



E8 V5
(slave mode)
Communication protocol
And Input/Output

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I - SERIAL COMMUNICATION

1 - V5 TEXT format of the communication protocol

a) String format to be sent:

<Command> [] <Data1> [] <Data2> [CR][LF]

where

< Command > is the command code
 < Data1> are the data of the command
 [CR] is the 0x0D in hexadecimal (facultative)
 [LF] is the 0x0A in hexadecimal
 [] space char

b) Response of the system

<command> <Answer>[CR][LF]

The control response to every command. Mostly, the answer will be OK or BAD FORMAT.

c) Commun functions

ASCII CODES		
Codes	Hexa	decimal
[CR]	0D	13
[LF]	0A	10
[]	20	32
[NUL]	00	00
[SOH]	01	01
[STX]	02	02
[ETX]	03	03
[EOT]	04	04
[ENQ]	05	05
[ACK]	06	06
[BS]	08	08
[VT]	0B	11
[NAK]	15	21

Command	Description	Data to send	Response of the system
LOADFILE	Select and load a file	Name of the file to be loaded (11 chars max)	OK : file loaded ERROR : File not found
SETTEXTVAR	Set a variable to the current file	<Name of the var> <Value>	OK VAR NOT FOUND
SETINCVAR	Set an increment to the current file	<Name of the increment> <Value>	OK VAR NOT FOUND
RUN	Start the marking <i>Start cycle</i> If there is PAUSE in the marking file : At a PAUSE line, the control send the char P [0x50] and wait for : - response p [0x70] from RS232, - or the Start button to be pressed, to continue the marking,	<i>No data</i>	OK → <i>cycle in process</i> [EOT] → <i>last dot marked</i> [ENQ] → <i>back to home position</i> [NAK] [Err1] [Err2] [Err3] → if an error occurs (see appendix)
RESETERROR	If an error occurs, you need to clear the machine status (Same as if you press the start button)	<i>No data</i>	OK
NEWFILE	Create a new file	Marking speed (1 à 9), Fast speed (1 à 9), Crossed zero (0 ou 1), Name of the file (optional)	OK : empty file created BAD ARGUMENT
INSERTTEXTLINE	Add a line to the current file	X, Y, Z, W, H (in 10 th of mm) Angle (in hundredth of degrees from -18000 to 18000) radius (in 10 th of mm) Space between chars (from 0 to 10) Force (0 à 9) Quality (1 à 9) Text to be printed	OK BAD ARGUMENT:

d) Examples

Select the 'AB12' file without running the cycle

Send the string : **LOADFILE AB12**[CR][LF]
 in hexadecimal : 4C 4F 41 44 46 49 4c 45 20 41 42 31 31 0D 0A

Select the 'AB12' file and start the cycle

Send the string: **LOADFILE AB12**[CR][LF]**RUN**[CR][LF]
 in hexadecimal: 4C 4F 41 44 46 49 4c 45 20 41 42 31 31 0D 0A 52 55 4E 0D 0A

Select the 'AB12' file, set the 'OF' variable with '12345' value and start the cycle

Send the string: **LOADFILE AB12**[CR][LF]**SETTEXTVAR OF 12345**[CR][LF]**RUN**[CR][LF]
 in hexadecimal: 4C 4F 41 44 46 49 4c 45 20 41 42 31 31 0D 0A 53 45 54 54 45 58 54 56 41 52 20 4F 46 20 31 32 33 34 35 0D 0A 52 55 4E 0D 0A

Send a complete marking frame in a 'TEMP' named file and start the cycle

X=10mm, Y=12mm, Char of 5x7mm, Force=5, Quality=double with text=HELLO WORLD

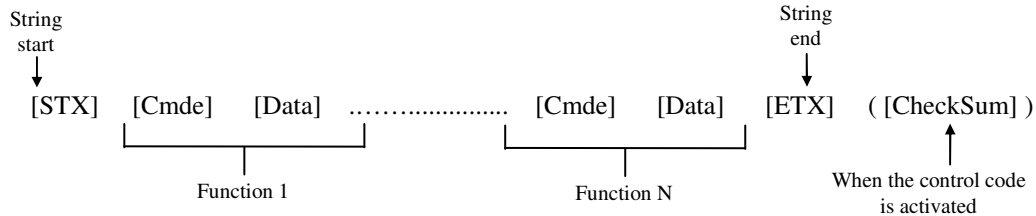
Send the string: **NEWFILE 5 7 0 TEMP**[CR][LF]
INSERTTEXTLINE 100 120 0 50 70 0 0 2 5 2 HELLO WORLD[CR][LF]
RUN[CR][LF]
 in hexadecimal: 4E 45 57 46 49 4C 45 20 35 20 37 20 30 20 54 45 4D 50 0D 0A
 49 4E 53 45 52 54 54 45 58 54 4C 49 4E 45 20 31 30 30 20 31 32 30 20 30 20 35 30 20 37 30 20
 30 20 30 20 32 20 35 20 35 20 48 45 4C 4C 4F 20 57 4F 52 4C 44 0D 0A 52 55 4E 0D 0A

2 - V4 protocol

a) Communication protocol

The string sent to the controller must start with the characters **STX** (Start TeXte: 02h), followed by a list of functions (described on the next pages) and the string must end with **ETX** (End TeXte: 03h).

b) String to be sent :



Control code CheckSum : In order to detect a possible error in the transmission, the CheckSum is calculated depending on the string sent by the main system and receptioned by the machine. If the string has been correctly transmitted, the code calculated by the marking machine is the same as the code sent by the main system. When a check sum error is detected, the system send back the [BS] code.

The **CheckSum** corresponds to an "EXCLUSIVE OR" of all codes transmitted in the string, including the STX code and the ETX code.

c) List of functions

Each function starts with a control code, followed by the data corresponding to the function to be used :

Cmde	Description																				
[NUL]	Deactivate the control code CheckSum [No data]																				
[SOH]	File Selection [Data: Name of the file to be loaded (max 11 characters)]																				
[ACK]	Marking release right after receiving the string without waiting for the confirmation through the <i>Start Cycle</i> button. [No data]																				
[ENQ]	Definition of a variable in the valid file or after loading a file through the [SOH] function [Data: name of the variable + '=' + value to be attributed]																				
[LF]	Definition of the marking speed (standard is speed 5) [Data : 0 to 9]																				
[VT]	Transfer all marking parameters Data: Each line of the file is transferred with the following format: <table border="1" style="width: 100%; text-align: center;"> <tr> <td>X</td><td>Y</td><td>Z</td><td>L</td><td>H</td><td>A</td><td>R</td><td>F</td><td>S</td><td>P</td><td colspan="10">Texte sur N caractères</td> </tr> </table> <p> <i>X, Y :</i> Coordinates of the text to be marked (-9999 to +9999 in tenth of mm), <i>Z :</i> Coordinates of the text to be marked (0000 to 9999 in tenth of mm), <i>W, H :</i> Width and height of the character to be marked(000 to 999 in tenth of mm), <i>Ang :</i> marking angle (000 to 359 in degrees), <i>Radiu :</i> Radius of the circle for circular markings (0000 to 9999 in tenth of mm), <i>D :</i> Depth - Impact force (0=no impact to 9=large impact), <i>O :</i> Orientation - Marking direction ('N' or 'I' for Normal or Reverse orientation), <i>F :</i> Character font (1 to 9), <i>Text :</i> Text to be marked </p>	X	Y	Z	L	H	A	R	F	S	P	Texte sur N caractères									
X	Y	Z	L	H	A	R	F	S	P	Texte sur N caractères											

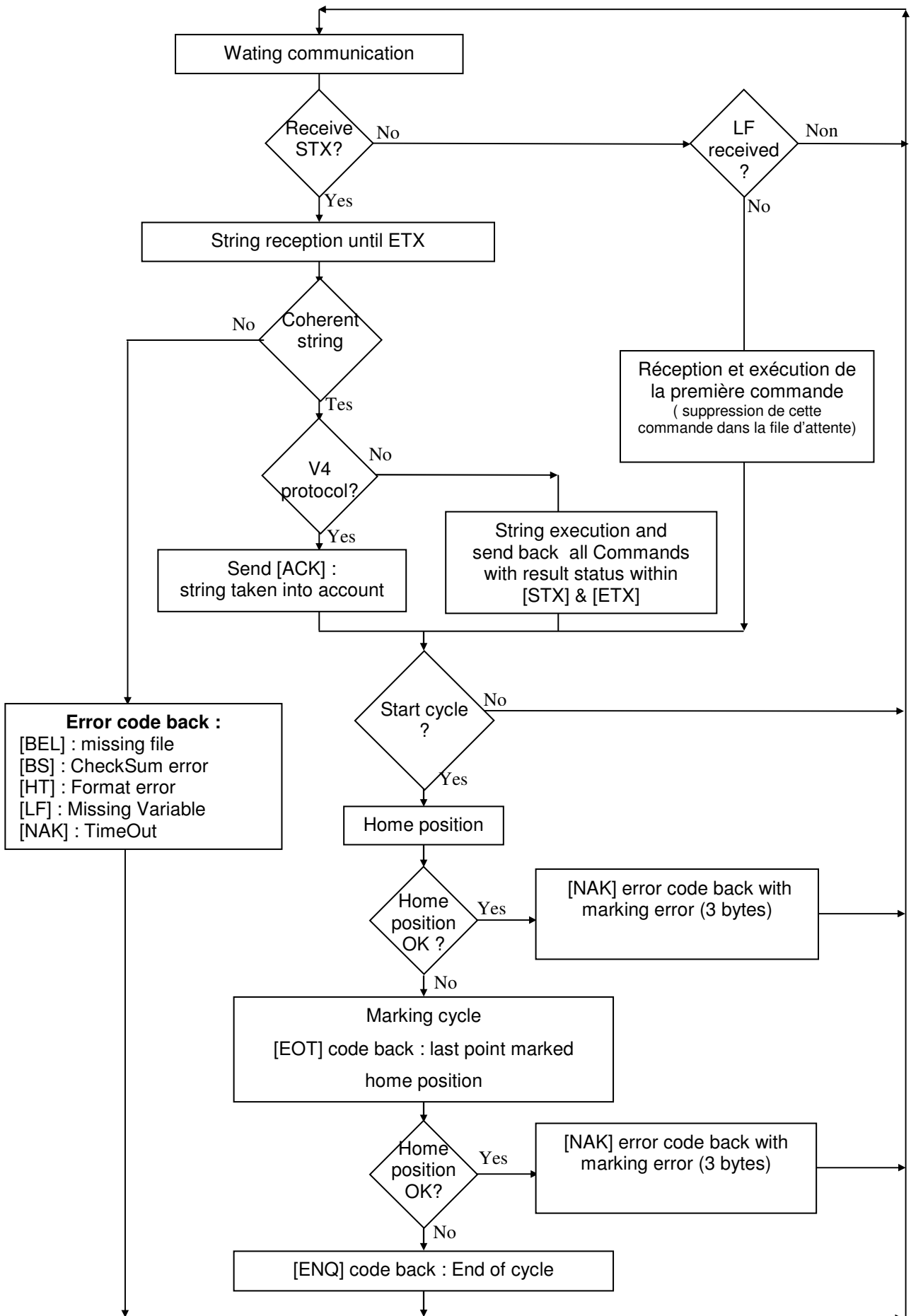
d) Examples

- Select the 'AB12' file without checksum and without running the cycle:
Send the string:
[STX] [NUL] [SOH] AB12 [ETX]
in hexadecimal:
02 00 01 41 42 31 32 03
- Affect the 'OF' variable in the current file and start the cycle:
Send the string:
[STX] [ENQ] OF=142BH05 [ACK] [ETX] [Check-summ]
in hexadecimal:
02 05 4F 46 3D 31 34 32 42 48 30 35 06 03 0E
- Sent a complete marking frame, and start the cycle, and select speed 9:
Send the string:
[STX] [NUL] [LF] 9 [VT] +0100+050000000200200000005N1ABCdef [VT] +0100+100000000300300000005N2Z123 [ACK] [ETX]
in hexadecimal:
02 00 0A 39 0B 2B 30 31 30 30 2B 30 35 30 30 30 30 30 30 32 30 30 32 30 30 30 30 30 30 35 4E 31 41 42 43 64 65 66 0B 2B 30 31 30 30 2B 31 30 30 30 30 30 30 30 33 30 30 33 30 30 30 30 30 30 30 35 4E 32 5A 31 32 33 06 03

3 - ASCII Codes:

Dec Code	Hex Code	Val	Dec Code	Hex Code	Val	Dec Code	Hex Code	Val	Dec Code	Hex Code	Val	Dec Code	Hex Code	Val	Dec Code	Hex Code	Val	Dec Code	Hex Code	Val
00	00	NUL	01	01	SOH	02	02	STX	03	03	ETX	04	04	EOT	05	05	ENQ	06	06	ACK
07	07	BEL	08	08	BS	09	09	HT	10	0A	LF	11	0B	VT	12	0C	FF	13	0D	CR
14	0E	SO	15	0F	SI	16	10	DLE	17	11	DC1	18	12	DC2	19	13	DC3	20	14	DC4
21	15	NAK																		
32	20		64	40	@	96	60	`							192	C0	←			
33	21	!	65	41	A	97	61	a	129	81	ü				193	C1	↕	225	E1	ß
34	22	"	66	42	B	98	62	b							194	C2	↓			
35	23	#	67	43	C	99	63	c							195	C3	↕			
36	24	\$	68	44	D	100	64	d	132	84	ä				196	C4	↕			
37	25	%	69	45	E	101	65	e												
38	26	&	70	46	F	102	66	f	134	86	å									
39	27	'	71	47	G	103	67	g												
40	28	(	72	48	H	104	68	h												
41	29	)	73	49	I	105	69	i												
42	2A	*	74	4A	J	106	6A	j												
43	2B	+	75	4B	K	107	6B	k												
44	2C	,	76	4C	L	108	6C	l												
45	2D	-	77	4D	M	109	6D	m												
46	2E	.	78	4E	N	110	6E	n	142	8E	Ä									
47	2F	/	79	4F	O	111	6F	o	143	8F	Å									
48	30	0	80	50	P	112	70	p												
49	31	1	81	51	Q	113	71	q												
50	32	2	82	52	R	114	72	r												
51	33	3	83	53	S	115	73	s												
52	34	4	84	54	T	116	74	t	148	94	ö									
53	35	5	85	55	U	117	75	u												
54	36	6	86	56	V	118	76	v												
55	37	7	87	57	W	119	77	w												
56	38	8	88	58	X	120	78	x										248	F8	°
57	39	9	89	59	Y	121	79	y	153	99	Ö									
58	3A	:	90	5A	Z	122	7A	z	154	9A	Ü									
59	3B	;	91	5B	[	123	7B	{	155	9B	ø							251	FB	¹
60	3C	<	92	5C	\	124	7C	|										252	FC	³
61	3D	=	93	5D	]	125	7D	}	157	9D	ø							253	FD	²
62	3E	>	94	5E	^	126	7E	~												
63	3F	?	95	5F	_							191	BF	→						

4 - Code sent back from the system (protocol v4 and v5)



5 - Error codes returning on a marking error

Decimal Code (3 bytes)	Hexa Code (3 bytes)	Binary value	description
00 00 01	00 00 01	0000 0000 0000 0000 0000 0001	Error with marking font
00 00 02	00 00 02	0000 0000 0000 0000 0000 0010	Error with dot logo
00 00 04	00 00 04	0000 0000 0000 0000 0000 0100	Error with vectorial logo
00 00 08	00 00 08	0000 0000 0000 0000 0000 1000	Error with Ecc200
00 00 16	00 00 10	0000 0000 0000 0000 0001 0000	Error with the syntax of text zone
00 00 32	00 00 20	0000 0000 0000 0000 0010 0000	Error with variable
00 00 64	00 00 40	0000 0000 0000 0000 0100 0000	Error with I/O
00 00 128	00 00 80	0000 0000 0000 0000 1000 0000	Error with RS232
00 01 00	00 01 00	0000 0000 0000 0001 0000 0000	Error : Stop button activated
00 02 00	00 02 00	0000 0000 0000 0010 0000 0000	Error with stylus
00 04 00	00 04 00	0000 0000 0000 0100 0000 0000	Error with motor
00 08 00	00 08 00	0000 0000 0000 1000 0000 0000	Error with sensor
00 16 00	00 10 00	0000 0000 0001 0000 0000 0000	Error out of marking window bound
00 32 00	00 20 00	0000 0000 0010 0000 0000 0000	Error with the X axis
00 64 00	00 40 00	0000 0000 0100 0000 0000 0000	Error with the Y axis
00 128 00	00 80 00	0000 0000 1000 0000 0000 0000	Error with the accessory axis
01 00 00	01 00 00	0000 0001 0000 0000 0000 0000	- Error blocked feeder Or - Error with Autosensing : no part detection
02 00 00	02 00 00	0000 0010 0000 0000 0000 0000	- Error empty feeder Or - Error with Autosensing : part detected out of bound Or - Error with binary axis
04 00 00	04 00 00	0000 0100 0000 0000 0000 0000	The marking head did loose steps
08 00 00	08 00 00	0000 1000 0000 0000 0000 0000	Error with external motor
16 00 00	10 00 00	0001 0000 0000 0000 0000 0000	Historique full
32 00 00	20 00 00	0010 0000 0000 0000 0000 0000	Double detected for historique
64 00 00	40 00 00	0100 0000 0000 0000 0000 0000	Error : stylus need to be changed
128 00 00	80 00 00	1000 0000 0000 0000 0000 0000	Error : stylus as to be changed

Examples :

00 01 00 : Emergency stop activated

00 30 00 (= 00 10 00 + 00 20 00) : Marking is out of bounds for X axis

00 48 00 (= 00 08 00 + 00 40 00) : Error with origin sensing on Y

Note : SIC TERMINAL use the decimal display of the ASCII codes .

6 - Description of the serial ports

a) "HOST"

SUB-D 9Pts female	
Pin	RS232
1	NC
2	RX
3	TX
4	NC
5	O Volt
6	NC
7	RTS
8	CTS
9	NC

Notes :

- This serial port is set at 9600 baud, with 8 data bits, 1 stop bit, and with no parity.
- It is allocated to the loading of the "controller" software and to the saving of the parameter setting files.
- It can also be used for the slave operating mode but it is only in standard type RS232 and the parameters can not be modified.

b) "SERIAL"

SUB-D 9Pts female	
Pin	RS232
1	NC
2	RX
3	TX
4	NC
5	O Volt
6	NC
7	RTS
8	CTS
9	NC

Notes :

- In the standard version, this serial port is set in RS232 but it can also be set in RS422 using the tabs.
- It is strictly usable in *Slave Operating Mode*.
- In order to set the configuration, open the hatch located under the marking controller, which will give you access to the configuration tabs. See diagrams below :

SUB-D 9Pts female	
Pin	RS422
1	RX+
2	NC
3	NC
4	TX-
5	O Volt
6	RX-
7	NC
8	NC
9	TX+

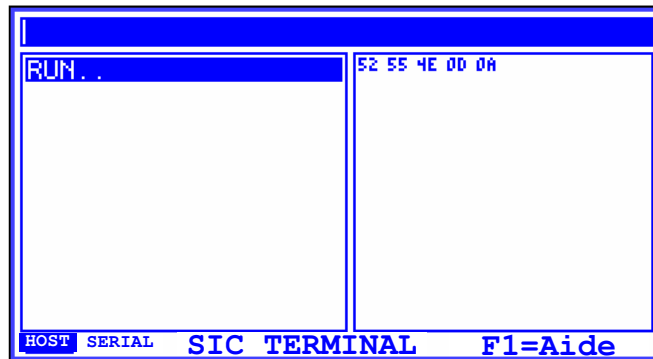
For RS422, it is need to add two end line resistances of 120 ohm 1/4W

RS232, RS422 RS485

The SERIAL port can be set to RS232 (default), RS422 or RS485.
See SERIAL COMMUNICATION PARAMETER under e8 v5 software.



7 - RS232 test

You can manually test the RS232 of the e6. Goes to menu ? → SIC TERMINAL, Follow screen will appear :





This function let you test serial communication with the e6. You can send string and see received string


- The edition filed is the string to be sent
- the left list correspond to the last received string
- the right text is the selected line of the left list RECEIVED DATA ARE IN HEXADECIMAL



  : Select a line within the received string list

 Send string to the Selectionned RS port

 Add check sum

 Clear the received string

 SERIAL Port <-> HOST Port

 or  return to previus SCREEN

II - TOR INPUTS / OUTPUTS

1 - cableing

N°	Name	function
1	Input 1 (NC)	Power off
2	Input 2	Cycle start
3	Input 3	<i>file selection</i>
4	Input 4	<i>file selection</i>
5	Input 5	<i>file selection</i>
6	Input 6	<i>file selection</i>
7	Input 7	<i>file selection</i>
8	Input 8	<i>file selection</i>
9	Gnd_ Input	Communs input
10	Gnd_ Input	Communs input
11	output 6 dry contact	" AutoSensing error: close when no part was detected "
12	output 6 dry contact	" AutoSensing error: close when no part was detected "
13	output 7 dry contact	"AutoSensing error: close when a obstacle has been detected "
14	output 7 dry contact	"AutoSensing error: close when a obstacle has been detected "
15	output 5 dry contact	" closed when e6 ready "
16	output 5 dry contact	" closed when e6 ready "
17		
18	GND du 5V	Ground
19	+5V	5V (500 mA max)
20	output 1 dry contact	" closed during the marking cycle "
21	output 1 dry contact	" closed during the marking cycle "
22	output 2 dry contact	" impulsion at the last printed dot, time 250ms "
23	output 2 dry contact	" impulsion at the last printed dot, time 250ms "
24	output 3 dry contact	" Default "
25	output 3 dry contact	" Default "
26		
27	output 4	« Pause »
28	Ground 24 V	Ground 24V
29	24V	+24V (500 mA max)
30		
31		
32	output 8 dry contact (NC)	" open when stylus need to be changed "
33	output 8 dry contact (NC)	" open when stylus need to be changed "
34		
35		
36		
37		

2 - électrique limit

a) dry contact output (relays)

- Switched current max.. = 1 A.
- Switched voltage max. = 48 V.
- Contact resistance < 100 mΩ.

b) Output 4 (transistor)

This transistor pluh the pin #27 to the ground (pin #28).

- Switched current max. = 1 A.
- Switched voltage max. = 30 V.

c) inputs

activating an input by grounding its pin (#1 to #8) to pin #9 or #10

3 - File selection

The selection of some of the controller input/output board inputs allows automatic opening of pre-recorded marking files (up to 63 files).

A maximum of 6 inputs are assigned to this task (inputs 3 to 8). Each "input" may be open (state "0") or closed (state "1") by dry contacts (*) to form a binary code.

(*) A dry contact can be assimilated to an open or closed switch connecting contact 9 or 10 (input common) to one of the inputs, without any voltage.

This binary chain, converted into decimal values, corresponds to a number varying from 0 to 63 (maximum). This is the value which will be associated with a marking file.

You will be able to assign a marking file to each binary input combination.

Input assignment code
Input 8, Input, ... Input 1

0 = Open,
1 = Close

Assigned file name

Keys for choosing binary combination

Key (=) or indicating list of files or , or key to obtain file preview

Key to validate

FILE SELECTION

Code	File
00000100	- - -
00001000	
00001100	
00010000	
00010100	
00011000	
00011100	

Immediat load OFF

Example for the assignment code

Input	8	7	6	5	4	3	2	1	Binary code	Decimal value
State	1	0	1	0	1	0	0	0	10101000	168

Remarks:

- The state of the inputs is scanned only when the cycle starts. Be sure to set the state of the inputs before activating the cycle start.
- Some accessories or options use inputs. These inputs will no longer be available for selecting the file which is limited.

4 - Input/Output test

You can manually test the input/output stats of the e6. Goes to menu :



Follow screen will appear :

```
INPUT/OUTPUT STATS
      1 2 3 4 5 6 7 8
INPUT   1 0 0 0 0 0 0 0
OUTPUT  0 0 0 0 1 0 0 1
SENSOR  X=0, Y=0, Z=0
1 to 8 Set/UnSet Output
X,Y or Z=return to Origin
--↑↓←→ = Motor movement
PRESS A KEY TO EXIT
```

INPUT line gives the input stats of the e6 :

1 active (contact is close with commun)

0 inactive (contact is open)

OUTPUT line let you set the stats : use keys 1 to 8.

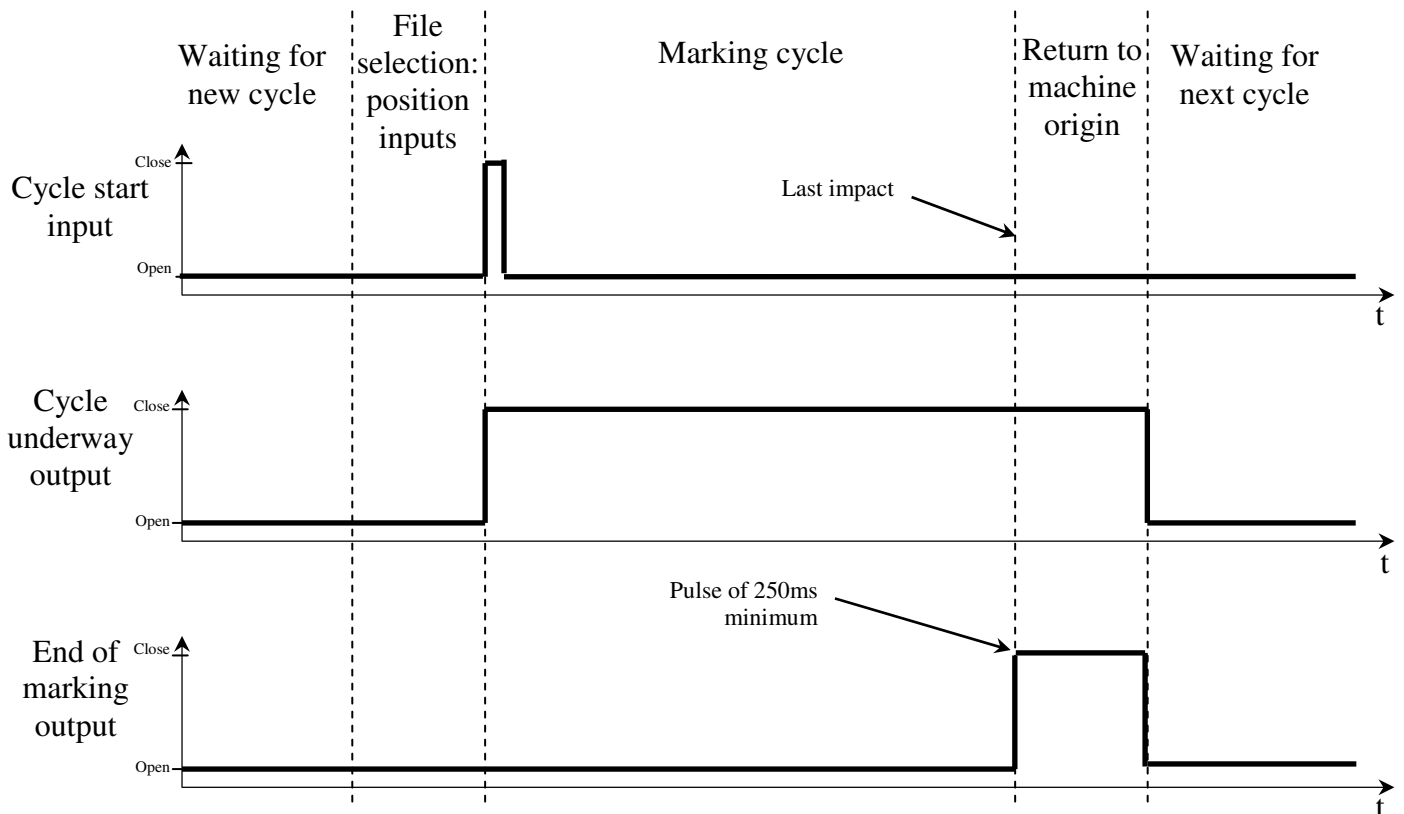
5 - Operating timing diagram

During the marking cycle the controller outputs are activated as follows:

Start of cycle :	The « controller ready » output changes to the inactive state The current cycle output changes to the active state
Last marked point:	The last marked point output changes to the active state
Return to origin	The last marked point output changes to the inactive state The current cycle output changes to the inactive state The « Controller ready » output changes to the active state
Error during cycle:	The « Fault » output changes to the active state The current cycle output changes to the inactive state The last marked point output changes to the active state The ready controller output remains inactive.
Validation of pause message:	The machine returns to the origin then, The current cycle output changes to the inactive state The « controller ready » output changes to the active state The « Fault » output changes to the active state
Pause during cycle:	The « Pause » output changes to the active state
Validation of pause message:	The « Pause » output changes to the inactive state

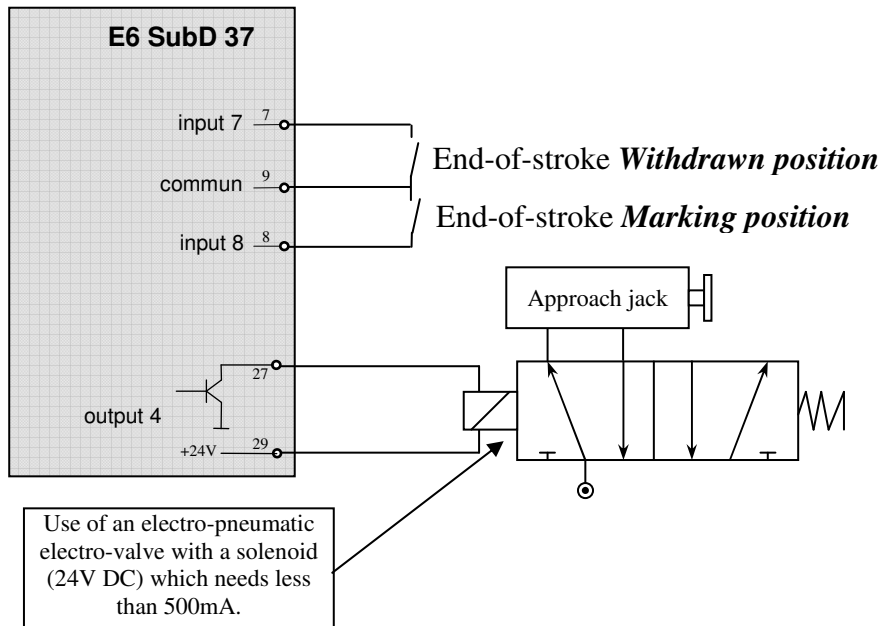
In a standard configuration

Output « Cycle in progress »	is active when the contact is close between bornes 20 et 21
Output « End of marking »	is active when the contact is close between bornes 22 et 23
Output « default »	is active when the contact is close between bornes 24 et 25
Output « pause »	is active when the contact is close between bornes 27 et 29
Output « e6 Ready »	is active when the contact is close between bornes 15 et 16

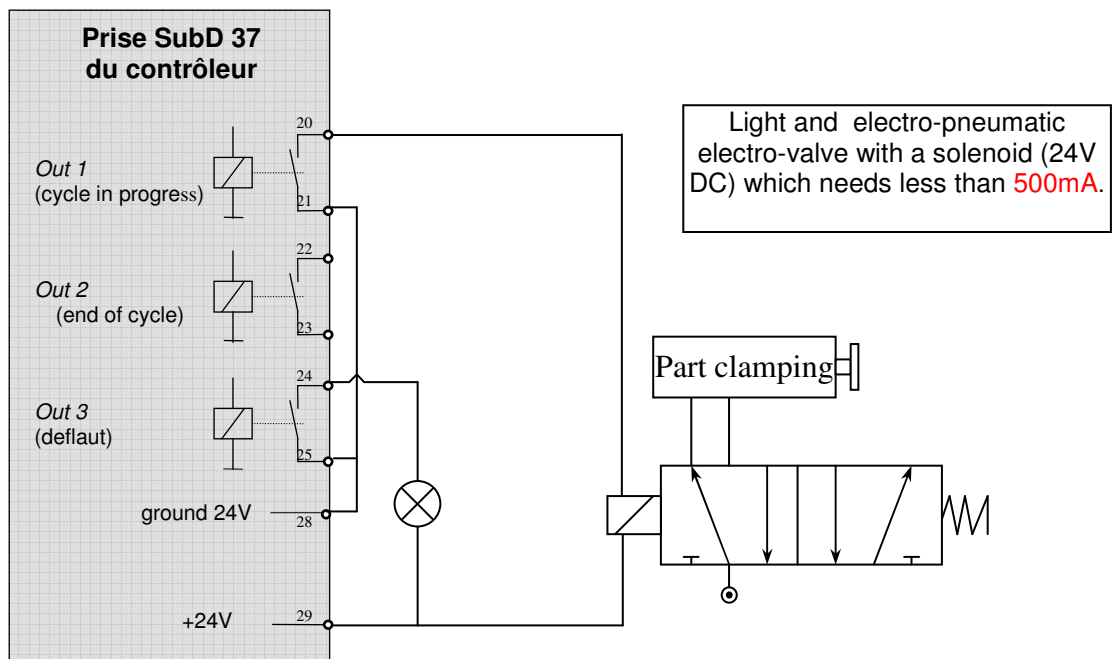


6 - Cabling examples

a) Wiring of the pneumatic Z-axis



b) Use of the I/O with the clamping of a part being marked, and default announced by a light.



In the case of I/O communication with a PLC, the inputs of the controller must be dry contacts with no tension.

To avoid any trouble, we recommend that you interface the static relay output by an external mechanical relay.