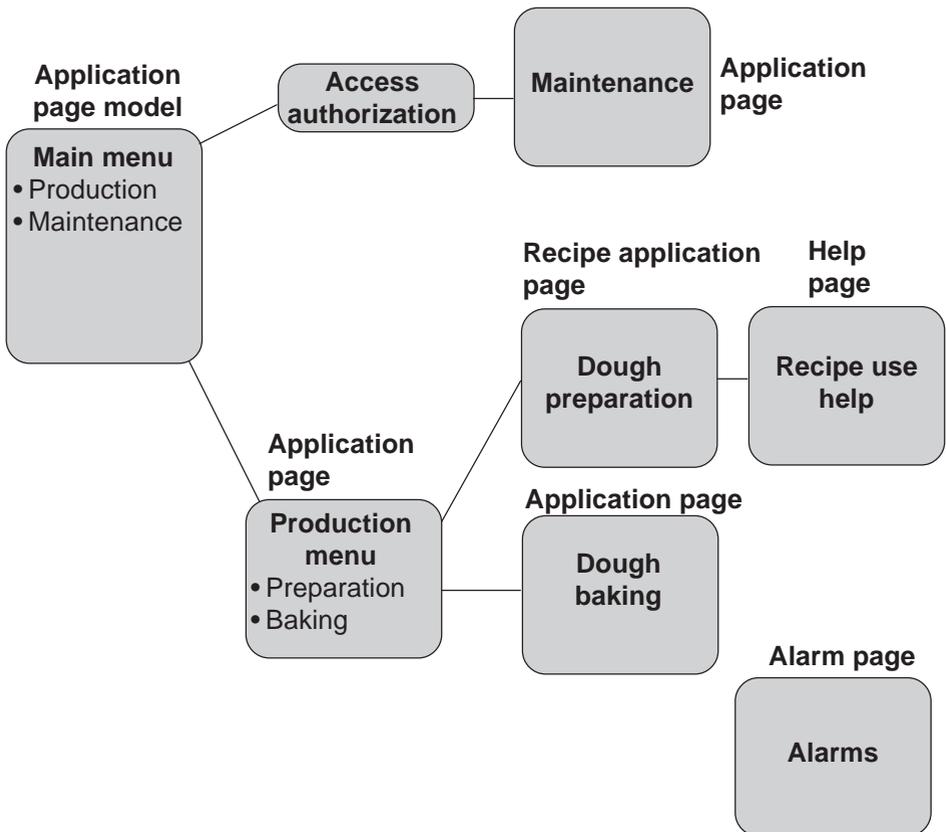
An **application page Model** will be used to display the company name and logo on the application pages (Dough preparation, Dough baking, Maintenance).

Navigating between application pages
The dynamic function keys associated with the corresponding icons will be used for navigating between pages.

5.2.2   Application tree structure balance

The application will include:

- 5 application pages:
    - Main menu
    - Production menu
    - Maintenance
    - Dough preparation
    - Dough baking

- 1 alarm page

- 2 help pages
    - Dough preparation help
    - Dough baking help

5.2.3   Main menu application page

Application model 1 which includes the company name and logo is used for this application page.
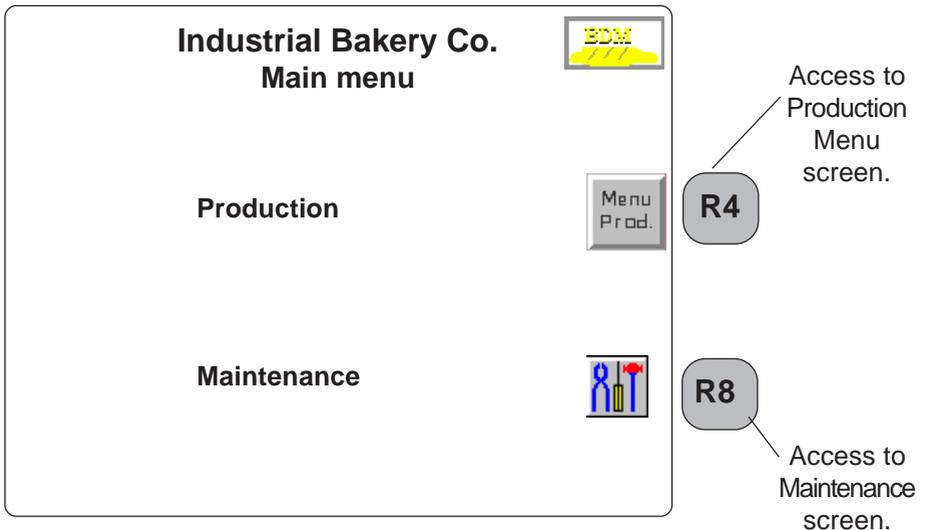
5.2.4   Production Menu application page

Application model 1 into which the company name and logo are entered is used for this application page.

5.2.5   Dough preparation application page

The recipe model into which the company name and logo are entered is used for this application page. The four icons for management of the recordings are included in this specific model (see next page).

Access to Production menu screen using dynamic key R1 associated with the icon.

Menu Prod. **R1**

Industrial Bakery Co.

BDM

Flour Yeast Water

Dough preparation

Menu Prod.

Select the amounts for each product.
Use the ? key for further information.

Enter amount
Flour
Yeast
Water

Amount of dough
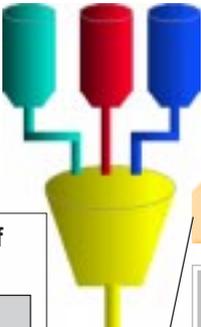
Access to the help page associated with the dough preparation application page by pressing the ? key on the keyboard.

Access to the baking monitoring screen by pressing the R6 dynamic key associated with the icon.

R6

Dough preparation

Freeze display

Record parameters

Transfer recording to the control system

Restore recording

Entering the amount
Enter the amounts of flour, yeast and water required.
Press the "Save parameters" key (R8) to record these
amounts. Enter the recording name (name of the type of
bread). Perform the same procedure for the other types
of bread. To restore a recording, press the "Restore
recording" (R10) key. Use the arrows to select a
recording in the list. Validate. Transfer the parameters
using the "Transfer recording" (R9) key.

Graphic Magelis

5.2.6   Dough baking application page

Industrial Bakery Co.

Dough baking

Forming

Temperature selection   Temperature monitoring

5
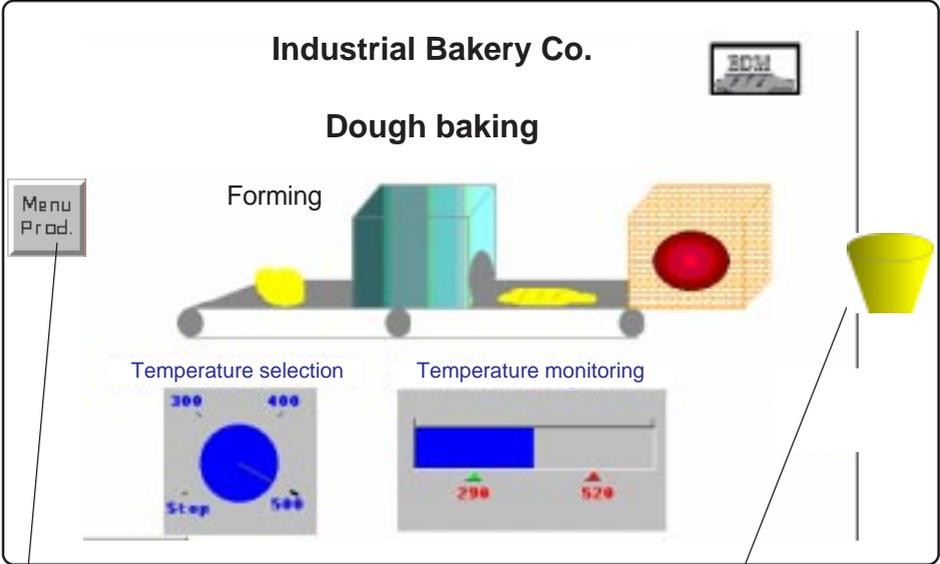
**Access to the Production menu
screen using dynamic key R1
associated with the icon.**

 R1

**Access to the Dough
Preparation screen
using dynamic key
R6 associated with
the icon.**

 R6

5.2.7   Maintenance page

**Industrial Bakery Co.
Main menu**

BDM

Production   Menu Prod. **R4**

Maintenance   **R8**

Password: PW01

**Industrial Bakery Co.
Maintenance**

BDM

Kneader maintenance

The kneader must be empty when performing this operation
1. Switch off the kneader: F2
2. Check the kneader parts
3. Switch the kneader on: F2

5
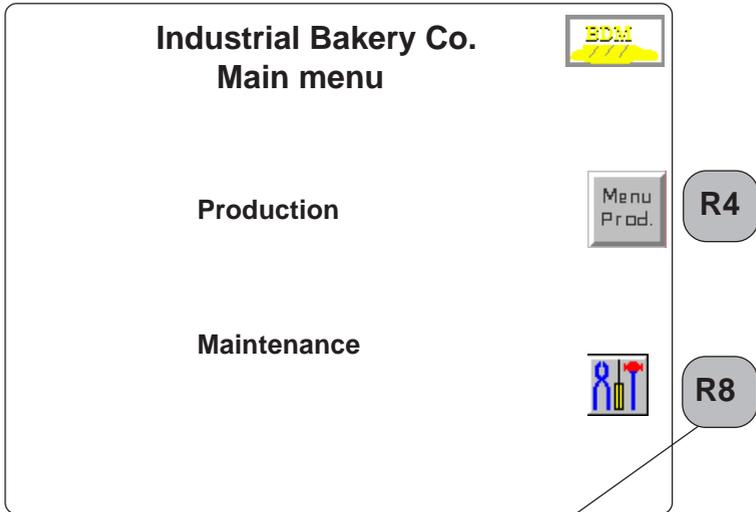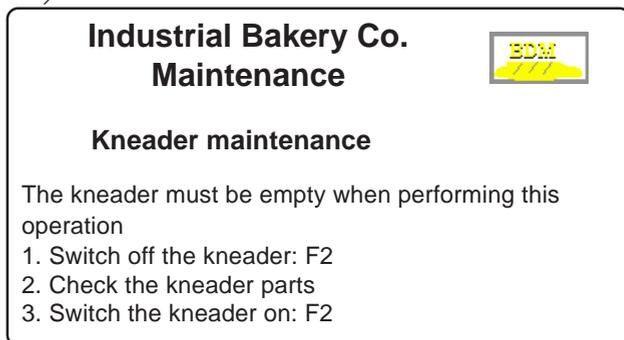
5.2.8   Static function keys

Process control
F1: toggle command

Maintenance (switching off the kneader)
F2: toggle command

Static function keys F1 and F2 are locked when the following pages are displayed:
- Main menu,
- Production menu,
- Dough preparation and dough preparation help,
- Dough baking,

and are unlocked when the Maintenance page is displayed.

5.2.9   Data associated with the application

Data associated with the alphanumeric and graphic fields
Amount of flour: %MW30.
Amount of water: %MW31.
Amount of yeast: %MW32.
Amount of dough produced: %MW33. (This data is provided by the control system).
Temperature selected with the rotary selector switch: %MW34.
Temperature monitored by the bar graph: %MW35.

Dialog table data
The start address of dialog table is %MW100.

%MW100: word containing the bits associated with the static function keys.
%MW101: word containing the number of the displayed page.
%MW102: word containing the static function key locking command.
%MW104: word containing the alarm bit.

The function of the words will be explained later in this document.

5.3 Creating the application

The XBT-L1000 software and the protocols must be installed on the PC. Refer to the corresponding service instructions.

5.3.1 Selecting the terminal and protocol

1. Start up the XBT-L1000 software. If an application is already displayed, choose the **File/New** menu.

Figure 5-2:   Terminal Type Configuration Dialog Box

2. Choose the **type of XBT** (example: XBT-F 10") (Figure 5-2)

Select the **protocol** (e.g.: ModBus Plus) and confirm by clicking **OK**. The default page will then be displayed (Figure 5-3).

Figure 5-3:   Default page window
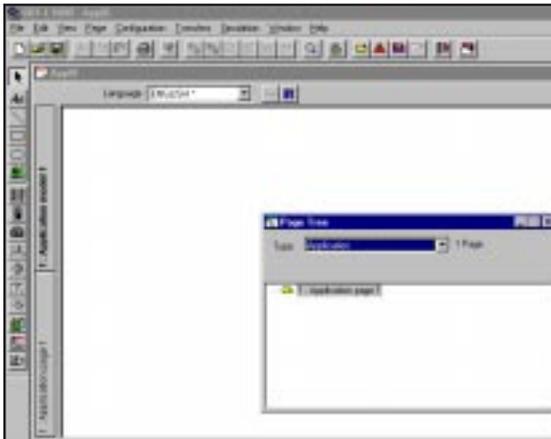
Save the application using the **File/Save** menu under the name: Bakery.DOP; this name will then be displayed in the title bar (Figure 5-4).

Figure 5-4:   Save As Dialog Box

5
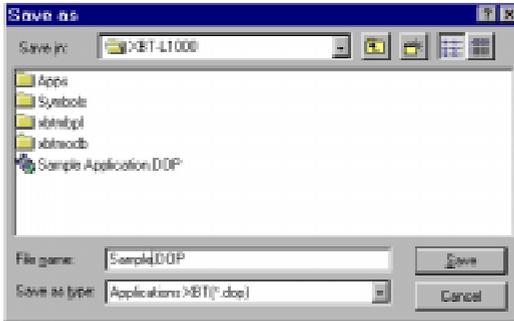
5.3.2   Creating the page model

Two model pages are available by default when creating an application: one model for standard application pages and another for the recipe pages. The designer can edit them or create new ones.

Application page model

Reminder: the company wants all the application pages to have the same page background.

Industrial Bakery Co.

Figure 5-5:   Page Tree Dialog Box

Choose **Application page model** in the tree structure window (Figure 5-5).
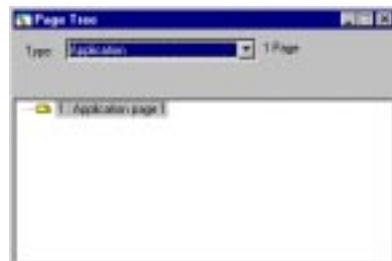
Choose the **Page/Properties** menu. Indicate the name of the model (MDM1 model) and deselect the **Locked** option. Click **Ok**.

Entering text

(Figure 5-6)

1. Select the Text tool button.
2. Using the mouse, select the required location using the right mouse button.
3. Enter the text: Industrial Bakery Co.
4. Confirm with ENTER.
5. Select the Edit/Text Properties menu (or click the right mouse button or press ALT ENTER).
6. Define the text properties (large character font, bold, yellow) and click **OK** to confirm (Figure 5-7).

Figure 5-6: Select the Text Object
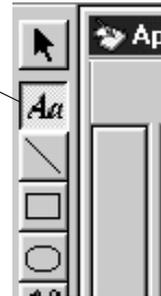
Figure 5-7: Text Properties Dialog Box
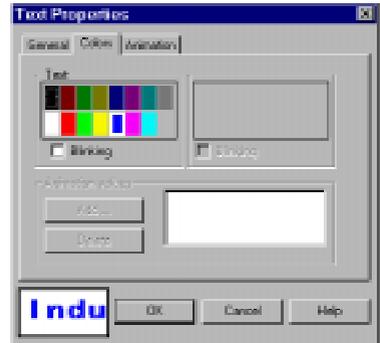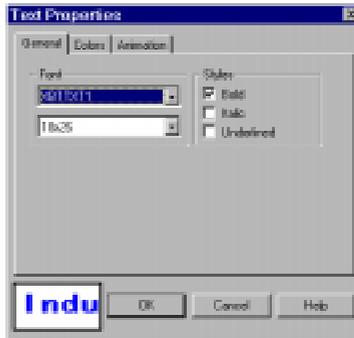
Importing an image

The logo is a *.BMP type file

1. Select the BITMAP tool button.
2. Using the mouse, click and drag the mouse to create an image area. The Insert Image dialog box is displayed (Figure 5-8).

Figure 5-8:   Insert Image Dialog Box

5
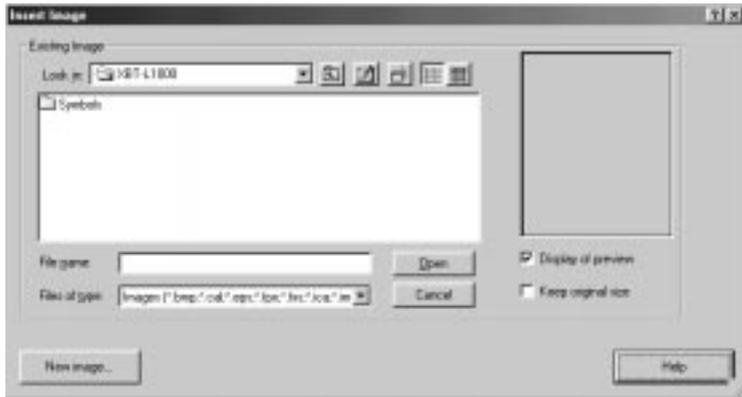
3. Select an existing image from the **Symbols** folder. Select **Open**, press **Enter,** or double-click to import an existing image.
4. Select the **New Image** button to open an application to import a new image (Figure 5-9). The list of applications are the programs loaded on the computer.

Figure 5-9:   New Image Dialog Box

6. The image is inserted, position it at the desired place.

Industrial Bakery Co.

Now that the model page has been created, we are going to create the pages.

NOTE: *The model page created will appear in gray on the XBT-L1000 background, but will appear in color on the terminal.*

Recipe page model

The recipe page models have the same properties as the application page models except that the latter includes the four additional icons for managing "recipe" recordings (Figure 5-10).

Figure 5-10: Recipe Page Model

Industrial Bakery Co.

Graphic Magelis
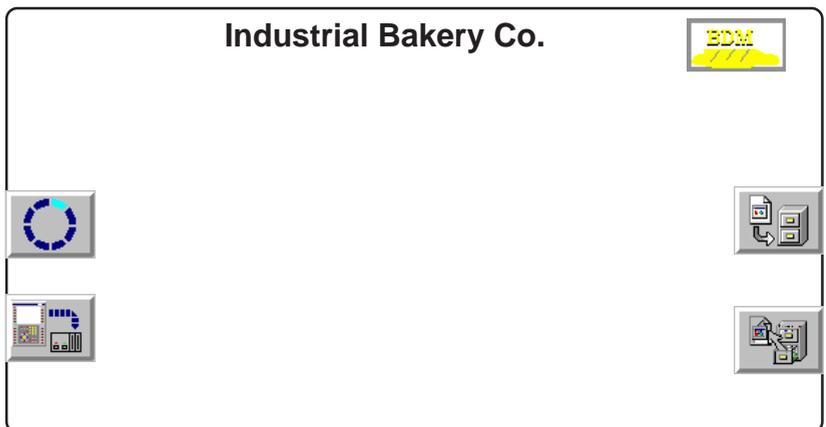
5.3.3   Creating the various pages

Application page

Figure 5-11: Properties Page Dialog Box

5

1. Select the application page type in the **Page tree structure** window, a page called Application page 1 exists by default, with the model page displayed in gray in the background.

2. Choose the Page/Properties menu (or click the right mouse button) (Figure 5-11).

The first page to be created in the example is called: MENU.

3. Enter the name of the page, click **Protection** and, if necessary, deselect the **Access with password** box and confirm with **Ok**. Click **Ok** again. The menu page has now been created.

4. Choose the **Page/New Page** menu or click the new page icon and proceed in the same way as in step 3 to create the "Dough preparation" page, and then create the "Dough baking" page in the same way.

5. To access the maintenance page, click **Protection** and select the checkbox **Access by password**. Check box **A** and click on **Passwords...**, enter PW01 in the **A** field. Select **Ok**, **Ok**, and **Ok**. (Figure 5-12)

Figure 5-12: Protection and Password Pages
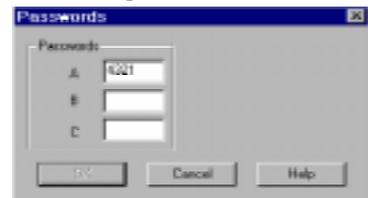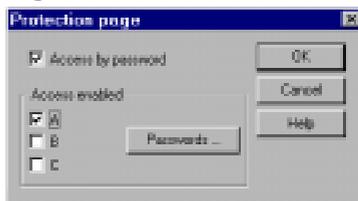
Help page

Create the help pages (Preparation and Baking) by selecting the **Page/New page/Help** menu.

To associate a help page with an application page:
1. Select the application page in the Tree structure page (for example: Dough preparation application page).

2. Select the **Page/Associate help page** menu or click the corresponding icon.
3. Select the help page you want to associate (for example: Preparation) and click **OK** to confirm. Also associate the Baking help page (Figure 5-13).

Figure 5-13: Page/Associate Help Dialog Box
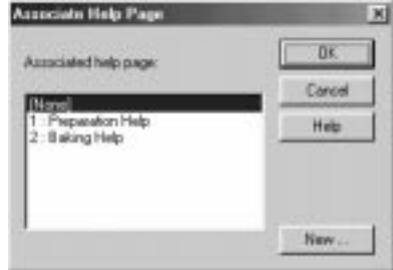
Alarm page

Create the alarm pages (Baking problem) in the same way as the application pages by choosing the **Page/New page/Alarm** menu or by clicking the corresponding icon. Enter the name of the alarm page (Baking fault) and click **OK** to confirm. Complete alarm processing is described in section 3.8 (Figure 5-14).

Figure 5-14: Alarm Page Dialog Box
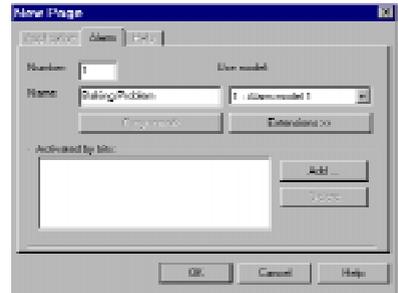
The page architecture is displayed in the tree structure window (Figure 5-15).

Figure 5-15: Page Tree Dialog Box
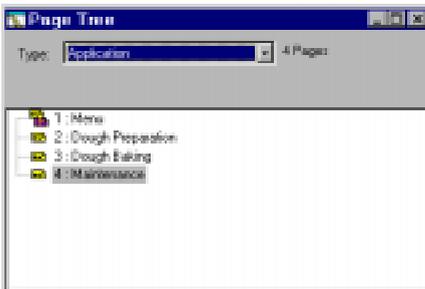
5.3.4 Creating navigation between the application pages

Navigation between the application pages is performed by means of dynamic function keys (example: Main menu page).

5

Access to the Production screen: R4 dynamic key associated with the icon

Access to the Maintenance screen: R8 dynamic key associated with the icon

1. Double click the dynamic function key to be assigned (Figure 5-16).

Figure 5-16: Dynamic Function Key
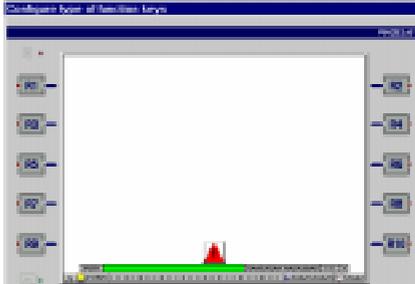
Example: R4

2. Select **Action/Page access**, the destination page (Dough preparation), click **Image** and insert the image associated with the R4 key (see Section 5.3.2 importing an image) (Figure 5-17).

Figure 5-17: Configure Dynamic Key
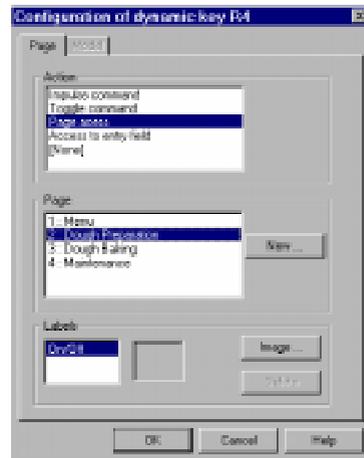
Create the navigation between all the application pages in the same way (see analysis in Section 5.2.3, 5.2.4 and 5.2.5). The Tree structure window displays the navigation architecture you have created (Figure 5-18).

Figure 5-18: Tree Window

5.3.5   Creating the page content

Text

Enter the text in the various pages as described in section 5.3.2.

Line, Rectangle, Ellipse

1. Select the tool button.
2. Using the mouse, define the object size.
3. Select the Edit/Property menu (or right mouse click or double click).
4. Define the object properties (filled in or empty, color, etc.).

Alphanumeric fields

The Dough preparation application page has 3 entry fields and one read only field.

1. Select the Create an Alphanumeric Field tool button.
2. Using the mouse, click on the required location.

3. Define the object properties (Figure 5-19). In the example the Amount entry fields have 5 characters maximum, and decimal format is used.

Click modify to define the PLC variable representing the content of the field and click **Ok** to confirm (Figure 5-20).

Figure 5-19: Properties Dialog Box

Amount of flour: %MW30
Amount of water: %MW31
Amount of yeast: %MW32
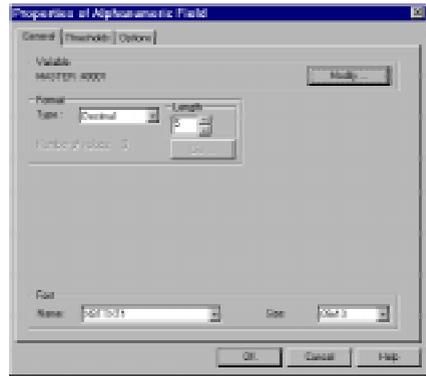
Figure 5-20: PLC Variable Dialog Box

Create the "Amount of dough produced" field in the same way. Click **Option** and set the access field to **read** (Figure 5-21).

Amount of dough produced: %MW33

Figure 5-21: Properties Page Dialog Box

Graphic Magelis

Reminder of the requirements specification: The amount of dough must be between 2800 and 3000. If the amount is not within these limits, the display will switch to red.

    a. Click the Thresholds tab
    b. Click **Limit** to set the max. limit to 3000 and the min. limit to 2800 and click **Color** to define the colors (Figure 5-22).

5

Figure 5-22: Properties Dialog Box

Color red: max. limit

Color blue: correct value

Color red: min. limit
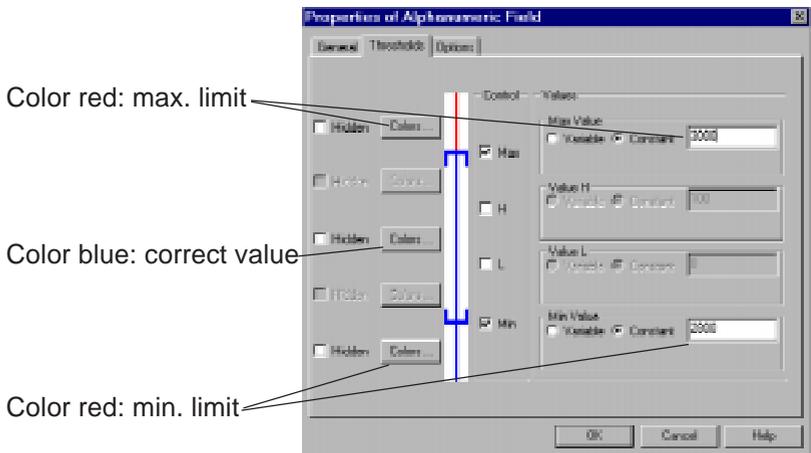
    c. End entering the "Dough preparation" page as described on the previous page.

The "Dough baking" application page includes:

- Text and drawings, whose input principle has already been described
- One temperature selection rotary switch
- One temperature monitoring bar graph
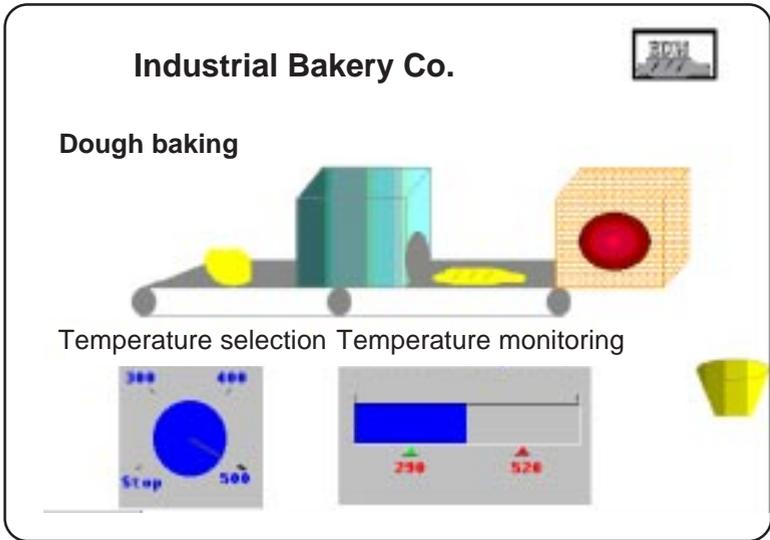
The "Dough baking" application page includes:
- texts and drawings, whose entry principle has already been described,
- 1 temperature rotary selector switch,
- 1 temperature monitoring bar graph.

Rotary selector switch

1. Select the rotary selector switch tool button.
2. Using the mouse, define the object size.
3. Select the **Edit/Rotary Switch Properties** menu (or right mouse click or double click).

Figure 5-23: Properties of Rotary Switch Dialog Box
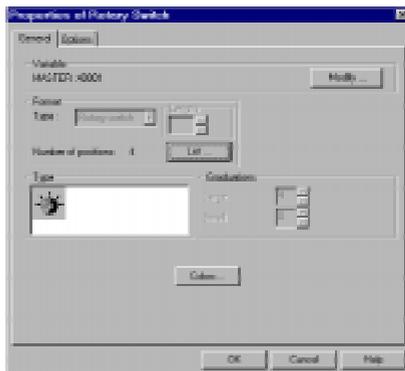
Assign the word %MW34 to the object using the **Modify** button, click **Ok**. This word will contain the value selected by means of the rotary selector. Click **List** and, using the **Delete** or **Add** buttons, define the number of positions for the rotary selector and the value to be assigned in the word (4 positions: 0, 300, 400, 500) (Figure 5-24).

Figure 5-24: Position List Dialog Box
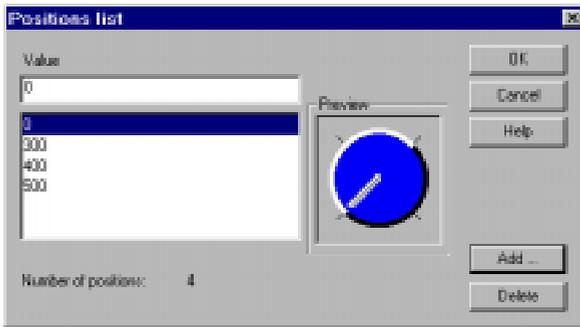
Click **Ok**.

Using the **Color** button, define the color of the graduations and of the background.

Click **Ok twice** to confirm, the rotary selector will then be displayed but the graduations will not be identified.

Using the **Text** tool, enter the values to allow the operator to identify the positions. Refer to the dough baking screen on page 5-28.

Bar graph

1. Select the Bar Graph tool button.
2. Using the mouse, define the object size.
3. Select the **Edit/Bar Graph Properties** menu (or right mouse click or double click) (Figure 5-25).

Figure 5-25: Properties of Bar Graph Dialog Box
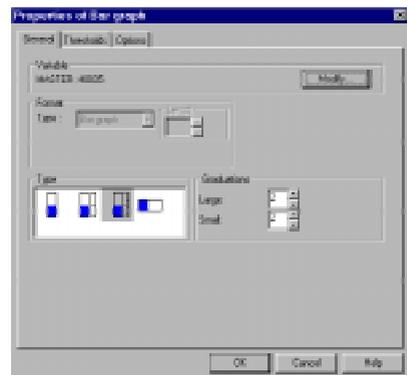
Select the type of bar graph (for example: horizontal, large graduation). Assign the word %MW35 to the object using the **Modify** button. This word will contain the oven temperature value (Figure 5-26). Click **Ok**.

Figure 5-26: Properties of Bar Graph Dialog Box
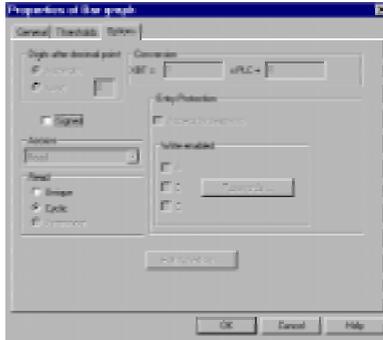
Click **Option** and set the object to cyclic reading. The baking temperature must be between 290° and 520°. If the temperature is outside these limits the display will switch to blue. Click **Threshold** to define a high threshold (H) of 520 and a low threshold (L) of 290

Figure 5-27: Properties of Bar Graph Dialog Box

Color red: high limit

Color red: low limit
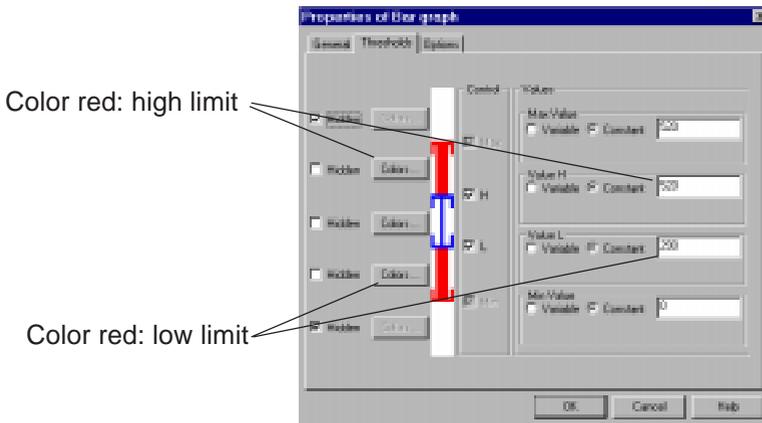
and click **Color** to define the colors (Figure 5-27).
Click **OK** to confirm. The bar graph is displayed but the graduations are not identified.
Using the **Text** tool, enter the values to allow the operator to identify the positions. Refer to the dough baking screen on page 5-28.

Graphic Magelis

5.3.6 Assigning the static function keys

In order to assign the static function keys:

1. Select the **Configuration/Function Keys** menu. The front panel
   of the terminal will then be displayed.
2. Double click the required function key (For example: F1).
3. Select the **toggle command** type.
4. Click **Ok** to confirm.

**Bits associated with the dialog static function keys that can be
used in the PLC application**
A reserved word in the dialog table indicates the status of the
function keys in the form of a word bit: bit at 1 = key pressed.
In our example the word %MW100 is used.

Bits B0 and B1 are associated with the F1 and F2 command keys.

5.3.7   Locking the static function keys

To perform this function, you must:

- know the number of the displayed page,
- lock or unlock the key as the case may be.

Number of the displayed page

A word in the dialog table contains the number of the displayed page; the **Page/property** menu gives the number of each page:

Menu: page No. 1
Dough preparation: page No. 2
Dough baking: page No. 3
Maintenance: page No. 4

In our example word %MW101 is used.

Locking the static function keys

A word in the table is assigned to static function key locking. In our

example word %MW102 is used.

Set bit B1 to 1 to lock the F2 key.

Key locking by the PLC

The program has the following structure:

If %MW101 (No. of the displayed page) = 1, 2 or 3 set bit B1 of word %MW102 to 1 (F2 locked).

If %MW101 (No. of the displayed page) = 4 set bit B1 of word %MW102 to 0 (F2 unlocked).

5.3.8   Creating the dialog table

Several elements of the dialog table have been declared in the preceding chapters:
%MW100: word containing the bits associated with the static function keys.
%MW101: word containing the number of the displayed page.

%MW102: word containing the static function key locking command.
%MW104: word containing the alarm bit.

5

Select the **Configuration/Dialog table** menu
Check the **Use dialog table** option (Figure 5-28).

Figure 5-28: Configure/Dialog Table
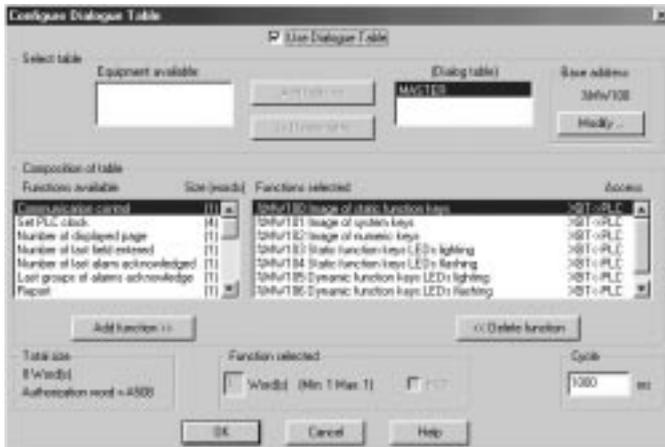
Click **Modify** to change the address of the beginning of table %MW100

In the **Function selections** list, delete or add the functions required by the application by means of the **Add Function** or **Delete Function** buttons to obtain the following list:

Functions selected	Access
%MW100 Image of static function keys	XBT->PLC
%MW101 Image of system keys	XBT->PLC
%MW102 Image of numeric keys	XBT->PLC
%MW103 Static function keys LEDs lighting	XBT<-PLC
%MW104 Static function keys LEDs flashing	XBT<-PLC
%MW105 Dynamic function keys LEDs lighting	XBT<-PLC
%MW106 Dynamic function keys LEDs flashing	XBT<-PLC

Once creation is completed, save the application using the **File/ Save** menu.

5.3.9 Alarm processing

Reminder of the expression of requirements
If the baking temperature is too high, an alarm will be displayed in a
strip on the application pages, the Alarm indicator will flash;

- you can acknowledge the alarm by pressing **ENTER**,
- or consult the alarm page by pressing **SHIFT+ ENTER**.

5

PLC command to display the alarm
The dialog table contains words reserved for displaying alarms.
Display is commanded by the PLC by setting a word bit to 1 in the
dialog table. In our example, bit B0 of word %W104 is used.

Alarm configuring by the PLC
Go to the alarm page by means of the **Page tree structure**
window, select the **Page/Properties** menu and click the **Extension**
button in the Property window (Figure 5-29).

Figure 5-29: Properties of Page Dialog Box

Select Type of action: **Display** (type of action when the alarm is
triggered).
Select the **ACK** box: compulsory acknowledgment of the alarm
when it is triggered.

Click **Add** to assign the alarm bit (bit 0 of word %MW104) (Figure 5-30).

Bit 15   **Bit 0**

%MW104 | AL16 | | AL0 |

Figure 5-30: Alarm Bits Dialog Box
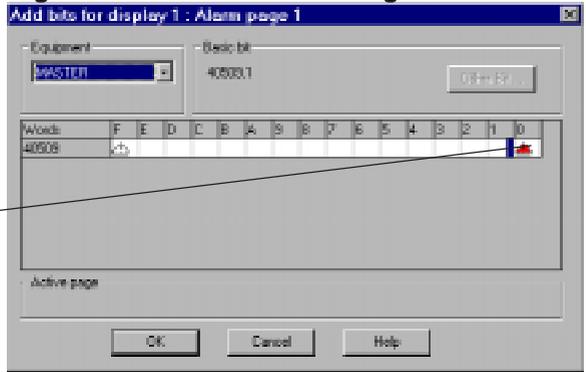
Click bit 0 to assign the alarm. The word is defined in the dialog table.

Case of TXBT: using any bit
If you want to assign a bit to the alarm, click on Other bit to assign bit 5 from register 40501 (Figure 5-31).

Figure 5-31: TXBT Alarm Bits Dialog Box

Graphic Magelis
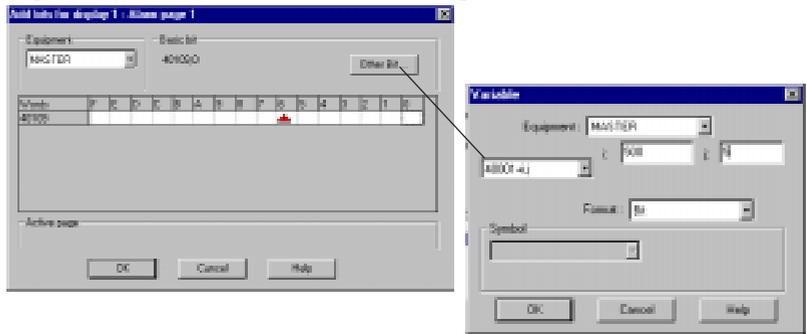
5.4 Loading the application in the terminal

1. Switch on the terminal (refer to the terminal service instruction for wiring of power supply).

2. Connect the terminal to the PLC using the relevant cable (ex.: XBTZ968 for a TSX Micro with Unitelway V2.0).

5

3. Connect cable **XBT-Z915, revision index 22 and the XBT-Z962** between the PC and the terminal.

4. Click "**Transfers**", "**Export**" to terminal using the software (application open).

5.5　Running the application

(See chapter 3 for more details).

The dynamic function keys are used to navigate between pages.

After pressing **MOD**, use the arrow keys to navigate from one field to the other.

Once you are positioned on the desired field, press **MOD** to select the field.

If you do not enter any value in the field within one minute, the field will exit the entry mode.

Cancelling the entry
Press the **ESC** key if you want to cancel the current entry; the field will then not be modified in any way.

Appendix A

A

A

A.1   XBT-F Specifications

A.1.1   XBT-F 01
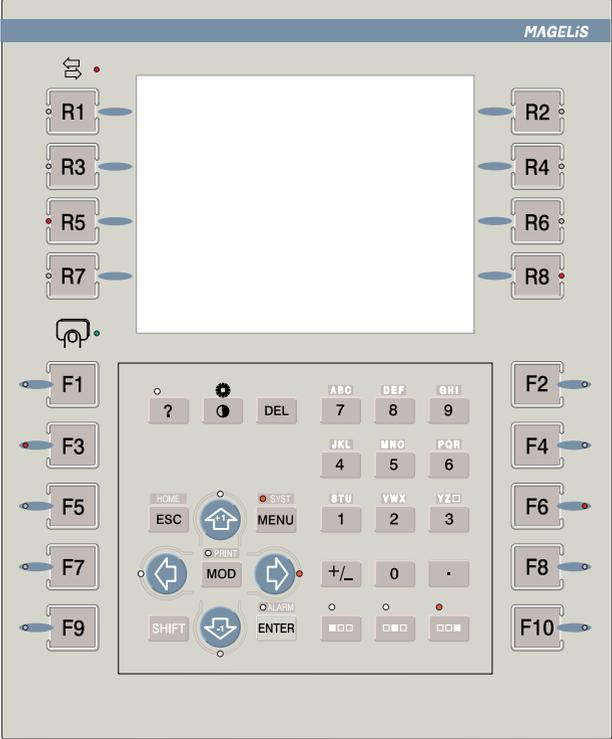
A

Types of display	LCD 5.7" 320x240 pixels STN monochrome, 16 grey levels
Power	24VDC Voltage limits: 18 to 30 VDC Ripple: 5 % maximun Consumption: 35 W
Memories	Application+protocol: 4 MB to 10 MB PCMCIA EPROM card, 50 to 450 pages of applications, alarms and help according to the memory card in use. Alarm log: 500 events Recipes: 125 recordings and 5000 values maxi- mum
Serial link	RS232/RS485/RS422 asynchronous serial link
Printer/ XBT-L1000 link	RS232 asynchronous serial link
Keypad	Customizable membrane keypad
Indicating	1 communication status indicator light 1 indicator light per function key 1 indicator light per service key 1 keypad/standby screen busy indicator light
Exchange protocols	Downloadable from the protocol diskette using the XBT-L1000 software. Protocols: UNI-TELWAY, FIPWAY, FIPIO, Modbus plus, Modbus, Jbus and those used for AEG, Allen Bradley, GE, Siemens and Omron PLCs.
Time-stamp	yes (no back-up)

Alarm relay   1mA/ 5V min AC/DC
0.5A/24V max AC/DC

Weight   3.96 lb (1.8 kg)

Temperature   Operating: +32 to +113 °F (0 to 45 °C),
Humidity: 0 to 85%.
Storage: - 4 to +140 °F (- 20° to + 60 °C)

Degree of protection   IP65 per IEC529 and degree 1 per NFC20-010; UL 4,4x, NEMA 4

Installation and attachment   Built-in, attached with 10 push latches (provided), on panel 0.06 to 0.24 inches thick (1.6 to 6 mm).

System languages   English, French, German, Italian, Spanish
System pages can be translated in any other language
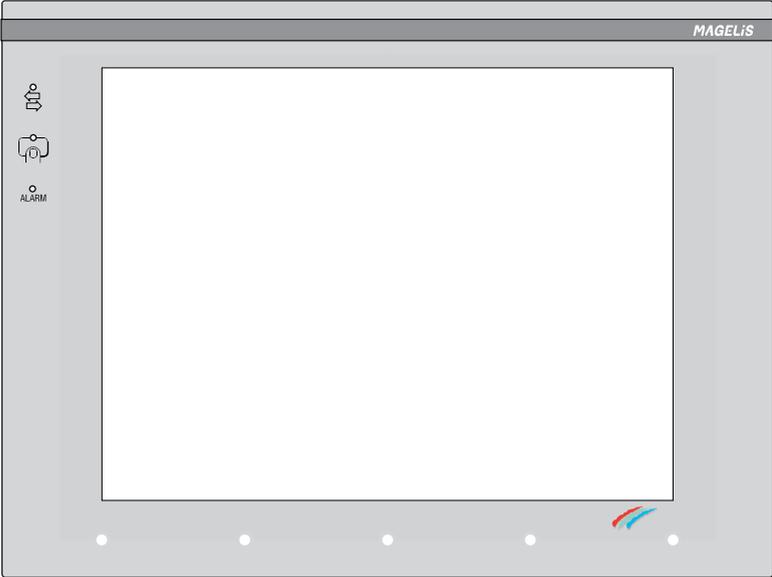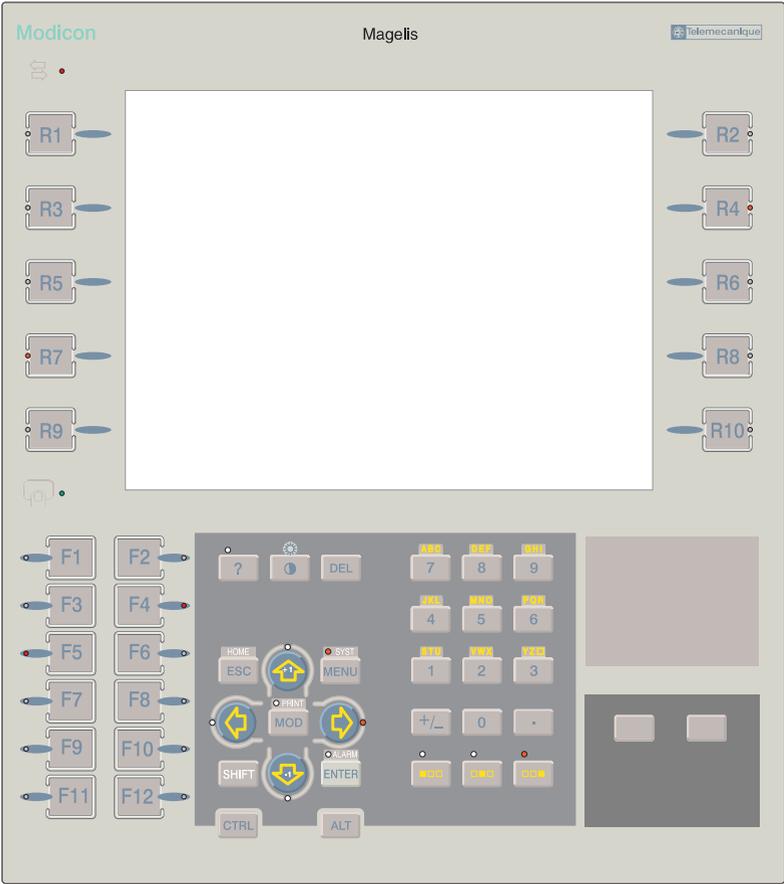
Static function keys   10

Dynamic function keys   8

A

Graphic Magelis

A.1.2 XBT-F 02

Types of display	LCD 10.4" 640x480 pixels STN monochrome (9.5" screen), 16 grey levels and TFT color (10.4" screen), 256 colors.
Power	24VDC Voltage limits: 18 to 30 VDC Ripple: 5 % maximun Consumption: 35 W
Memories	Application+protocol: 4 MB to 10 MB PCMCIA EPROM card, 30 to 300 pages of applications, alarms and help according to the memory card in use. Alarm log: 500 events Recipes: 125 recordings and 5000 values maxi- mum
Serial link	RS232/RS485/RS422 asynchronous serial link
Printer/XBT-L1000 link	RS232 asynchronous serial link
Keypad	Customizable membrane keypad
Indicating	1 communication status indicator light 1 indicator light per function key 1 indicator light per service key 1 keypad/standby screen busy indicator light
Exchange protocols	Downloadable from the protocol diskette using the XBT-L1000 software. Protocols: UNI-TELWAY, FIPWAY, FIPIO, Modbus plus, Modbus, Jbus and those used for AEG, Allen Bradley, GE, Siemens and Omron PLCs.
Time-stamp	yes (no back-up)

Graphic Magelis

Alarm relay	1mA/ 5V min AC/DC 0.5A/24V max AC/DC
Weight	5.95 lb (2.7 Kg)
Temperature	Operating: +32 to +113 °F (0 to 45 °C), Humidity: 0 to 85%. Storage : - 4 to +140 °F (- 20° to + 60 °C)
Degree of protection	IP65 per IEC529 and degree 1 per NFC20-010; UL 4, 4x, NEMA 4
Installation and attachment	Built-in, attached with 10 push latches (provided), on panel 0.06 to 0.24 inches thick (1.6 to 6 mm).
System languages	English, French, German, Italian, Spanish System pages can be translated in any other language
Static function keys	12
Dynamic function keys	10

A

A.1.3   Touchscreen XBT-F 032
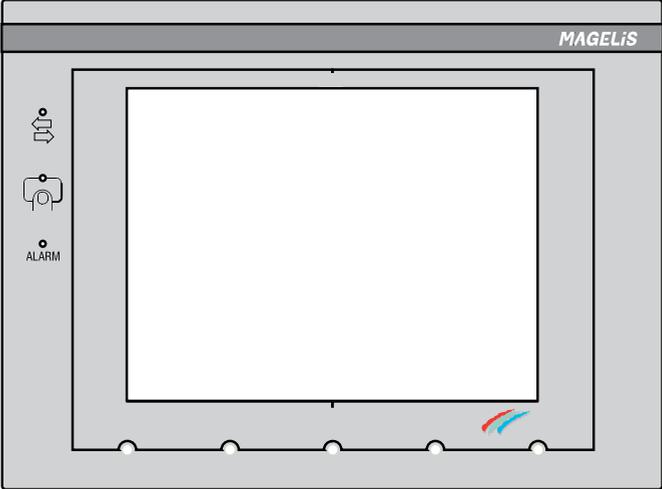
Types of display	LCD STN 5.7" touchscreen 320x240 pixels 256 colors
Touchscreen pad	Resistive matrix 6x8 touch zones
Power	24VDC Voltage limits: 18 to 30VDC Ripple: 5% maximum Consumption: 35 W
Memories	Application + protocol: 4 MB to 10 MB PCMCIA card 50 to 450 application, alarm and help pages according to the memory card in use Alarm log: 500 events Recipes: 125 recordings and 5000 values maximum
Serial link	RS232/RS485/RS422 asynchronous serial link
Printer/ XBT-L1000 link	RS232 asynchronous serial link
Indicating	1 communication status indicator light 1 touchscreen pad pressed/standby screen indicator light 1 alarm indicator light
Exchange protocols	Downloadable from the protocol diskette using the XBT-L1000 software. Protocols: UNI-TELWAY, FIPWAY, FIPIO, Modbus plus, Modbus, Jbus and those used for AEG, Allen Bradley, GE, Siemens and Omron PLCs
Time-stamp	yes (no back-up)

Alarm relay	1 mA/5V min. AC/DC 0.5A/24V max. AC/DC
Weight	3.53 lb (1.6 kg)
Temperature	Operating: +32 to +113 °F (0 to 45 °C), Humidity: 0 to 85%. Storage : - 4 to +140 °F (- 20° to + 60 °C)
Degree of protection	IP65 per IEC529 and degree 1 per NFC20-010; UL 4, 4x, NEMA 4
Installation and attachment	Built-in, attached with 8 push latches (provided), on panel 0.06 to 0.24 inches thick (1.6 to 6 mm).
System languages	English, French, German, Italian, Spanish. System pages can be translated in any other language.

A

A.1.4 Touchscreen XBT-F 034

Types of display	LCD TFT 10.4", touchscreen 640x480 pixels 256 colors
Touchscreen pad	Resistive matrix 10x13 touch zones
Power	24VDC Voltage limits: 18 to 30VDC Ripple: 5% maximum Consumption: 35 W
Memories	Application + protocol: 4 MB to 10 MB PCMCIA card, 30 to 300 application, alarm and help pages according to the memory card in use Alarm history: 500 events Recipes: 125 recordings
Serial link	RS232/RS485/RS422 asynchronous serial link
Printer/ XBT-L1000 link	RS232 asynchronous serial link
Indicating	1 communication status indicator light 1 touchscreen pad pressed/standby screen indicator light 1 alarm indicator light
Exchange protocols	Downloadable from the protocol diskette using the XBT-L1000 software. Protocols: UNI-TELWAY, FIPWAY, FIPIO, Modbus plus, Modbus, Jbus and those used for AEG, Allen Bradley, GE, Siemens and Omron PLCs
Time-stamp	yes (no back-up)

Alarm relay	1 mA/5V min. AC/DC 0.5A/24V max. AC/DC
Weight	5.29 lb (2.4 kg)
Temperature	Operating: +32 to +113 °F (0 to 45 °C), Humidity: 0 to 85%. Storage: - 4 to +140 °F (- 20° to + 60 °C)
Degree of protection	IP65 per IEC529 and degree 1 per NFC20-010; UL 4, 4x, NEMA 4
Installation and attachment	Built-in, attached with 10 push latches (provided), on panel 0.06 to 0.24 inches thick (1.6 to 6 mm).
System languages	English, French, German, Italian, Spanish. System pages can be translated in any other language.

A

A.1.5 TXBT

Types of display	LCD 10.4" 640x480 pixels Monochrome, 16 grey levels (9.5" screen) and color (10.4" screen), 256 colors
Power supply	24VDC Voltage limit: 18 to 30 VDC Ripple: 5% maximum Consumption: 80 W
Hard disk	1.6 Gb or more
Dynamic RAM	16 Mb expandible to 32 Mb
Application memory	Application+protocol: 4MB to 10 MB PCMCIA type II card Faults history: PCMCIA card
Serial link	PLC: isolated serial link, RS232C/RS485/RS422 PC: Non-isolated serial link, RS232C
Printer link	Parallel
External keyboard	PS/2 compatible
Bus or network	Slot for PCMCIA type II and III card
ISA bus cards	2 format 2/3 slots
Keypad	Customizable membrane keypad
Indication	1 communication status indicator light 1 indicator light per function key 1 indicator light per service key 1 keypad/standby screen busy indicator light

Graphic Magelis

Signaling Exchange protocol	Downloadable from protocol diskette using the XBT-L1000 software. Protocols: UNI-TELWAY, FIPWAY, FIPIO, ISAWAY, Modbus plus, Modbus, Jbus
Time-stamp	yes (with back-up)
Alarm relay	1 mA/5 V min. AC/DC 0.5 A/24 V max. AC/DC
Weight	11.2 lb (5.1 kg)
Temperature	Operating: +32 to +113 °F (0 to 45 °C), Humidity: 0 to 85%. Storage: - 4 to +140 °F (- 20° to + 60 °C)
Degree of protection	IP65 per Section IEC529 and degree 1 per NFC20-010; UL 4, 4x, NEMA 4
Installation and attachment	Built-in, attached with 12 push latches (supplied), on panel 0.06 to 0.24 inches thick (1.6 to 6 mm).
System language	French, English, Spanish, Italian, German. System pages can be translated in any other language
Static function keys	10
Dynamic function keys	12
Application, help and alarm pages	Application, alarm and help pages: limited to disk capacity, maximum of 1024 pages

A

Appendix B

Graphic Magelis

B

B.1 System messages

System messages generated by XBT

(system messages in English, not configurable)

WIRING FAULT
SWITCH POWER OFF: Incorrect cable.

WAITING FOR TRANSFER: Waiting for downloading.

NO PROGRAM: No application in the product.

DOWNLOAD IN PROGRESS: Downloading to XBT in progress.

DOWNLOAD ABORTED: Downloading to XBT cancelled by the operator.

DOWNLOAD FAILED: Unsuccessful downloading to XBT.

DOWNLOAD COMPLETED: Downloading to XBT succesfully completed.

UPLOAD IN PROGRESS: Uploading to the PC in progress.

UPLOAD ABORTED: Uploading to the PC cancelled by the operator.

UPLOAD FAILED: Unsuccessful uploading to the PC.

UPLOAD COMPLETED: Uploading to the PC successfully completed.

CONNECTING: Cable reading and search for the communication configuration in progress.

B

APPLICATION FAULT: Application error (incoherence).

System messages generated by XBT (5 languages), language selected during configuration.

WRONG PASSWORD: Entry of an incorrect password.

PAGE DOES NOT EXIST: Call-up of a non-existent page.

PROTECTED ACCESS PAGE: Call-up of a page protected by password.
Remedy: enter the password protecting the page.

IMPOSSIBLE TO WRITE VARIABLE: Writing of a non-existent variable or XBT <-> PLC connection problems. Possible cause: equipment address error, variable address error.
Remedy: change the parameters of the variable in XBT-L1000.

OVERFLOW MIN <= VALUE >= MAX: Entry of a value which is outside the limits.

INCORRECT DIALOG TABLE AUTHORIZATION: Incorrect authorization word.
Remedy: write in the word "Authorization" the value given by XBT-L1000 in the dialog box "Configure dialog table", "Authorization word=" field.

DIALOG TABLE READING IMPOSSIBLE: Connection problems between XBT <-> PLC.
Same possible cause, same remedy: see "Impossible to write variable".

DIALOG TABLE WRITING IMPOSSIBLE: Writing to a protected zone or XBT <-> PLC connection problems.
Same possible cause, same remedy: see "Impossible to write variable".

PRINTING ACKNOWLEDGED: Transient display if printing requested by the user is possible.

IMPOSSIBLE ACTION, PRINTING IN PROGRESS: Transient display when printing is in progress.

IMPOSSIBLE ACTION, FAULTY PRINTER : Transient display when printer is faulty, or the terminal is still connected to XBT-L1000 or there is no paper in the printer.

SAVING IN PROGRESS: Transient display during saving on the PCMCIA card of:
- a recipe recording,
- an adjustment page.

SAVING IMPOSSIBLE: Transient display after request for saving on the PCMCIA card of:
- a recipe recording,
- an adjustment page.

Possible cause: PCMCIA card full or zone allocated to storage full.

LOADING IN PROGRESS: Transient display during loading from the PCMCIA card of:
- a recipe recording,
- an adjustment page.

LOADING IMPOSSIBLE: Transient display after request for loading from the PCMCIA card of:
- a recipe recording,
- an adjustment page.

Possible cause: file damaged.

TRANSFER IN PROGRESS: Transient display during transfer to the control system of recipe recording data. The transfer can be aborted by pressing ESC (key or touch zone).

TRANSFER IMPOSSIBLE: Transient display after request for transfer of a recipe recording to the control system.

Possible cause: connection problem between the terminal and the control system.

B

NO SAVING OF VALUE FOR OBJECTS SET TO ERROR:
Transient display after saving a recipe recording on the PCMCIA card.
Possible causes:
a) the objects could not read their variables (symbol: $\times$ or $\boxtimes$),
b) the request for saving has been initiated while all the objects had not read their variables. The objects are not displayed yet.

Remedies:
a) - check that the equipment item of the variable(s) associated with the objects set to error is properly connected to the terminal,
    - check that the variables of the objects set to error are declared in the PLC.
b) wait for the full page to be displayed before requesting saving.
In both cases: delete incomplete saving, solve the problem, save again.

OBJECTS SET TO ERROR NOT INITIALIZED: Transient display after loading of a recipe recording from the PCMCIA card.
Possible causes:
a) some objects were set to error during saving and thus not saved,
b) one or several objects have been added to the page since last saving of the recording; no value has thus been recorded by the objects.
Remedy: in both cases, the terminal initializes the relevant objects to 0.
    - The objects must be set to a correct value.
    - The recording must be saved again and include the values correctly initialized by the user.
    - All these actions must be performed before transfer to the control system in order not to transfer erroneous values.

OPERATION IN LOCAL MODE: Display in the status line.
In this mode, **the terminal does not indicate the status of the control system** but usually the status of a recipe recording which has just been loaded from the PCMCIA card.

Index

Graphic Magelis