

E700 Manual

Revision : 0.79 - English

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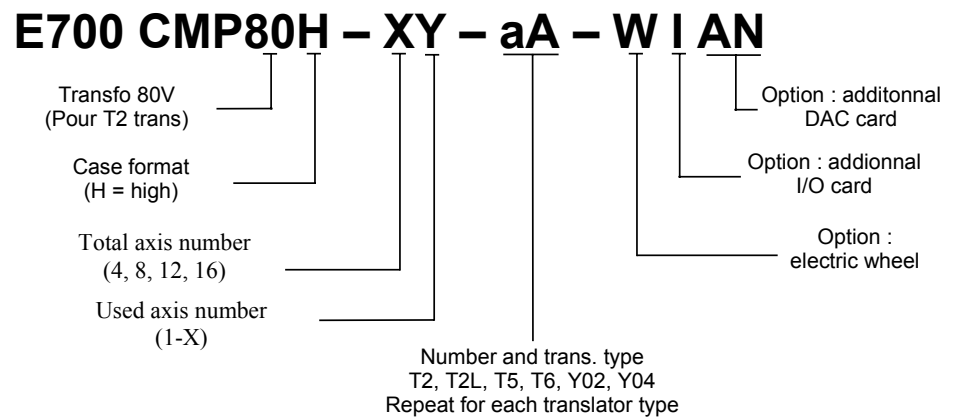
1 Safety

1.1 People safety

1.2 Machine safety

2.1.1 Types

Several types of compact controllers are available. The key of identification of the various types is as follows:



2.1.2 Panel

The interface panel is integrated in the controller. See the types for the options.

2.2 CPU version

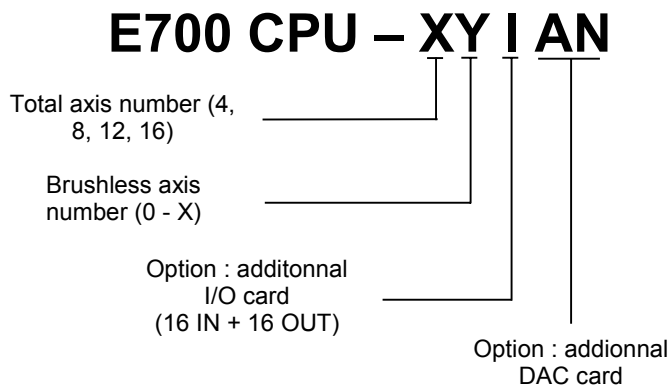
Version "CPU" includes only the control part. All the other elements, such as translators or the interface panel, are wired in an external way. This version allows more flexibility for the machine building while making it possible to off-set the elements. The control part is for example installed in the electrical equipment box, whereas the interface panel is directly on the machine.

Its appearance is as follows:



2.2.1 Types

Model "CPU" is available in several achievements. The manufacturing key is as follows:



2.2.2 Panel

The interface panel is not integrated, it must be ordered separately. Its designation is "E700-T". For more information, consult EIP SA.

3 Installation

3.1 E700 Compact

3.1.1 Types

3.1.2 Box Fixation

3.1.3 230 VAC supply wiring

3.1.4 Emergency stop wiring

3.1.5 24 Volts input – output wiring

3.1.6 Analog input – output wiring

3.1.7 Motor wiring

3.1.8 External modul input – output wiring

3.1.9 TRANS5 translator adjustment for 3 phase step motor

3.1.10 E700-3 translator adjustment for 2 phase step motor

3.1.11 Yaskawa translator adjustment for brushless motor

3.2 E700 CPU

The front panel of E700 CPU contains the following connectors:

- Supply and Analog (J1).
- Inputs (J2).
- Outputs (J3).
- Emergency (J4).
- Supply (J5).
- RS-232.
- External I/O Modules.
- E700-T PANEL
- Encoder 0, 1
- RS-485 Bus

Depending of the hardware configuration, the following connectors could be present :

- Input / Output extension card (J6-J7)
- Step motor signals
- Brushless motor signals

Each of these connectors are described in the following paragraphs.

3.2.1 Box fixing

3.2.2 Supply and Analog (J1)

It is a Weidmüller 3.5mm connector. It groups analog inputs and outputs. Pin description is as follows:

Pin	Signal	Description
1	0V	0V (internally connected to J5 :SUPPLY pin 3)
2	+24VOUT	+24V (internally connected to J5 :SUPPLY pin 2)
3	0V	Connected with pin n°1
4	+24VOUT	Connected with pin n°2
5	+10VREF	Reference voltage for analog inputs ADC0..1
6	+10VREF	Reference voltage for analog inputs ADC0..1
7	DAC0	Analog output 0..10V 8bits resolution
8	DAC1	Analog output 0..10V 8bits resolution
9	ADC0	Analog input 0..10V 10bits resolution
10	ADC1	Analog input 0..10V 10bits resolution
11	AGND	0V for analog signals
12	AGND	0V for analog signals

Note :

- Pin 1 and 3 or 2 and 4 are internally connected together and are used to supply E700 motherboard in his “stand alone” version.
- In a CPU box, 24V power supply is made in the box with the J5 connector (Supply). It not necessary to connect pin 1, 2, 3 and 4.

3.2.3 Inputs (J2)

It is a Weidmüller 3.5mm connector. It groups Mother Board 24V digital inputs. Inputs must be pulled to the +24V to be active and must be let open to be inactive. Pin description is as follows:

Pin	Signal	Description
1	+24VOUT	+24V (internally connected to J5 :SUPPLY pin 2)
2	IN7	
3	IN6	
4	IN5	
5	IN4	
6	IN3	
7	IN2	
8	IN1	
9	IN0	
10	+24VOUT	+24V (internally connected to J5 :SUPPLY pin2)

3.2.4 Outputs (J3)

It is a Weidmüller 3.5 mm connector. It groups Mother Board 24V digital outputs. Outputs are pulled to the +24V when they are in the active state and are free of potential when they are in the inactive state. They can deliver 1 Ampere. Load must be connected between the output and the 0V. Pin connection is as follows:

Pin	Signal	Description
1	0V	0V (internally connected to J5 :SUPPLY pin 3)
2	OUT7	
3	OUT6	
4	OUT5	
5	OUT4	
6	OUT3	
7	OUT2	
8	OUT1	
9	OUT0	
10	0V	0V (internally connected to J5 :SUPPLY pin 3)

3.2.5 Emergency (J4)

It is a Weidmüller 3.5mm connector.

- +24VEM OUT pin is used to supply the emergency circuit. It shuts down when the processor fails (when Watch Dog signal appears). +24V EM OUT can deliver 1 Ampere.
- /EMERGENCY input must be pulled to +24V. When this input fails, E700 controller go to the emergency mode. To summarize, the normally closed contact of the emergency system must be connected to pin 2 and 3 of the J4 connector.

Pin	Signal	Description
1	0V	
2	/EMERGENCY	Emergency 24V input
3	+24V EM OUT	+24V voltage to supply emergency switch (max. 1A)

3.2.6 Supply (J5)

It is a Weidmüller 5.08 mm connector. It is used to provide the 24V main supply to CPU box components. Total consumption must not exceed 10 Amperes (according to the weidmüller connector specifications). Pin description is as follows:

Pin	Signal	Description
1	PE	Ground protection (connected to frame)
2	+24V IN	24V main supply of CPU box
3	0V	Return for the 24V main supply

3.2.7 RS-232 connector

It is a Sub-D 9 pin connector. The RS-232 interface is electrically isolated. It allows serial transfer with a PC using a **1:1 standard cable**. Pin description is as follows:

Pin	Signal	Description
1	CD	Carrier detect, connected with DTR and DSR
2	RXD	Data Receive from PC
3	TXD	Data Transmit to PC
4	DTR	Data terminal ready, connected to DSR and CD
5	0V (232)	0V RS-232, isolated
6	DSR	Data set ready, connected to DTR et CD
7	RTS	Request to send, connected to CTS
8	CTS	Clear to send, connected to RTS
9	-	Not connected

3.2.8 Input / Output extension card connectors (J6 –J7)

The J6 connector is Weidmüller 3.5mm screw type. It gathers the extension card 24V digital outputs. The exits are drawn with +24V in a active state and free of potential at rest. They can deliver a max. current of 1 Amp. The load must be connected between the exit and the 0V. Pin description is as follows :

J6 Pin	Signal	Description
1	COU15	
2	COU14	
3	COU13	
4	COU12	
5	COU11	
6	COU10	
7	COU9	
8	COU8	
9	COU7	
10	COU6	
11	COU5	
12	COU4	
13	COU3	
14	COU2	
15	COU1	
16	COU0	

The J7 connector is Weidmüller 3.5mm screw type. It gathers the extension card 24V digital inputs.

The inputs must be drawn with +24V to be activated and free of potential to be inactivated. Pin description is as follows :

J7 Pin	Signal	Description
1	CIN15	
2	CIN14	
3	CIN13	
4	CIN12	
5	CIN11	
6	CIN10	
7	CIN9	
8	CIN8	
9	CIN7	
10	CIN6	
11	CIN5	
12	CIN4	
13	CIN3	
14	CIN2	
15	CIN1	
16	CIN0	

3.2.9 External I/O Module Connector

It is a Sub-D 15 pins connector. It is a bus to connect external EIP I/O modules (E500-I1, E500-I/O, E500 I/OV and E500-ODC). It is possible to use till 128 external inputs and 128 external outputs. The link between E700 controller and I/O modules can be made with a flat cable with a 15 pins Sub-D male connector at one end and a 16pin female socket connector at the other end. Pin description is as follows:

Sub-D pin	Signal	Socket pin	Description
1	BDATA	1	
2	BRES	3	
3	+13V	5	
4	BWR	7	
5	BA0	9	
6	BA2	11	
7	BA4	13	
8	GND	15	
9	GND	2	
10	/BDI	4	
11	+13V	6	
12	BA1	8	
13	BA3	10	
14	BA5	12	
15	BA6	14	
-	-	16	

3.2.10 E700-T PANEL Connector

It is a Sub-D 15 pins male connector. It is used for the serial full duplex RS-422 line and to supply the E700-T front panel. The cable between the E700 controller and E700-T front panel must be a 1:1 shielded cable with 15 pin Sub-D connector at each end. Pin description is as followed:

Sub-D pin	Signal	Sub-D pin	Description
1	+24V	1	E700-T power supply
2	TX+	2	Transmit + from CPU
3	TX-	3	Transmit - from CPU
4	RX-	4	Receive - from CPU
5	RX+	5	Receive + from CPU
6	0V	6	E700-T power supply
7	+24V	7	E700-T power supply
8	-	8	-
9	+24V	9	E700-T power supply
10	+24V	10	E700-T power supply
11	0V	11	E700-T power supply
12	0V	12	E700-T power supply
13	0V	13	E700-T power supply
14	0V	14	E700-T power supply
15	+24V	15	E700-T power supply

3.2.11 Encoder 0, 1 Connectors

It is a Sub-D 9 pin female connector. It is used to connect an encoder with or electrical wheel. Pin description for is as follows:

Pin	Signal	Description
1	CHA0 +	A phase positive logic
2	CHB0 +	B phase positive logic
3	INDEX0 +	Index pulse positive logic
4	+5V OUT	Encoder power supply
5	-	Not connected
6	CHA0 -	A phase negative logic
7	CHB0 -	B phase negative logic
8	INDEX0 -	Index pulsenegative logic
9	GND	Encoder power supply return

3.2.12 RS-485 Bus Connectors

They are Sub-D 9 pin male and female connectors. They can be used to create an half-duplex RS-485 multi-point serial link between CPUs. The cable must be shielded and have Sub-D 9 pin female and male connectors.

Sub-D pin	Signal	Sub-D pin	Description
1	-	1	Do not connect (future use)
2	GND(w/100 Ohm serial resistor)	2	Do not connect (future use)
3	TX, RX -	3	Transmit, receive -
4	-	4	Do not connect (future use)
5	GND	9	ground
6	-	6	Do not connect (future use)
7	+24VOUT	7	Do not connect (future use)
8	TX, RX +	8	Transmit, receive +
9	-	9	Do not connect (future use)

Note :

Termination resistors must be connected at the two ends of the multi-point bus. To do this, a simple solution consist to put Sub-D connectors containing the terminal resistor on the free connectors of the first CPU and on the free connector of the last CPU. This allows to have an identical cable for all others connectors.

3.2.13 Step motor signal connectors

3.2.13.1 Motor connector

They are Sub-D 9 female connectors for the control signals of EIP SA translators type TRANS-2, TRANS-3, TRANS-4, TRANS-5, TRANS-6.

Flat cable Sub-d 9 pin contacts towards socket female 10 pins. Pin description is as follows:

Sub-D pin n°	Signal	Socket broche n°	Description
1	+12V	1	
2	FAULT	3	
3	/BOOST	5	
4	/PULS	7	
5	/DIR	9	
6	GND	2	
7	GND	4	
8	/RESET	6	
9	INB	8	
-	-	10	

3.2.13.2 Home 0..3 Inputs (J8)

This connector is of type Weidmüller 3.5mm. It gathers the 24V digital inputs of axes 0,1,2,3.

These inputs are comparable that the others, but are mainly intended for the reference of the corresponding axis (LS inputs of the E600).

The entries must be drawn with +24V to be activated and at free potential to be inactive. Pin description is as follows:

Pin	Signal	Description
1	+24VOUT	+24V output protected by a fuse from 750mA
2	INA0	Reference input axis 0
3	INB0	Spare input axis 0
4	INA1	Reference input axis 1
5	INB1	Spare input axis 1
6	INA2	Reference input axis 2
7	INB2	Spare input axis 2
8	INA3	Reference input axis 3
9	INB3	Spare input axis 3
10	+24VOUT	+24V output protected by a fuse from 750mA

3.2.13.3 Home 4..7 inputs (J9)

This connector is of type Weidmüller 3.5mm. Like connector J8, but for axes 4,5,6,7.

Pin description is as follows:

Pin	Signal	Description
1	+24VOUT	+24V output protected by a fuse from 750mA
2	INA4	Reference input axis 4
3	INB4	Spare input axis 4
4	INA5	Reference input axis 5
5	INB5	Spare input axis 5
6	INA6	Reference input axis 6
7	INB6	Spare input axis 6
8	INA7	Reference input axis 7
9	INB7	Spare input axis 7
10	+24VOUT	+24V output protected by a fuse from 750mA

3.2.14 Brushless motor signal connectors (E600-8)

The Sub-D 9 pins female connectors holds inputs for limit-switches and reference sensor for a Pulse Controlled Servo Translator. Sensors for PLS, NLS, and HOME-SWITCH lines must be NPN normally close type. When not used, this lines must be connected to 0V (pin 4 and 8). Pin description is as follows:

Pin	Signal	Description
1	NLS	Negative limit-switch
2	HOME SWITCH	Reference sensor
3	+24VOUT	+24V power supply
4	0V	0V power supply
5	SECURITY CHAIN	+24V output, become open when translator alarm occurs
6	PLS	Positive limit-switch
7	-	Not connected
8	0V	0V power supply
9	SECURITY CHAIN	Connected to pin 5

The Sub-D 15 pins female connectors hold all the command signals for a Pulse Controlled Servo Translator. The link must be made with a shielded 7 twisted pair cable with a Sub-D 15 pins male connector at one end and a connector wich depend on the translator at the other end. Pin description for two-phase mode is as follows:

Yaskawa					
Sub-D pin	Signal	Color	CN1 pin (Yask.)	Signal	Description (Yaskawa)
1	0V	Black	32	ALM -	Alarm output
2	A PULS -	Brown	8	/A phase (/PULS)	Pulse input
3	B PULS -	Brown/ green	12	/B phase (/SIGN)	Pulse (Sign) input
4	/PC0	Pink	20	/PC0	C-Phase
5	N-OT	Grey/ pink	43	N-OT	Negative Over Travel
6	/BOOST	Yellow	40	/S-ON	Servo on input
7	ALM +	Purple	31	ALM +	Alarm output
8	+24V-OUT	Red	47	+24V-IN	Yaskawa optocoupler supply
9	INB	Blue	26	/COIN-	Positioning completed output
10	A PULS +	White	7	A phase (PULS)	Pulse input
11	B PULS +	White/ green	11	B phase (SIGN)	Pulse (sign) input
12	PC0	Grey	19	PC0	C-Phase
13	P-OT	Red/ blue	42	P-OT	Positive Over Travel
14	BOOST	Green	44	/ALM-RST	Alarm reset input
15	0V	-	-		not connected
8	+24V-OUT	Red	29	/S-RDY+	Yaskawa optocoupler supply
-	-	Blue	30	/S-RDY -	Servo ready output, connected to pin 25
-	-	Blue	25	/COIN +	Connected pin 30
Shielded shell	SHIELD	(Braid)	50	Shield	Cable Shield

Fuji FALDIC-W model RYC751D3-VVT2				
Sub-D pin	Signal	CN1 pin (Fuji)	Signal	Description (Fuji)
1	0V	14	M24	0 V
2	A PULS -	8	CA*	Pulse input
3	B PULS -	21	CB*	Pulse (Sign) input
4	/PC0	24	/PC0	FFZ*
5	N-OT	5	N-OT	Negative Over Travel
6	/BOOST	2	/S-ON	RUN
7	ALM +	17	ALM +	Alarm output OUT3
8	+24V-OUT	1	P24	Supply
9	INB	-	-	
10	A PULS +	7	CA	Pulse input
11	B PULS +	20	CB	Pulse (sign) input
12	PC0	23	PC0	FFZ
13	P-OT	4	P-OT	Positive Over Travel
14	BOOST	3	/ALM-RST	RST
15	0V	14	M24	0 V
Shielded shell	SHIELD	Shielded shell	FG	Cable Shield

4 Startup

4.1 Precaution to be taken

4.2 Fast checks

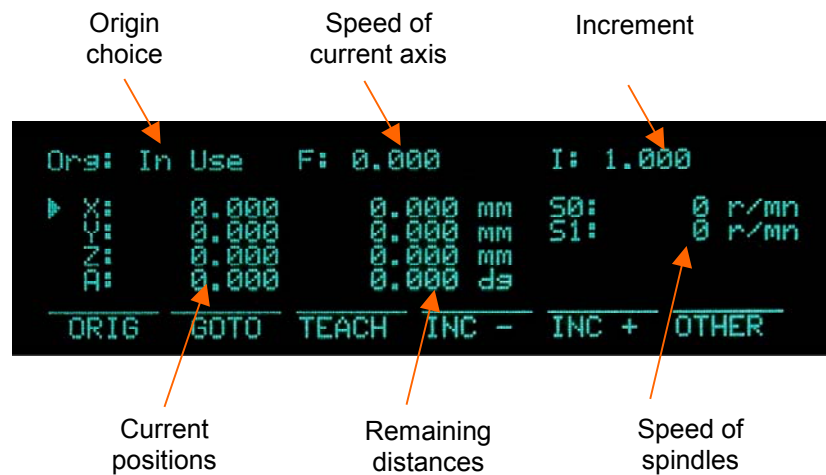
5 Menus

This chapter explain the current operations and screens, like position screens or program choice.

5.1 TOOLPOS - Positions and Jogging

This screen displays in continuous the current and remaining positions in function of origins and tool offsets. From this display, it's possible to do jogging on the axes.

This screen is accessible by key "TOOLPOS" from the group "PAGE" and looks as follows:



5.1.1 Displayed Values

The 1st column of values indicates the current position of the axis in an absolute or relative way according to choice's made by the function F1 "ORIG".

The 2nd column displays the remaining distance to reach the position setpoint.

The 3rd column indicates the speed of the spindles in rev/min. Moreover, the speed of the selected axis is displayed at top in the middle of the screen.

5.1.2 *Displaying and Selection of the axis.*

By default, the screen "ToolPos" displays the first machine axes, that to amount of 4 axes.

To select a displayed axis, use the up and down arrows.
To display another axis or to present them in a different way, delete one of them using "DEL" key. Then, on the blank line, type the number or the corresponding name of the axis.

It's also possible to use the fast selection. For that, type only the name of the desired axis. If it's already displayed, the arrow moves, if not, the new axis replaces the current.

5.1.3 *Numerical input box*

Several numerical input box are present on this screen. The choice of the edited value is done dynamically according to the context. By default, the numeric keypad is dedicated to change the value of the increment. However, if the line pointed by the arrow is empty, the number of the axis is set. And lastly, if function "TEACH" is activated, the numeric keypad is dedicated to it.

5.1.4 *Jogging – Manual Displacements*

It's possible to make movements in manual mode (jogging) from this screen. For that, use key "JOGGING -/+". The axis selected by the arrow moves according to the increment (I:) displayed at top on the right of the screen and as long as the key remains depressed.

To change the increment use the numerical keypad, or use the F4-F5 "Inc -/+" keys which divides and multiplies by 10 the current value.

The function F2 "GOTO" makes it possible to give an destination setpoint to the current axis. Displacement takes effect so long as key "ENTER" remains depressed.

5.1.5 Teach

The function F3 "TEACH" makes it possible to correct by teach-in the offset values such as the G54-58 origins and the length of the tools

For example, to position manually a tool to position zero, press F3 and enter value 0. The length of tool then will be automatically adjusted to obtain the desired offset.

5.1.6 Other functions

Use the F6 "OTHER" key to reach the following functions:

- Manual reference of the current axis
- Management of the electric wheel

To leave this sub-menu, use "ESC" key.

5.1.7 Electric wheel

The electric wheel is managed by the sub-menu since "OTHER".

By activating the electric wheel, it remains active until deactivation or leaving the ToolPos screen.

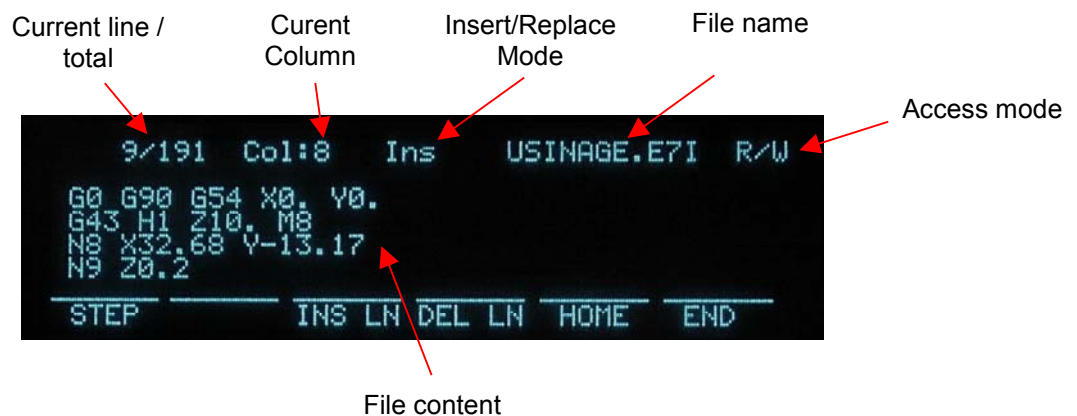
When going back to the ToolPos screen, the electric wheel is not automatically re-activated.

5.2 EDIT – Text editor

The text editor allows the visualization and the edition of the files contained in the internal memory. The edition of breakpoints is also done by this interface.

To open or to edit a file, use "MEM" key, then select the desired file with the arrow and press "EDIT" or "ENTER" key. Depressing "EDIT" key from another interface will open the last treated file. To leave the editor, press "ESC" key.

Editor screen :



The editor can treat all the types of files contained in E700, programs or configuration files.

5.2.1 Navigation

Scrolling within the file is done mainly using the arrows up, down, left and right arrows. The F5-F6 "HOME/END" function keys make it possible to quickly reach the beginning and the end of a line.

"GOTO" key, between the arrow keys, makes it possible to reach a specific line. The end of file is accessible quickly by this method.

Use F7-F8 function keys like "Page Up - Page Down " keys. They carry out displacements of 3 lines as long as they remain depressed.

5.2.2 Breakpoint

To define a breakpoint at one of an ISO or UniProg program line, use the function F1 "STEP"

However, take care to place it on an executable line.

5.2.3 Access Mode

The text editor can treat files in read/write (R/W) or read only (R) mode. A file is opened as reading only if declared like this in the file explorer of the E700 or with a PC file explorer.

Moreover, the edition of files can also be locked for the user without a password (see Authorizations).

5.2.4 Edition

When a file can be modified, symbol (R/W) appears at the high right corner of the screen.

All the alpha - numerical keys are usable. To insert a special character, use the "MISC" key which proposes the symbols.

The "ALPHA" key makes it possible to select the keys of the numeric keypad. If the "ALPHA" led is lit, the blue part of the numeric keypad is active.

"CLR" and "DEL" allows characters obliteration. Use "INS" key, to select between insertion (INS) and replacement (REP) mode.

Use function keys F3-F4 "INS LN - LED LN" to insert or erase a line in the file.

The text editor has a basic possibility of cancellation. Indeed, the modifications on a line are taken into account only when leaving the line (↑, ↓, PgUp, PgDown, etc) or after validation by "ENTER". Before these confirmations, use "ESC" key to cancel the modifications.

5.2.5 Execution

In order to avoid modifications involving on consequences on the execution of the programs, the text editor must be closed to start an execution (START).

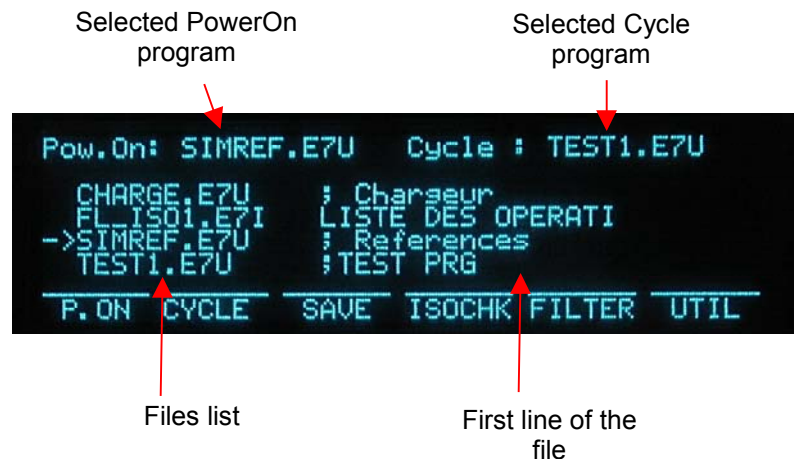
Of course, it cannot be open if a program is already running.

5.3 MEM – Explorer and File Manager

"MEM" screen allows the selection of the "Power On" and "Cycle" files. It also gives access to the file manager.

To reach this screen, press "MEM" key of the group "PAGE". To leave, press "ESC" key.

The screen is presented in a following way:



5.3.1 Navigation

To scroll in the file list, use the arrow up and down keys and F7-F8 "PageUp - PageDown" keys.

The arrow on the left of the screen indicates the selected file.

5.3.2 Filter

The file explorer has a filter by extension. Press F5 "FILTER" key to define which type of files you want to see in the list. You have the following choices:

- ISO files
- UniProg files
- ISO and UniProg files
- M Function and System (*.E7M) files
- Configuration (*.ini) files
- All E700 valid files

In order to know all file extensions accepted by E700, refer to the "File system" chapter.

5.3.3 Program selection

Use F1-F2 "P.ON - CYCLE" keys to respectively assign the PowerOn and Cycle programs.

No execution or movements must be running when affecting a new program.

5.3.4 Manual Saving to internal memory

In spite of the autosaving principle of E700, to carry out a manual saving of the whole of the modified files use F3 "SAVE" key.

5.3.5 File Manager

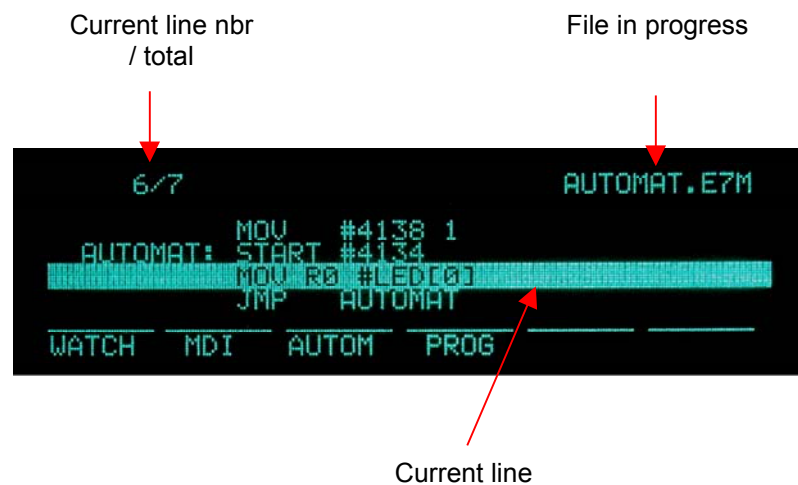
Press F6 "UTIL" key to access the file manager. This interface allows the current files handling such as copying, erasing or renaming. It allows also the formatting of the internal memory and the access to the SD/MMC card.

5.4 TRACE – Execution monitoring

This interface makes it possible to visualize the execution of the programs in progress, like the PLC task and the "Power On" or "Cycles" programs by holding account of simultaneous execution.

To reach this screen, press the key "TRACE" of group "PAGE". To leave it, press "ESC".

The screen is as follows :



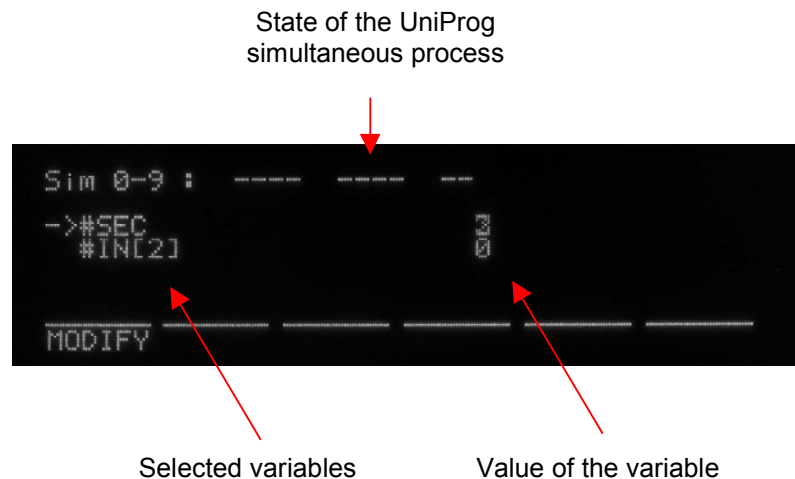
5.4.1 Displaying

To commute between the PLC task and the program currently executing , use keys F3-F4 "AUTOM - PROG".

The program carried out can call upon several simultaneous process (see UniProg). To select one of them use the keys F5-F6 "SIM- SIM. Key "GOTO" makes it possible to reach directly a simultaneous process

5.4.2 Watch

"WATCH" screen, accessible by the F2 key, makes it possible to visualize the systems variables. It looks as follows:



The higher line displays the state of the UniProg simultaneous process with the following correspondence :

A	Activated
P	Pause
-	Stopped

The screen can contain up to 4 variables simultaneously. If the name of a variable is not known, an error message replaces the value.

The up and down arrow keys make it possible to select a variable. "DEL" key makes it possible to withdraw one of them from the interface.

To insert a variable, type its name on a blank line. To correct the field of a variable, press a not-numerical key or use "CLR" key.

The numeric keypad is by default dedicated to the value modification of the selected variable. Thus, enter a value and press "ENTER" to assign a new value to the variable. It's also possible to press the F1 key "MODIFY" to edit the value of a variable.

To go back to the "TRACE" screen press as with the practice "ESC" key.

5.4.3 MDI

This screen makes it possible to carry out ISO order lines. To reach it press the F2 "MDI" key from the "TRACE" screen. To leave, press "ESC".

MDI interface looks as follows:

Edition of the line to be executed



Use alpha – numerical keys, "CLR" or "DEL" to edit a command line to be executed.

Validate the contents of the line with "ENTER" key. Then, to carry out, press F1 "EXEC".

The MDI interface memorizes the 5 last edited lines. You can thus point out these lines for execution by using F2-F3 "PREV – NEXT" keys.

To go back to the "TRACE" screen press "ESC" key.

5.5 MENU – Main menu

The "MENU" key of the "PAGE" group gives the access to the main menu of E700. This menu is presented as follows:



To leave this menu, press "ESC" key. This principle is repeated in all the screens and menus which follow.

5.5.1 USER – User menu

The menu « USER » gives access to the screens reserved for the user configuration. The menu is currently presented as follows:



From this menu, you reach the two user parameter screens. The user parameters are defined in UniProg by the "PARAM" function in a system file. OEM screen is normally envisaged for the machine's manufacturer and CUST screen is reserved for the final customer.

These two screens can be the subject of modifications restrictions (see Authorizations).

A "OEM Parameter" screen can be presented thus for example:

```

Parametres OEM                                R/W
TEMPO SOUFFLAGE SOUS : 1.000000
TEMPO DECHARGEMENT : 0.400000
CHARGEMENT PRESENCE PCE : 1
MAGASIN CHARGEMENT M/D : 1
DEF
  
```

5.5.2 ORIGIN – Origin tables

From the "MENU" screen, press the F2 "ORIGIN" key to reach the edition interface of the origin tables.

This interface arises as follow :

```

G54
-> X: 0.0000 mm      B: 0.0000 mm
    I: 0.0000 mm
    Y: 0.0000 mm
    A: 0.0000 mm
INDEX                                G54-8  G60
  
```

It is possible to edit the origin tables G54-58 and G60. These tables include a shift of origin per axis and G60 tables contain also a tool radius.

F5-F6 "G54-8" and "G60" keys allow to select the table type. The F1 "INDEX" key is to specify the table offset. F7-F8 "PgUp - PgDown" keys are used to inc/dec the offset.

To edit a value, initially select the axis using the arrow keys or the axis name, then enter the new value with the numeric keypad, finally validate with "ENTER" key. "CLR" key also allows the edition of a value.

"ORIGIN" screen displays by default the first axes of the configuration, that to amount of 8. Hit the "DEL" key to erase the selected axis.

To display an unlisted axis, introduce its number on a blank line (after "DEL") or enter its reference name.

The origin values are stored in the "ORIGIN.ini" file. Read the "File system" chapter and the "E700 INI Files Tab.pdf" document for more informations.

5.5.3 TOOL – Tool tables

From the "MENU" screen, press F3 "TOOL" key to display the tools screen.

The interface looks as follow :



Tool	Length	Radius
-> 0:	0.0000	0.0000
1:	0.0000	0.0000
40:	0.0000	0.0000
45:	0.0000	0.0000

TOOL - TOOL +

The interface displays 4 of the 100 tools.

Use the numeric keypad to modify the number of the tool, the length or the radius according to the selection. The arrow selects element. Use "CLR" key to modify a value.

It is also possible to modify the number of the tool by using F5-F6 "TOOL- TOOL+" and by F7-F8 "PgUp - PgDown" keys.

The tools values are stored in the "TOOL.ini" file. Read the "File system" chapter and the "E700 INI Files Tab.pdf" document for more informations.

5.5.4 COM – PC communication mode

From the "MENU" screen, press F4 "COM" key to put E700 in PC communication mode .

This mode is to link a Windows ® PC to the E700 via a RS232 cable for file transferts. The screen is presented as follows:



The "Operation" line shows the current operations. It is not possible to exit this screen during any operation.

In this mode, the PC is the master and the E700 is the slave. Other communication modes are envisaged in the future.

For further information, read the "Programs File Manager" chapter.

5.5.5 Configuration

By pressing the F5 key in the "MENU" screen, you reach the menu of configuration which arises as follows:



This menu is to configure the E700. That includes the axes, general and user (language) configuration.

For more information, read the "Configuration" chapter.

5.5.6 OTHER – Miscellaneous functions

The main menu contains some additional functions which appear while pressing on the F6 "OTHER" key. The screen looks as follows :



The F1 "LOGIN" is to modify the user's status, operator or supervisor.

The F2 "TESTS" key gives access to the menu of the hardware tests. Read the chapter "Controls operation" for more details.

The F3 "CLOCK" key displays the time and the date, as well as the access to its adjustments. In finds in more in this screen the operation life time of E700.

The screen recapitulating the software versions of E700 (firmware) is accessible by pressing the F5 "VER" key.

The function F6 "HELP" gives now the address of EIP SA, manufacturer of E700.

6 Configuration

This chapter gathers the detailed explanations on the configuration interfaces of E700. What includes in particular the general and the axes configuration.

The configuration menu is reached by pressing the "MENU" key then the "F5" key. Its aspect is as follows:



Function "DEF" that one finds in several places (generally F1) makes it possible to apply the default values. That only with the parameters displayed with the screen.

The enumerated parameters (of preset choices) are generally modifiable by F5-F6 keys. The state of this one changes dynamically according to the choice of the parameter.

The numerical parameters are edited directly by the numeric keypad. By value validation by "ENTER" key, a checking of the limiting values is made. Thus, if the value is except limit, the terminals are specified.

It's possible at any time to leave a parameter in the course of edition by employing "ESC" key. The modification of a parameter is only possible if no execution is in hand. Conversely during the edition of a parameter it is impossible to start an execution.

The modification of the configuration can make the object of a locking by password or safety key.

All the parameters of the configuration are safeguarded in the E700.ini file. It's possible to recover very easily the configuration of a machine simply by copying this file. It is however not recommended to edit this file manually. For more information on this point and the limiting values of the parameters, refer to the "E700 INI File Tab.pdf" document and to the "File system" chapter.

6.1 GEN – General Configuration

The few general parameters of E700 are gathered within this screen :

```
General Settings
Max RPM 10 Volts : 3000
Max RPM 10 Volts : 3000
Tool correct. inv. : no
Remote Control : no
Number of axis : 5
-----
DEF
```

These parameters are generally defined at the startup of the machine.

The first two parameters "Max RPM 10" correspond at the max. speed of the spindles.

The Tool correct. inv. makes it possible to hold account which table or tool moves.

The value of the number of axis is equivalent to that of the machine. It's however also possible to define it according to the number of axes cards multiplied by 4.

6.2 NAME – Reference names

This interface makes it possible to allot to the axes names of reference. It is presented as follows :



The screen displays the first axes of the configuration, that to amount of 9 to the maximum.

The free choice of the attribution of the names is left to the user. This attribution is not obligatory. Indeed, using the F6 "NO DEF" key define an axis without name. To define a name, press simply on the corresponding key when the axis is selected.

A checking of redundancy of the names is carried out when leaving the screen. In the event of error, a message specifies the situation and the configuration by default of the names is used, that is to say X; Y; Z; A, B, C.

The play of allowed names is as follows: X, Y, Z, A, B, C, U, V, Y

6.3 AXIS – Axes configuration

The configuration of the axes is done by the intermediary of a sub-menu and several screens gathering of the related parameters.

Press F1 "AXIS" starting from the configuration screen to reach the following sub-menu :



It's now possible to reach the configuration screens of the axes by topic.

All the following screens specifies with the corner higher right the reference of the axis. To change axis, use F3-F4 "AXIS - - AXIS +" keys or use the name of reference.

It's also possible to sail between the configuration screens of axis using F7-F8 keys.

6.3.1 DRIVER – Translator

This screen gathers the various parameters related to the power translator (driver). It is presented as follows:



The control mode defines the output signal towards the translator, that is to say PulsFB, PulsDir or Quad.

Boost defines when the motor receives 100% of the current. If not it receives the 60% which corresponds to the economic mode.

6.3.2 DISPL – Displacements

This screen gathers the parameters relating to displacements of the axis. Here this screen:

```

Axis Displacement Settings                               Axis : X
Unit : mm
Rev/unit Ratio : 1.000000                               rev/mm
Offset : 0.000000                                       mm
Positive Stroke : 100.0000                               mm
Negative Stroke : -100.0000                              mm
-----
DEF  MODULO  AXIS -  AXIS +  -  +

```

The parameter "Unit" is definable in mm, m, deg or rev. It acts as displacement unit.

The Rev/unit Ratio. indicates the number of turn of the driving axis to advance of a displacement unit.

The offset makes it possible to shift the central point of the total travel. This value as well as the races are given according to the selected unit.

6.3.3 SPEED – Axes speeds

The interface of the parameters related to the movement is as follows :

```

Axis Speed Settings                               Axis : X
Unit : m/mn
High speed : 1.000000                               m/mn
Joggins speed : 1.000000                             m/mn
Acceleration Dist. : 1.000000                         mm
Deceleration Dist. : 1.000000                         mm
-----
DEF  MODULO  AXIS -  AXIS +  -  +

```

The speed unit is given in mm, m, deg or rev according to the seconds or to the minutes.

High speed corresponds at the authorized maximum speed. The jogging speed must be lower then the high speed.

Accelerations/decelerations are given in unit of displacement. The introduced value corresponds to the distance put to reach maximum speed.

6.3.4 REF – Reference

The parameters of reference catch gathers as follows:

```

Axis Reference Settings                               Axis : X
  Ref. enable : yes
    Speed : 1.000000 m/mn
  Low Speed : 0.100000 m/mn
  Digital Input : HOMER:0
    Switch : Index
-----
DEF  YASKAW  AXIS -  AXIS +  NO  YES

```

Ref. enable parameter makes it possible to activate or inhibit the catch of reference. The other parameters remain memorized even if this parameter is negative.

It's also necessary to specify the setting rates of reference. Low speed being that at the time of the return towards the detector.

The Digital Input parameter has to correspond to the entry on which the sensor of reference is cabled. The type of sensor is specified by the Switch parameter.

6.3.5 DIR – Rotation direction

The directions of rotations are defined in the screen which follows:

```

Axis Direction Settings                               Axis : X
  General inversion : yes
  Reference inversion : no
-----
DEF  AXIS -  AXIS +  NO  YES

```

The first parameter makes it possible to reverse in a total way the direction of rotation of the motor. The second influences only on the reference catch.

6.3.6 WHEEL – Electric wheel

The parameters relating to the electric wheel are defined in the following screen:

```

Axis Wheel Settings                               Axis : X
Wheel enable : yes
Speed : 1.000000 m/mn
Acceleration Dist. : 1.000000 mm
Deceleration Dist. : 1.000000 mm
DEF      AXIS -  AXIS +  NO  YES

```

It is important to notice that these parameters are defined for each machine axis.

The first parameter activates or inhibits the electric wheel for the selected axis.

The three remaining parameters make it possible to specify a maximum speed at the time of the use of the electric wheel, as well as acceleration and relative deceleration.

6.4 EXTERN – External START / STOP / PAUSE configuration

The commands Start, Stop and Pause can be activated from digital inputs. The configuration interface is as follows :

```

External Input Settings
Start Input 1 : IN:0
Start Input 2 : no
Stop Input : IN:2
Pause Input : no
-----
DEF          NO    YES    -    +

```

All these external inputs can be activated or inhibited using F3-F4 "NO - YES" keys. The definite digital input remains memorized in the event of inhibition.

Define the type of input thanks to F5-F6 "-/+ " keys and the offset using the numeric keypad.

The external Start function can be defined with only one input or 2 inputs in parallel (Two hands start).

6.5 LNG – Choice of the language

The choice of the displaying language of E700 is done by the following screen:

```

Language Settings
Selected Language : English
-----
DEF          -    +

```

Use F5-F6 "-/+" keys, to choose between French, English or German. To note however that the language of the menus is not definable.

The language by default is French.

6.6 OTHER – Various configurations

The F6 key of the configuration menu gives access to some additional configuration screens. Here the sub-menu :



The following points define these screens.

6.6.1 PROG – PowerOn et Cycle prog. activation

This screen makes it possible to activate or not the taking into account of the programs of PowerOn and Cycle. To reach it, press the F1 "PROG" key, since the sub-menu of configuration.



F5-F6 "NO - YES" keys allow activation or not. In the event of inhibition, the name of the program remains memorized.

This interface does not make it possible to select the name of the program, that is done by screen "MEM".

6.6.2 USER – User interface parameters

Some parameters making it possible to personalize the user interface are defined on this screen.

```
User Settings
  ToolP single incr. : yes
  Real value precision : 4
  Keyboard beep      : no
  Automatic save     : no
  Inverted Menu      : no
-----
DEF                NO  YES
```

The 1st parameter makes it possible to define a single increment or not within the ToolPos screen. If the choice is "yes", all the axes will have the same increment.

It's also possible to define the number of decimal digits (between 1 and 6) using the parameter "Real value precision".

The parameter "Keyboard beep" allows the activation of the audio signal by key pressing.

The automatic safeguard makes it possible to carry out a save of the whole of the modified files by interval of 15 min.

Lastly, the inversion of the menu makes it possible to display the menus in intensified brightness (reverse video).

6.6.3 ACCESS – Authorizations

It is possible to restrict the use of E700 by the use of password or of safety key, that is to say access privileges. The menu, accessible by F3 "ACCESS" since the sub-menu from configuration, is as follows:



Starting from this screen, define for each principal screen (ToolPos, Editor, Mem, Trace and Menu) the functions which the user can employ without restrictions.

For example, for the ToolPos screen, the current configuration will make it possible to the user without privilege to carry out manual movements, but will not authorize it to modify origins (TEACH for example).



The F6 "LOGIN" key gives access to the screen of definition of the user password. Of course, this one is accessible only after authentication by system password or safety key.


The functions which can be restricted are the following :

- ToolPos Manual movements
 Origins modifications
- Editor File edition
 Breakpoint edition
- Mem File selection
 Access to file manager
- Trace Value modification in Watch screen
 MDI access
- Menu OEM parameters modifications
 Custom parameters modifications
 Origins and tools modifications
 Configuration modifications
 Force digital output (TEST screens)

6.6.4 SYSTEM – System parameters

The parameters which follow act on the whole of the executive behavior of E700, from where them name of system.

Here the interface :



```

System Parameters
  Min. interpol. seg. angle : 12.0
  Tool correction err stop : yes
-----
DEF
  
```

The minimum angle between interpolation segments makes it possible to define an angle below which the machine will automatically carry out a deceleration, a stop and an acceleration at the time of the passage of the angle. This with an aim of avoiding an unhooking of the step by step motors for example.

By default, this value is null; thus inhibiting this safety. This one is active with a value between 0.1 and 179.9.

The 2nd parameter "Tool correction err stop" makes it possible to put in pause the execution in the event of error of tool correction. The execution can continue while pressing again on "START".

This parameter activated makes it possible to check the exactitude of the realization of a part.

7 Operation control

E700 incorporates several screens and test functions. Some make it possible to check the operation of a machine on the level of the input-outputs for example. Whereas another group of functions makes it possible to check some basic elements of E700 itself.

The screens of test are atteignable by pressing the F6 "OTHER" key then the F2 "TESTS" key starting from the main menu "MENU".

The test menu look as follows :



The first three screens, is "AN REM", "AN CPU" and "DIGITAL" make it possible to carry out the tests on the machine, like the tests of wiring for example.

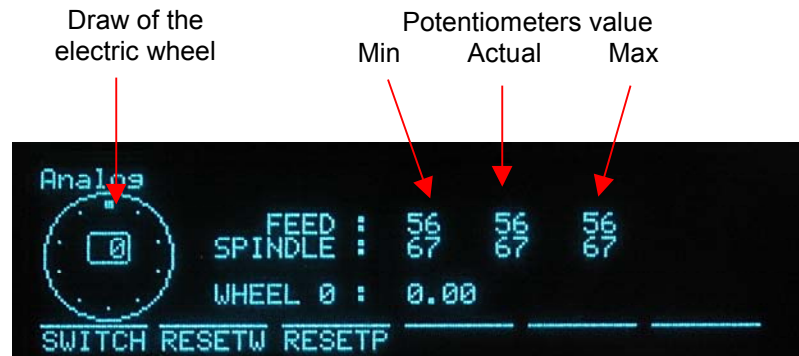
The last three screens, "DETECT", "OTHER" and "SDCARD", give the possibility of carrying out basic tests concerning E700. These checks are generally carried out on request for EIP SA

The majority of the screens and functions are available only if no execution is course.

7.1 Inputs - Outputs

7.1.1 AN REM - Potentiometers and electric wheel

The following screen enables to check the operation of potentiometer "FEED" and "SPINDLE" as well as electric wheel.



The three columns of values respectively give the smallest, the current and the greatest measured value.

The F1 "SWITCH" key makes it possible to commutate between the two electric wheels. The F2 "RESETP" key makes it possible to put the electric wheel at zero.

The F3 "RESETP" key reset the minimal and maximal values of the potentiometers.

7.1.2 AN CPU – CPU analog inputs and outputs

This interface makes it possible to read the inputs and to write the analog outputs of the CPU. Here its appearance :

```

                                ADC Values
                                Min  Actual  Max
                                ↓    ↓      ↓
Analogs
IN   ADC 0 : 359   360   360
     ADC 1 : 1023  1023  1023
OUT ->DAC 0 : 120
     DAC 1 : 0
-----
                                RESET
  
```

The three columns of ADC values respectively give the smallest, the current and the greatest measured value.

To set an output value to the DAC0, 1 select it with the arrow and by introduce the value with the numeric keypad. The valid range is between 0 and 255.

7.1.3 DIGITAL – Digital inputs and outputs

An interface joins together all the types of digital inputs-outputs of E700. The whole of the tests of digital wiring can for example be done since the following screen:

Input choices

```

Digital Inputs - Outputs
IN   IN:0   0000  0000
     CIN:0  1000  0000  0000  0100
OUT ->OUT:0 OFF
     COU:0  OFF
-----
                OFF  ON  -  +
  
```

Output choices

The screen is divided into two parts. The two higher lines are reserved for the digital inputs. As for the two lower lines, they are it for the outputs.

The inputs are displayed by group of 16 to the maximum, but of course limited by the last possible theoretical input. The selected input is 1st on the left. The following ones being consecutive inputs with that selected.

The exits are not displayed by group, but in a single way. It is possible to force off/on the selected output using F3-F4 "OFF-ON" keys.

To choose an input or an output, select the line with the arrow, then using F5-F6 "-/+" keys define the desired type. Then introduce the value of the offset using the numeric keypad and validate by "ENTER" key.

It's only possible to edit the offset using the numeric keypad.

7.2 E700

The screens and functions detail hereafter only make it possible to carry out basic tests of E700 itself.

7.2.1 DETECT – Auto-detected hardware

This screen only makes it possible to check the detected number of inputs – outputs of the external keyboard.

```

Detected Hardware
  EXRIN : 0      EXROUT : 0
  _____

```

The result is of course dependent on your hardware configuration.

7.2.2 OTHER – Other E700 tests

The interface which gathers several tests and indications is as follows:

```

Other tests
  Emergency stop : Inactive
  Security key   : 0
  Motherboard Switches : 000000
  _____
  LED   BEEP  EXTRAM  SCREEN  KEY

```

The 1st indication gives the statute of the emergency stop. That makes it possible in other to check the wiring of this circuit.

The line " Security key" represents of course the state of the digital input reserved for this key.

The state of the "DIP Switch" of the CPU are displayed with the third line.

The F1 "LED" key carry out a test on the whole keyboard leds. The F2 "BEEP" key makes it possible to check the operation of the audio signal.

Function "EXTRAM", F3 key, must be used with precaution. It indeed makes it possible to check the access (lines of addresses) of the memory of E700. It is recommended to carry out all the safeguards necessary and after the test to start again the E700.

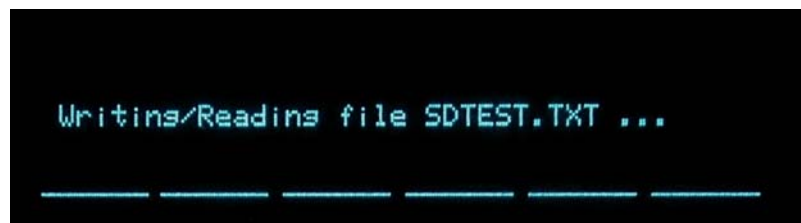
The F4 "SCREEN" key launch the routine of screen checking of E700.

7.2.3 SDCARD –SD / MMC card test

This function carry out a test on the SD/MMC card reader.

When pressing F6 "SDCARD" key, an automatic test proceeds. A file "SDTEST.TXT" is created and various cycles of writings and readings follow one another then. This file is automatically destroyed at the end of the test. According to the type of card, the test can last up to 30 sec.

During the test the screen is as follows :



With the end of the test, a message indicates the result. Receipt it by "ESC" key.

8 File system

8.1 Principle

E700 has a file system of FAT16 type. For this reason, it is possible to exchange between the E700 and a PC the files without any problem of format. It should be noted that the file names are limited to 8 characters.

8.2 Internal memory

A "flash" type memory is present. All the files used must be on the internal memory. This one has a default size of 1Mb while being extensible.

8.3 File management

A file manager allows to select the programs to be execute. It's also possible carrying out the current operations on the files, like copying from/to SD/MMC card.

8.4 File transfert

8.4.1 SD/MMC Card

E700 is equipped with a SD/MMC card reader (Secure DIGITAL/MultiMedia Card). It is thus possible to exchange with this type of cards files between the E700 and a PC. This format of card is currently very widespread and is in all multi-media trade.

8.4.2 PC communication

Thanks to the E700 FileManager software and using a serial line, it is also possible to transfer files directly from a PC. For more information, see the handbook of the software.

8.5 Configuration files (*.ini)

For the moment are comments prohibited in the *.ini files.

8.5.1 E700.INI

All the essential parameters for the operation of E700 are gathered in the file "E700.ini". That includes the axes and the general configuration (external start - stop - pause, language, etc). Parameters to memorize the user interface are also present.

At the start, the values are charged with checking of min. and max values. In the event of disability or absence of the parameter, the default value is assigned and an error message indicates the section and the parameter in question. If a section is missing (entirely or only the heading), the whole section is charged with the default values.

In more of the particular control of each parameter, the general configuration is checked at the end of the loading, in particular the names and the configuration of the axes. If the configuration of an axis is not applicable, a message announces the first source of error and the standard configuration is applied to the axis.

The basic parameter list of E700 is explicitly programmed. A modification of the list involves a modification of the operating system (firmware).

The menu "CONFIG" makes it possible to edit the principal elements of configuration. A safeguard is carried out in the following cases:

- Leaving configuration screens
- START command
- Interval of 15 min if autosaving is activated.
- Manual safeguard in screen "MEM"

The safeguard is carried out of course only if modifications are detected.

The secondary elements (user interface) are set according to the choices of the user (e.g. choice of the axes in the ToolPos screen). Their safeguard is carried out by manual safeguard.

For more details about the parameters of the E700.ini file, refer to the "E700 INI Files Tab.pdf" document.

8.5.2 ORIGIN.INI

All the values of tables G54-58 and G60 are memorized in this file. Each table has a section in the file. In the event of absence of a section, all the origins in question are initialized to zero.

A screen "ORIGIN" makes it possible to edit the values of the origins G54-58 and G60. Moreover, screen "TOOLPOS" also makes it possible to correct the values of G54-58 table using function "TEACH".

G60 tables include, in more than one shift of origin per axis, a radius correction value. Index of G60 is 0 to 63.

As long as no origin is defined, the ORIGIN INI file is empty. At the time of the edition of a first origin, all the sections of the file are created.

For more details about the ORIGIN.ini file, refer to the "E700 INI Files Tab.pdf" document.

8.5.3 TOOL.INI

All the values of table T (Tool) are memorized in this file. Each tool has a section in the file. So, for each tool, a value of length and radius are present. In the event of absence of a section, the values in question are initialized to zero.

A screen "TOOL" makes it possible to edit the values of the tools. It is possible to visualize 4 tools simultaneously. The number of tool is 100, that is to say [0-99].

Screen "TOOLPOS" makes it possible to correct the tool length thanks to function "TEACH".

As long as no tool is defined, the TOOL.ini file is empty. At the time of the edition of a first tool, all the sections of the file are created.

For more details about the TOOL.ini file, refer to the "E700 INI Files Tab.pdf" document

8.5.4 PCUST.INI et POEM.INI

These files contain the values of the user (PCUST) and integrator (POEM) parameters. The parameters are declared in a *.E7M file.

As it acts of a *.ini file, each value is identified by a key according to the index. The number of parameter is 50 and 20, for respectively. OEM and Custom.

An interface of E700 makes it possible to directly edit the parameters declared for OEM or CUST.

For more information concerning the users parameters, refer to the Uniprogram instruction "PARAM".

8.5.5 DISPLAY.INI

This file contains the static screens of the user and/or the integrator. A total of 10 screens can be defined. The screens contain 6 text and 6 labels for the function keys. The UniProg instruction "DISPS" display the desired screen.

Screen number 0 is reserved as main screen. If it isn't defined, the standard screen is displayed. The standard screen contains only the file names in the course of use.

The labels of screen number 0 are allotted to the user macros defined in Uniprogram. See the system flag "MACRO".

Each screen is defined by a section and the contained elements by a key. For example:

```
[Display2]
I0 = "    Program choice"
I2 = Prog A
I3 = Prog B
f1 = A
f2 = B
```

If the section or the heading is missing, the screen is not considered and in the event of call, it will be replaced by the main screen. If a key label is missing, its contents are initialized with null.

The lines (I0-I5) are each limited to 42 characters and the key labels (f1-f6) are limited to 6 characters. The quotation marks are optional, however, they are necessary to delimit a chain containing some spaces.

E700 doesn't have an dedicated interface to define the users screens. Use the text editor of E700 or a PC.

8.5.6 MSG.INI

The information or error messages or all other character strings used by Uniprogram instructions are memorized thanks to a indexed key in this file.

It is possible to define **50 chains of 76 characters at the maximum**. The indefinite chains are initialized with null. The quotation marks are optional, however, they are necessary to delimit a chain containing some spaces.

The file is presented as follows :

```
[Msg]
m0 = Test
m1 = "      Second test"
```

E700 doesn't have an dedicated interface to define the user character strings. Use the text editor of E700 or a PC.

8.6 M Functions / Systems

8.6.1 M Functions

A M function is defined by a single file. This file contains only the aforementioned function. The name of the file acts as identifier, that is to say "FCTMx.E7M". X being the index of the function, [0-299]. All the M functions are automatically charged at starting. For further information, see Unipro.

8.6.2 Systems

The "systems" files are "Unipro" files which are carried out only once at starting. This files can include equivalences, define parameters or initialize variables.

To the maximum 10 "systems" files can be defined. Name is free, except for the reserved names, that is to say "FCTM" and "AUTOMAT" and the extension which must be "* E7M".

By default, E700 contains the file "SYSTEM.E7M" which gathers the principal equivalences (ADC, DAC, IN, OUT, etc).

Note: The axes names should not be defined by equivalence, but by the configuration.

8.6.3 Automate

The "AUTOMAT.E7M" file, written in "UniProg" code, contains the monitoring program, as in particular START key.

9 PLC programming (UNIPROG)

9.1 Instructions recapitulation

ABS	dst			
ADD	dst	src		
ADDD	src			
AND	dst	src		
ASIM	num	label		
BRIN0	in	label		
BRIN1	in	label		
BRM	label			
BRNZ	label			
BRP	label			
BRZ	label			
CALL	label			
CINR	dst			
CINT	dst			
CIRA	ax1	val1	ax2	
	val2	[cx	cy	mode]
CIRR	ax1	val1	ax2	
	val2	[cx	cy	mode]
CMP	src1	src2		
COS	dst			
CPL	dst			
CYCLN	type	no		
DEC	dst			
DISPC	src			
DISPN	src	precision		
DISPS	src			
DIV	dst	src		
DIVD	src			
DPATH	interpolation			
	space	speed		
END				
ENDP				
ENDRP				
ENDS				
ERROR	msg	mode		
GTXY	column	line		
ICNT				
INC	dst			
INP	val	inf	sup	
	precision			
INV	dst			
ISO				
JE	label			
JG	label			
JGE	label			
JL	label			
JLE	label			
JMP	label			
JNE	label			
KSIM	number			
LINA	axis	val	mode	
LINA2	{	axis	val }	
LINR	axis	val	mode	
LINR2	{	axis	val }	
LOAD	src			
MFILE	number			
MOD	dst	src		
MOV	dst	src		
MSG	msg			
MUL	dst	src		
MULD	src			
NEG	dst			
NOP				
NOT	dst			
ON	dst			
OR	dst	src		
PARAM	"text"	default	mode	
PECK	mode	axis	prof	
	tempo	passe	garde	
	vitesse			
POP	dst			
POSA	axis	vitesse	pos	
	mode			
POSR	axis	vitesse	pos	
	mode			
PSIM				
PUSH	src			
RAD	radius	cwmode		
REF	axis			
REP	n			
RSIM				
SHL	dst	offset		
SHR	dst	offset		
SIN	dst			
SQR	dst			
SQRT	dst			
START	dst			
STOPM	axis	decel		
STORE	dst			
SUB	dst	src		
SUBD	src			
SWITCH	src			
TAN	dst			
TOOL	number			
TPING				
WAIT	tempo			
WAIT0	src			
WAIT1	src			
WAITK	dst			
XOR	dst	src		

Variables systèmes

The following table summarizes the accessible systems variables in UniProg.

System variables table						
Variable	Address	Description	Array size	Min	Max	Access
Analog inputs - outputs						
DAC	4096	CPU Analog output	2	0	255	R/W
ADC	4097	CPU Analog inputs	2	0	255	R
Digital inputs						
IN	4098	Internal	8	0	1	R
MIN	4099	Module	128	0	1	R
CIN	4100	Card	128	0	1	R
RIN	4101	Remote internal	16	0	1	R
EXRIN	4102	Remote external	96	0	1	R
KEY	4103	Keyboard key	64	0	1	R
INA	4104	Axis home A	16	0	1	R
INB	4105	Axis home B	16	0	1	R
FLT	4106	Axis fault	16	0	1	R
Digital outputs						
OUT	4107	Internal	8	0	1	R/W
MOU	4108	Module	128	0	1	R/W
COU	4109	Card	128	0	1	R/W
ROU	4110	Remote internal	6	0	1	R/W
EXROU	4111	Remote external	96	0	1	R/W
LED	4112	Keyboard led	26	0	1	R/W
Cinematic						
FPABS	4113	absolute axis position				
FVACT	4114	current axis speed				
FKUP	4115	acceleration factor				
FKDN	4116	deceleration factor				
RUN	4117	axis run				
WHEEL	4118	electrical wheel value				
System						
SIMPTR	4119	TASK POINTER				
DEG	4120	DEGREES/RADIANS				
EMER	4121	EMERGENCY BUTTON				
CNT	4122	COUNTER				

Date and hour						
CLOCK						
SEC	4123					
MINUTE	4124					
HOUR	4125					
DAY	4126					
DATE	4127					
MONTH	4128					
YEAR	4129					
Others						
VTOOL	4130	TOOLS				
BST	4131	BOOST AXIS				
RST	4132	RESET AXIS				
PNB	4133	CURRENT PROGRAM NUMBER				
STARTFLG	4134	START BUTTON STATE				
POEM	4135					
PCUST	4136					
FEEDPOT	4137					
INITRDY	4138	Pour attendre sur les amplis				
STROKEP	4139					
STROKEN	4140					
REFDONE	4141					
TAF	4142					
TMR	4143					
SPINRDY	4144					
TOOLLEN	4145	Longueurs en Z				
SECURITY	4146	Cle de securite				
RTCLOST	4147	Temoin RTCRAM perdue				
RTCGRAM	4148	RTCGRAM[0] et RTCGRAM[1] de 0 a 255				
EXECISO	4149	Mettre a 0 pour stopper ISO				
CURDAC	4150	G75 => 0 / G76 => 1				
DACVAL	4151	Sxxx				
MAXRPM	4152	For 10V				
SPOT	4153	SINDLE pot value				
BEEP	4154	0 OFF 1 ON				
STARTFAIL	4155					
MACRO	4156					
CURKEY	4157					
ORIGIN	4158					

10 Parts programming (ISO)

10.1 Instructions description

A, B, C, U, V, W, X, Y, Z Axes names

D G60 Parameter
 It is to modify an origin. There are a offset by axis and a ray. It is the equivalent of instruction TOOL in UNIPROG. The edition of the tools (G60 origins) is done in MENU | ORIGIN | G60. There are 64 tools available numbered from 0 to 63. Tool -1 cancels any G60.
 G60 Dxx with $-1 \leq xx \leq 63$.
 The default tool is -1.

E Not used !

F Speed of machining, in user units. This speed is never initialized. It is thus modal from power on until the power off of E700. But attention, at power on, its value is unspecified. It is to the user to initialize it!
 The speed is a real value.

G Preparatory functions. See chapter of the preparatory functions Gxx.

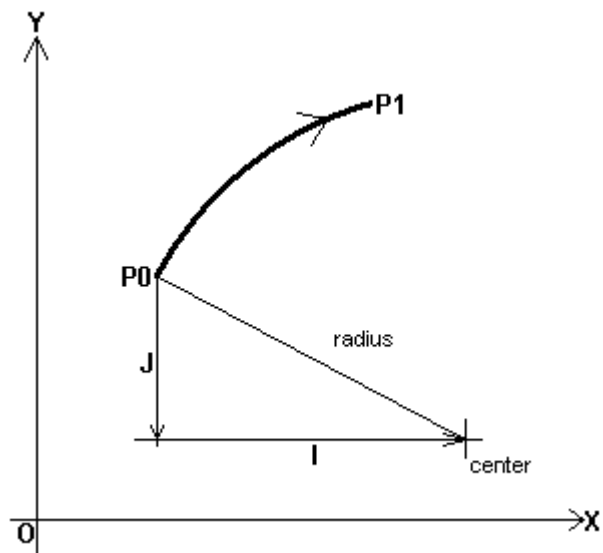
H G17 Parameter.
 It is the definition of the interpolation space. Example: G17 H7 defines space XYZ if X is axis 0, Y axis 1 and Z axis 2. See DPATH (parameter spaces) in chapter UNIPROG.

I, J

Coordinates (X; Y) of the arc center. These coordinates relate to the starting point of the arc.

Example : Arc from P0 to P1, clock wise :

In the following example, one notes that I is positive and that J is negative.



K

Not used !

L

Sub-programs

Declaration: G98 parameter

G98 Lxx: Beginning of the subroutine xx (xx are a positive whole number from 1 to 99).

G98 L0: End of a subroutine.

Caution: A subroutine must be declared at the beginning of the file containing the ISO code (before its call). One can declare a maximum of 99 different subroutines.

Call : Lxx Pnn

Call subroutine xx with nn repetitions. nn is a positive whole number. If nn is equal 0, the subroutine will nevertheless be carried out once.

M	Automatic functions. It is a call (CALL) to a program written in UNIPROG. Mxx carries out the code contained in the FCTMxx.E7M file. This code begins with label Mxx:. The return to the ISO is done by UNIPROG instruction END. xx is a positive integer value from 1 to 300.
N	Line Number. This number is optional. It is for the moment not interpreted.
O	Not used !
P	G81/G83 Parameter (Drilling peck/chip-breaker) It is the depth of cut in user units. See description of the drilling cycles for more details. G04 Parameter (Temporization) G04 Pxx causes a xx seconds temporization. Lxx Parameter Lxx Pnn call subroutine xx with nn repetitions. . nn is a positive whole number. If nn is equal 0, the subroutine will nevertheless be carried out once.
Q	G81/G83 Parameter (Drilling peck/chip-breaker) It is the size of the guard in user units. See description of the drilling cycles for more details.

R

Arc radius.

An arc can be define by its center (see I and J) or by its radius. When there are two solutions, the shortest arc is automatically selected. It is not possible to define an arc of 360 degrees (complete circle) by using R. It is necessary in this case to use I and J.

Note : $R = (I^2 + J^2)^{1/2}$.

S

G81/G82/G83 optional parameter (Drilling with or without peck/ boring/ chip-breaker).
Temporization in seconds at the bottom of the hole. See description of the cycles of drilling for more details.

Spindle speed in rev/minutes. It is necessary that the system variable SPINRDY is to 1 so that the operation takes place. SPINRDY is equal to 1 per default.

T

Tool

It is the tool number which will machine. A tool is composed a length (which affect the origin of axis Z) and of a radius which will be used at the time of a radius compensation (G41/G42).

Txx : xx is a positive integer value from 0 to 99.

T-1 cancels any Txx.

10.2 Gxx preparatory functions descriptions

The preparatory functions (G) of E700 are as follows.

G00 : Simultaneous displacements with high speed.

G01 : Linear interpolation at machining speed (declared with F).

G02 : Circular interpolation between X and Y, clockwise and at machining speed.

G03 : Circular interpolation between X and Y, in the anti-clockwise direction and at machining speed.

G04 : G04 Pxx: xx seconds temporization. xx is a positive real number.

G09 : Finish an interpolation (ENDP in UNIPROG). Useful if it is necessary to stop the movement between two consecutive interpolations to avoid unhookings.

G17 : Interpolation space definition.
G17 defines XY space.
G17 Hxx defines a space on unspecified axes (axes from 0 to 14). For more details, see the description of H and the UNIPROG instruction DPATH, spaces argument.

G18 : Definition of XZ interpolation space.

G19 : Definition of YZ interpolation space.

G25 : Tangential mode. Help with the segments connection of arcs or tangent with the preceding element. This function is not yet available.

G26 : Not-tangential mode (normal). Cancellation of the tangential mode (G25). This function is not yet available.

G32 : Whirling clockwise (Tapping with a tap whose diameter is lower than that of the hole. This function is not yet available.

G33 : Whirling in the anti-clockwise direction (Tapping with a tap whose diameter is lower than that of the hole. This function is not yet available.

G40 : End, exit of the tool radius compensation.

G41 : Beginning, entry of the tool radius compensation on the left.

G42 : Beginning, entry of the tool radius compensation on the right.

G53 : Cancellation of a origin shift of the type G54, G55, G56, G57 or G58.

G54 : Origin shift taken in the G54 origins table.

G55 : Origin shift taken in the G55 origins table.

G56 : Origin shift taken in the G56 origins table.

G57 : Origin shift taken in the G57 origins table.

G58 : Origin shift taken in the G58 origins table.

G59 : Programmed origin shift.
G59 X0.1 Y0.15 causes a additionnal origin shift of 0.1 on X and 0.15 on Y.

G59 X0 cancels the origin shift in X. G59 cancels the preceding origin shift by G59 on all the axes.

G60 : Origin shift taken in the G60 origins table. Use parameter D to specify the number. See this instruction for more details.

G75 : Selection of the analog output number 0 to assign it to the spindle (S).

G76 : Selection of the analog output number 1 to assign it to the spindle (S).

G81 : Drilling with or without peck. See annexe documentation for more details.

G82 : Boring. See annexe documentation for more details.

G83 : Drilling with chip-breaker. See annexe documentation for more details.

G90 : Absolute mode (default mode).

G91 : Relative mode.

G98 : Declaration of the beginning of a subroutine (G98 Lxx) or of end of a subroutine (G98 L0). See L for more details.

10.3 ISO Syntax

An ISO instruction is a character with a number. The number must be stuck to the character (X10 for example).

If several ISO instructions are on the same line, they are carried out simultaneously:

`G0 X10 Y23.4` X and there will move simultaneously at high speed (G0).

`G0 X10`
`Y23.4` Here, X will move first. It is only when X arrives at destination that the movement in Y will be carried out.

An ISO program starts with the line

`%1`

and ends in the line

`%`

All that precedes %1 is not interpreted. One can thus comment on the program which follows.

An ISO program is an ASCII file. **But attention, the accentuated characters (é, è, ü, etc are not recognized. Not use the character (tabulation) which is not recognized either!**

The comments in the program are placed between brackets: (comment)

10.3.1 Tool raduis compensation

In a tool radius compensation (between G41/G42 and G40), each line must comprise X and Y coordinates.

One could not put a line of the type

`M12`

between a G41/G42 and G40 for example because this line does not comprise any X, Y coordinates.

A tool raduis compensation cannot be the subject of a subroutine.

10.3.2 Interpolation

Be careful with the definitions of interpolation spaces. For example, one can make

```
G17 (XY space)
G1 Z-12 (1 axis «interpolation» → ok !)
X10 Y23.4 (XY interpolation → ok !)
```

But...

```
G17 (XY space)
G1 Z-12 X10 Y23.4 (XYZ interpolation → error !)
```

10.3.3 Variables and constants

It is possible to replace the immediate number which follows the ISO instruction (the character) by a variable or a constant:

```
Xconst
X#variable
```

One will have declared constant and variable beforehand in a file * E7M with following syntax:

```
; Constantes :
const = 10

; Variables :
variable =
```

To assign a value to a variable, use UNIPROG:

In the FCTM12.E7M file, write

```
M12 : MOV #variable 10
      END
```

Since the ISO, M12 will assign 10 to X. Thus the 3 following programs will be identical:

```
X10
Xconst
M12 X#variable
```

11 E700 FileManager Software

11.1 Introduction

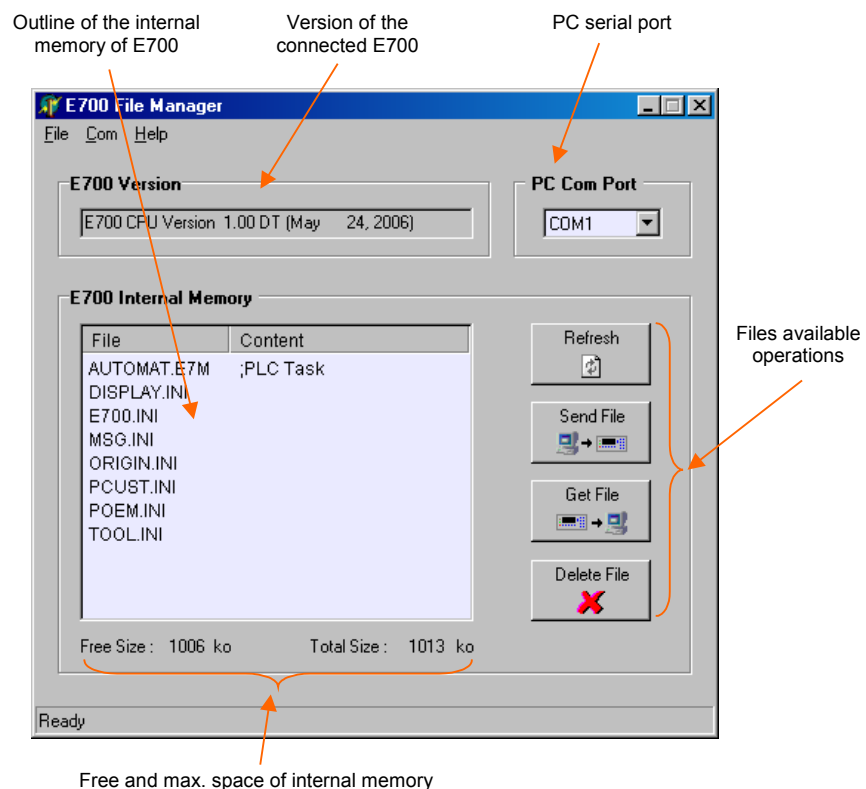
The E700 File Manager software makes it possible to handle files within E700 as well as files transfers. All this from a PC interface and with a RS232 serial line. For this mode of communication, the PC functions as Master and E700 as slave by carrying out the orders which it receives.

11.2 Installation and Launching

No installation is necessary! To use E700 FileManager, it's enough to launch the file "E700File.exe".

11.3 Interface

The software is composed of a single principal window which is presented as follows :



11.4 Communication initialization

It is necessary to put E700 in communication mode as a preliminary. Select the "MENU" page on E700 then the option "COM". The access to the communication is locked if movements or an execution are in hand.

Then, start the PC software. This one tries automatically to establish the communication at starting. In the event of success, the following data of E700 are updated on the interface, that is to say:

- Version number
- E700 list of files
- Memory free space
- Memory size

In the event of failure an error message specifies the situation. This one can come from one or more points, that is to say :

- E700 not in communication mode
- Defective connection (serial line not connected, damaged, etc)
- Wrong PC serial port

Note: At starting, E700 File Manager takes into account the first detected serial port.

If the communication could not be established at the start of the software or if it is lost in the course of use, try to restore it using the menu "COM - Init Com."

11.5 Files availables operations

All the items discussed in this chapter are contained in the zone "E700 Internal Memory" of the principal window.

11.5.1 « Refresh » function

This function displays the list of the files contained in E700. They are sorted alphabetically. The field "File" of the list specifies the name of the file, whereas the "Content" field displays the first line of the file that to amount of 18 characters.

The list of the files is automatically updated at the time of connection with E700, and at the time of transfer or erasure of files. Consequently this function is not strongly used in theory.

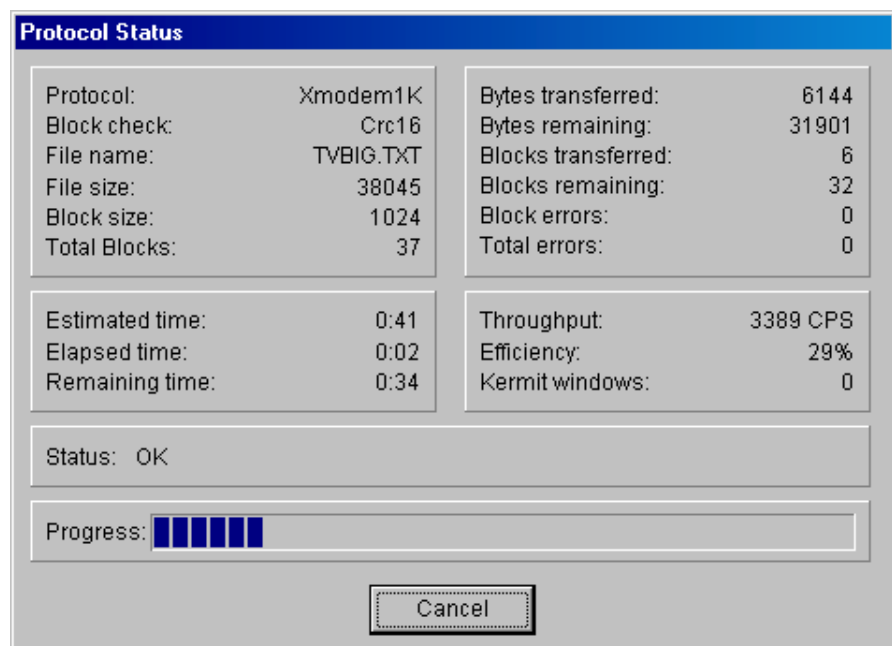
11.5.2 « Send File » function

Use this function to transfer files from the PC towards to E700. To be valid, **the file names should not exceed 8 characters**, this without the extension.

The allowed file extensions by E700 are as follows:

- *.E7I ISO files
- *.E7UUniProg files
- *.E7M M Functions and Systems files
- *.INI Configuration files
- *.TXTText files
- *.BRI ISO breakpoint files
- *.BRU UniProg breakpoint files

After the choice of one or more file of your PC, (hard disk, networks) the transfer starts automatically. Dialog box which is displayed then normally is as follows:



However the transfer can not take place for the following reasons :

- Invalid file type (extension)
- Too long file name

An error message informs you about the situation, and the "Status" bar of the principal window points it out.

You can stop the transfer using the function "Cancel". However, it should be specified that the part of the file already transmitted is not removed.

A message indicates the errors of transfer or the cancellation of this one. If no message appears and that the status bar displays "Ready" it is that the transfer was carried out correctly.

11.5.3 « Get File » function

It is also possible to transfer one or more file contained in E700 towards the PC. For that, it is enough to select the wanted files in the list "E700 Internal Memory" and to use the function "Get File". You can then specify the directory on the PC and possibly define the name of the copy of the first file. By default, the name and the extension of the file are identical to those of E700.

A safety for file overwriting is present by the intermediary of a validation window.

If not the same dialogue box as for the sending a file appear, a message specifies you the encountered problem, that is to say :

- File access error (file in use)
- Internal memory in use

11.5.4 « Delete » function

Use "Delete" function to erase files of the internal memory of E700. However take care to use this function with precaution ! No "undo" function is available.

11.6 Hyperterminal

All the operations carried out or data received by the E700 File Manager software can also be treated by a terminal such "Hyperterminal" which equips each Windows® OS. It's possible for this purpose to obtain suitable documentation. We to give preference to the E700 File Manager software which simplifies the operations.