

4.1 General

When the equipment is powered up, the XBT-K executes a series of self-tests (see chapter 10). Selection of the operating protocol is made by wiring connections in the serial link connector.

Screen messages

ACTION	XBT-K DISPLAY	COMMENTS
Power-up	<div style="border: 1px solid black; padding: 2px; display: inline-block;">XBT-K70101 V 1.3</div>	Brief display of the commercial catalogue number (XBT-K 70101) and of the software version (V1.3)
No connection on the serial line (ASCII selected) XBT-Z902 connection to the serial line (ADJUSTMENT MODE selected)	<div style="border: 1px solid black; padding: 2px; display: inline-block;">ASC H 9600 8B OD 1S</div> or <div style="border: 1px solid black; padding: 2px; display: inline-block;">REG H 9600 8B OD 1S</div>	5 second display of the line parameters (*)
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">OPERATING MODE</div>	The XBT-K waits for an operating command

(*) Parameter settings on initial power-up :

ASC : ASCII mode
 H : HALF DUPLEX
 9600 : speed 9600 bauds
 8B : 8 bit format
 OD : odd parity
 1S : 1 stop bit

General

Selection of transmission parameters

ACTION	XBT-K DISPLAY	COMMENTS
ESC G [parameters] CR	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">OPERATING MODE</div> <div style="border: 1px solid black; padding: 2px;">ASC H 4800 7B EV 2S</div>	<p>Send the XBT-K an ESC G command (see chapter 6 : COMMUNICATION)</p> <ul style="list-style-type: none"> - The display blinks for 10 seconds - Display is then steady : the new parameters are loaded and saved. <p>The XBT-K is now in the OPERATING MODE</p>

Operating mode

This mode is reserved for the operator during operation. The control system and the XBT-K dialogue via a serial or parallel link. The dialogue is achieved using protocols, for which the commands are defined in chapters 6 and 7.

Storage mode

This mode allows the operator to store the messages in the XBT-K :

- from a visual display terminal,
- from a T407 programming terminal.
- from XBTEL programm running on a PC,PS/2 computer.

4.2 Storing the messages

4.2.1 In operating mode

Using a PC, PS/2 computer with XBTEL programm, application messages can be created without the XBT-K.

They can be saved on to the disk and then printed.

All the stored messages can be listed together with their attributes.

Storing in the XBT-K is then performed as follows :

- power-up the XBT-K in the OPERATING MODE,
- connect the serial port on the XBT-K to the serial port on the PC, PS/2 (see chapter 9 : CONNECTIONS),
- adapt the line parameters for the PC, PS/2 running under XBTEL to those of the XBT-K,
- transfer the PC, PS/2 application to the XBT-K,
- compare the contents of the XBT-K memory and the application file in the PC, PS/2.

4.2.2 In storage mode

In this mode the operator can choose between :

- Storing the messages with conversational guidance (using a visual display terminal) or
- Storing the messages without conversational guidance (using a T 407 terminal).

Switching the storage mode is achieved when the XBT-K receives a particular command via the serial link :

ESC D [OP] CR.

- [OP] = 1: Storing non-conversationally,
- 2: Storing conversationally,
- 0: Return to operating mode.

A message definition sheet is provided in chapter 12 : APPENDIX.

5.1 General

5.1.1 Selecting the storage mode

OPERATOR ACTION	XBT-K DISPLAY	COMMENTS
ESC D 2 CR or ESC D 1 CR (@ D1 for T407)	STORAGE MODE	The XBT-K is ready to store messages in conversational mode
ESC D 0 CR (@ D0 for T407) or ESC D CR (@ D for T407)	OPERATING MODE	The XBT-K quits the storage mode and returns to the operating mode

The XBT-K systematically acknowledges by echoing the ESC D command along the serial link.

5.1.2 Scrolling messages

The XBT-K offers a total display capacity of 40 characters. All display commands exceeding 20 characters cause the display to scroll horizontally cancelling all blinking.

During storage, the following rules must be respected:

X+ length of message \leq 40

X+ start of numeric field \leq 32

The attribute X (column number) positions the first character of the message in the display.

General

Example 1 : - message number : 015

- message (19 characters) : PROGRAMME = - - - CYCLES
- type : V
- column number X = 0

A request to display message 015 will not initiate scrolling.

Display of the same message stored with X = 10 (for example) will initiate scrolling (10 + 19 = 29 characters requested for display).

Example 2 : - message number : 015

- message (19 characters) : PROGRAMME = - - - CYCLES
- type : V
- column number X = 0
- message number : 029
- message (19 characters) : COMPOSITION 3 = - - - Kg
- type : V
- column number X = 20

The request to display messages 015 and 029 is made as follows :

OPERATOR ACTION	XBT-K DISPLAY	COMMENTS
ESC V 015 [LF] CR.	PROGRAMME = - - - CYCLES	Steady display of message 015
ESC V 029 [LF] CR.	AMME = - - - CYCLES COMPOS	Appearance of message 029 from right to left of the display
	COMPOSITION 3 = - - - KG	Complete appearance of message 029

The cycle then starts again by presenting message 015 followed by scrolling of message 029.












5.2 Storing with a visual display terminal

A physical link is made to a visual display terminal (see chapter 9 : CONNECTIONS).

Before all storage :

- 1) Adapt the line parameters of the bi-directional terminal to those of the XBT-K (displayed on power-up) or vice-versa,
- 2) Consult the compatibility table for the messages (chapter 5).

Visual display terminal keys

Changing the character		BACKSPACE (HEXA 08) deletes the last character
Cancelling a complete parameter		DELETE (HEX 7F) deletes all of the parameters shown
Checking the messages	 or 	ESCAPE ARROBAS } Message limit characters
Storing blank messages		SPACE - Message number (without text)   - Message number (with text)   
Confirmation		ENTER or CR (carriage return) confirms the parameter shown

Storing with a visual display terminal

Message of display during storage

OPERATOR ACTION	XBT-K DISPLAY	COMMENTS
(ESC) (D) (2) (→) (←)	OPERATING MODE	Power-up
	STORAGE MODE	The display waits for commands from the visual display terminal
	RUNNING	At this stage all dialogue is made on the terminal screen

Storing the messages

Message number

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
Message number: ?	(n ₁) (n ₂) (n ₃) (→)	$0 \leq n \leq 179$
Example :	(5) (5) (→)	Confirmation of number 55
	(DEL)	If the message already exists, press (DEL) to erase

Storing with a visual display terminal

Message text

Message < = 20 characters ?

Defining the text of the message

. . .

The positions reserved for a numeric field are defined by entering the characters :

(Code ASCII 5 F)

An additional digit should be included for variables with sign (variable words in ADJUSTMENT MODE).



Example :

Type of message

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
Type : V = VISU, D = DEF ?	<input type="text" value="V"/> <input type="button" value="→"/> or <input type="text" value="D"/> <input type="button" value="→"/>	Definition of the type of message Default value : V Numeric type can be displayed by the operator Fault message blinks
Example :	<input type="text" value="V"/> <input type="button" value="→"/>	Storing a type V message

Storing with a visual display terminal

Page layout

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
Column number $0 \leq X \leq 32$?		The page layout information defines the position of the first character on the XBT-K display. Default value $X = 0$
$X = 0$ THE DISPLAY IS AUTOMATICALLY CLEARED BEFORE THE REQUIRED MESSAGE IS DISPLAYED		
Example :		The display of the first character of the message VALVE — V — — is made on the third character position of the XBT-K display.

Conversion coefficient

CONVERSION COEFF. : $0.001 \leq C \leq 1$



This coefficient enables a numerical value to be displayed in user units.
 Multiplication is performed by the XBT-K.

The conversion is made by the XBT-K when reading and writing the variable.

Any rounding required still provides a precision of 1% (at full scale).

When $C = 1$, the number transmitted is not converted and is displayed directly.

It may consist of 1 to 20 digits.

The default value is $C = 1$.

Storing with a visual display terminal

Associated variables

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
TSX-7 PLC VARIABLE ? Variable accessible :		This information, used only with the TSX 7 (ADJUSTMENT MODE), defines the variable associated with a type V message. It could be : - B0 to B255 - W0 to W1023 - CW0 to CW1023 - Ti, V ; Mi, V ; Ci, V ; Di, V ; - Ti, P ; Mi, P ; Ci, P ; COMi, j
Example :		TSX 7 variable stored : word 30. The terminal echos the message with all its parameters.


VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
PROG. OK : Y = YES N = NO		Confirm the information and continue to the next step.
		Continue to edit the message.

For further storage

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
PROG. END : Y = YES N = NO		Move to the following message.

Storing with a visual display terminal

Exiting the storage mode

VISUAL DISPLAY	OPERATOR ACTION	COMMENTS
PROG. END : Y = YES N = NO?		The message <div style="border: 1px solid black; padding: 2px; display: inline-block;">OPERATING MODE</div> appears on the XBT-K

Example of conversational programming

VISUAL DISPLAY	OPERATOR ACTION
MESSAGE NUMBER : [N < 180] MESSAGE : [< = 20 CHARACTERS] TYPE : V = VISU, D = FAULT COLUMN NUMBER : 0 < = X < = 32	?55 ?VALVE V __ ?V ?0
CONVERSION COEFF. : 0.001 < = CC < = 1 TSX-7 PLC VARIABLE	?1 ?W30
MESSAGE NUMBER : N < 180 MESSAGE : [< = 20 CHARACTERS] TYPE : V = VISU, D = FAULT COLUMN NUMBER : 0 < = X < = 32	?055 ?VALVE V __ ?V ?00
CONVERSION COEFF. [0.001-1] TSX-7 PLC VARIABLE	?1 ?W30
PROG. OK : Y = YES, N = NO PROG. END : Y = YES, N = NO	?Y ?Y

5 Storing the messages

Storing with the T407 terminal

5.3 Storing with the T407 terminal

Connection is made to the printer port on the TSX-T407 terminal (see chapter 9 : CONNECTIONS).

THE TRANSMISSION PARAMETERS OF THE T407 TERMINAL
MUST BE ADAPTED TO THOSE OF THE XBT-K

Setting up the display

ACTION	XBT-K DISPLAY	COMMENTS
@ D1 (PRT)	OPERATING MODE	Power-up the XBT-K
	STORAGE MODE	The XBT-K is ready to receive messages to be stored

Storage syntax

@ nnn	[@ Mm1 ... m20]	[@ Tt]	[@Xx]	[@ Cc ₁ ..c ₄]	[@ Vv]	LF CR
message number (0 to 179)	message text (20 alphanumeric characters max.)	message type V : steady D : blinking	column number (0 to 32)	correction factor (0.001 to 1)	TSX7 variable address	end of message

Special points when storing with the T407 terminal :

- Up to 24 characters only can be entered on the T407 terminal.
- Transferring messages : @ n @ E nnn : transfer a message address n to address nnn.

TO STORE MESSAGES WITH 20 CHARACTERS OF TEXT, ONE ADDRESS (0 TO 9) MUST BE LEFT AVAILABLE (SEE EXAMPLE 2)

Storing with the terminal T407

- The **PRT** key generates the LF CR characters
- The **CLR** key clears the screen (required before entering new commands)

Combination keys

SH + **S** generates the @ character

SH + **L** generates the numeric field ____

Terms between square brackets ([]) are optional when storing messages

The (—) signs represent spaces (**SP** key)

Storage examples

Example 1 : Store a message with the following complete syntax
 @ 055 @ M VALVE_ V __ @ T V @ X 3 @ C 1 @ V W 30 LF CR

The following must be stored successively :

@ 055 @ M VALVE V __ @ **PRT**

CLR

@ 055 @ TV @ X 3 @ C 1 @ V W 30 **PRT**

Storing with the T407 terminal

Example 2 : Store a message of 20 characters
 @ 132 @ M CONVEYOR — ADJUSTMENTS

The following should be stored successively :

@ 0 @ M CONVEYOR — ADJUSTMENTS (PRT) Store at
 address 000

(CLR)

@ 0 @ E 132 (PRT) Transfer the message
 to address 132

Additional attributes may be stored by the following procedure :

@ 132 @ TV @ X15 @ G1

Example 3 : Store a blank message

@ 77 @ M _ _ _ _ _ (PRT)

Example 4 : Store a message with several points

@ 16 @ M WAIT (PRT)

Exit the storage mode

ACTION	XBT-K DISPLAY	COMMENTS
	<div style="border: 1px solid black; padding: 5px; text-align: center;">WAIT MESSAGE</div>	The XBT-K waits for commands from the T407 (new message)
@ D (PRT)	<div style="border: 1px solid black; padding: 5px; text-align: center;">OPERATING MODE</div>	Return to operating mode
@ L 132 V (PRT)	<div style="border: 1px solid black; padding: 5px; text-align: center;">CONVEYOR — ADJUSTMENTS</div>	Check the storage Display message 132
@ L 132 1 V	<div style="border: 1px solid black; padding: 5px; text-align: center;">CONVEYOR ADJUSTMENTS</div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 5px;">T = V X = 00 C = 1</div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 5px;">VAR = 7 7 7</div>	Display message 132 with its attributes

5.4 Compatibility

When writing messages to the memory, it is important to ensure that the choice of parameters is compatible with the messages.

5.4.1 General rules for composing messages :

- The length of text and numeric field must not exceed 20 characters.
- The numeric field should be indicated using the _ (ASCII characters 5F).

5.4.2 Particular rules for ADJUSTMENT MODE :

- The numeric field associated with a PLC word variable cannot exceed 6 characters, including the sign.
- The numeric field cannot exceed 5 characters if a conversion coefficient is used or if a TSX 7 PLC variable is a counter or a timer.
- The numeric field associated with a bit in the TSX 7 PLC is only 1 character.

The accessible TSX 7 PLC variables are :

- - words W0 to W1023, CW0 to CW1023 and COM0,0 to COM 15,3
- timers T0 to T15
- monostables M0 to M7
- counters C0 to C15
- drums D0 to D7
- bits B0 to B255

Compatibility

Type of Message	MESSAGE		Column Number	Conversion Coefficient	TSX 7 PLC Variable	Comments
	Text	Numeric Field				
	M		X	C	V	
Visualisation (V)	TEMP._____	1 to 20	0 to 32	1	Wi; Cwi Comi, j	Display variables with +/- sign
	TEMP._____	1 to 6	0 to 32	1	Ti, p; Ci, p; Mi, p	
or	TEMP._____	1 to 5	0 to 32	0.001 to 1	Ti, V; Ci, V; Mi, V Di, V	
Fault (D)	TEMP._	1	0 to 32	1	Bi	Display bit status (0 or 1)
	TEMP.	0	0 to 32	1		Display text without variables
V			0	1		Default values

USING THE PARALLEL LINK, THE NUMERIC FIELD HAS A MAXIMUM LENGTH OF 16 CHARACTERS

6.1 General

Three modes of communication are available for the XBT-K :

- ASCII MODE can be used for all types of programmable logic systems.
- ADJUSTMENT MODE can be used with the terminal port on the TSX 7 PLC.
- The parallel link can be used with the outputs of programmable controllers or all types of logic.

6.1.1 ASCII MODE with asynchronous modules (e.g. SCM module).

The ASCII mode is used when an XBT-K is connected to a control system using a serial communications module (example TSX SCM 20 with TSX 7). With this type of operation, it is necessary to adapt the transmission characters (generally by program) of the asynchronous module used, to that of the XBT-K display.

The exchanges are in the form of strings of ASCII characters, completely controlled by the automation system.

Coupler text blocks are used for programming the exchanges on TSX 7 PLCs.

6.1.2 Adjustment mode on the TSX 7 terminal port

The adjustment mode is used when an XBT-K is connected to the terminal port of TSX 7 PLC.

Pre-storing a message in the XBT-K enables the correspondence to be established between :

- the message text, identified by its number.
- a TSX 7 variable.

The exchanges are made in the same way as for the ASCII protocol (terminal text block).

When the PLC sends a message number the message is displayed.

The value of the variable in the TSX 7 PLC is embedded transparently in the numeric field of the displayed message.