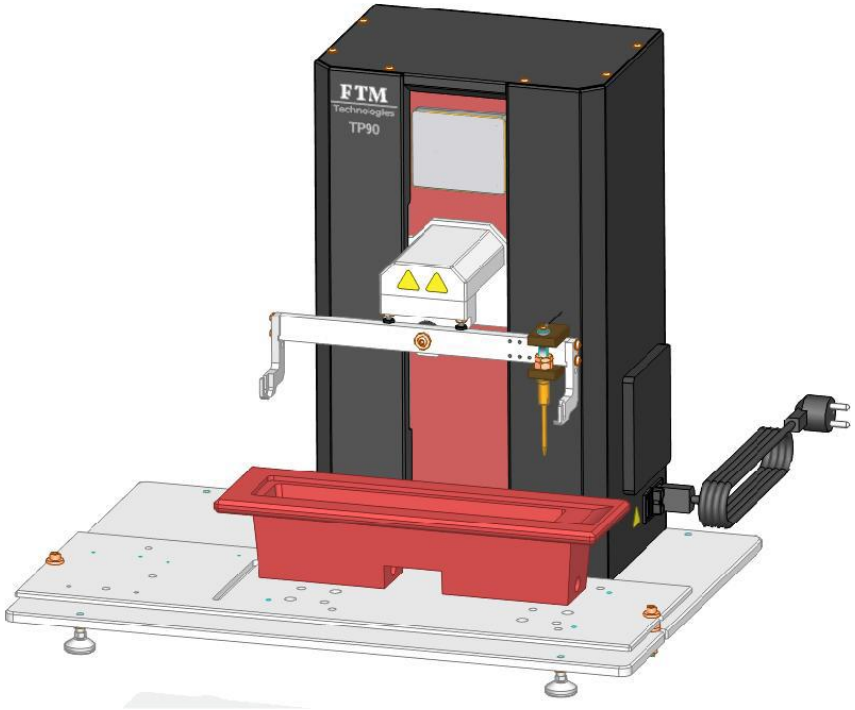
USER MANUAL

TINNING ROBOT TP90



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Fax : + 33 1 40 86 16 45

The purpose of these instructions is to help you familiarize yourself with the machine and make use of its possibilities depending on the intended goal.

The manual contains important instructions that allow you to operate the machine safely and in an appropriate and economical manner. Compliance with these contributes to avoiding risks, reducing repair costs and downtime and increasing the reliability and lifespan of the machine. When reading this manual, compare the illustrations to the machine itself.

The instruction manual must always be available at the place of operation of the machine.

The instruction manual should be read and applied by anyone who needs to use the machine.

The machine is intended exclusively for the use described in this manual. Another use, or a use going beyond what is permitted, cannot be considered as conforming to the intended use. The manufacturer declines all responsibility for damage that would result from such use.

The user alone assumes the risk.

The intended use also includes observing the service manual and observing the inspection and maintenance conditions.

Carry out the adjustment, maintenance and inspection operations prescribed by the service manual, respecting the intervention intervals also provided for by the latter as well as the indications relating to the replacement of parts / partial equipment.

Only qualified personnel can carry out this work.

Read this manual carefully before using this equipment

INFORMATION FOR THE OPERATOR

Instructions for safe use

The responsibility of the user is to comply with the following instructions:

- Only entrust the use of the machine to responsible persons who are familiar with the instructions in this manual.
- read, understand and follow all machine instructions and instructions.
- Familiarize yourself with the controls and operation of the machine before starting it.
- Take note of all the safety and operating labels present on the machine, equipment and accessories.
- Learn the location and operation of each command.
- Use the machine only for its intended use.
- Keep the work area clean and orderly. A messy workplace increases the risk of accidents.
- Wear appropriate clothing.
- Wear safety glasses.
- Wear gloves suitable for the use of the machine.
- Wear safety shoes.

General contraindications

- Do not wear loose clothing, wide hanging belts or anything that can be grabbed.
- Do not operate the machine while under the influence of alcohol, drugs or medication which may cause drowsiness or affect the ability to use it.
- Never operate the machine without its safety devices, risk of serious injury (casing, radar, etc.).
- Do not operate the machine when a person is present in the secure enclosure.
- Do not handle the machine without having read the paragraph "Description of Handling"
- Do not use the machine with any other parts than those defined in the paragraph "List of incoming products"
- Disconnect the electric cable before dismantling the casing

Specific Risks

Electrical risks

Risks of pinching

Risks of burns

INSTALLATION

1. Site environment

Environnement conditions

Temperature : 15°C to 30°C
Hygrometry : <80 %

Mains supply

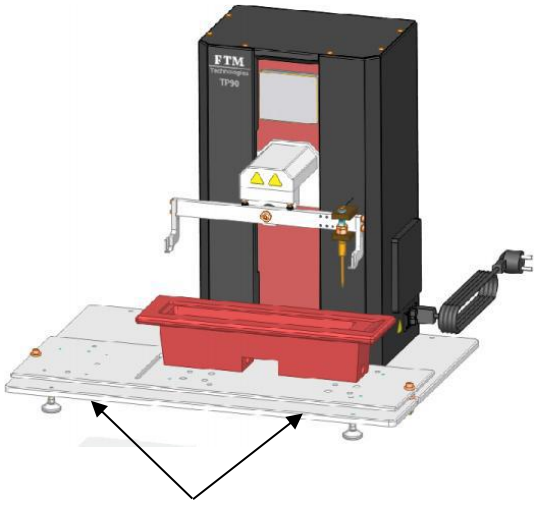
Energy	Characteristics	Connection
Electricity	230 V 50 Hz 1Ph+N+ Ground Installed power : < 1,5 KW. 24 Vdc for secondary circuit	European plug 2P+G standard 16 A

Technical data

- Weight : 30 kg (without tinning bath)
- Length : 600 mm
- Width : 300 mm
- Height : 600 mm

Description of handling and setting

Number of package : 1.
Type of handling : Hand pallet truck manual.



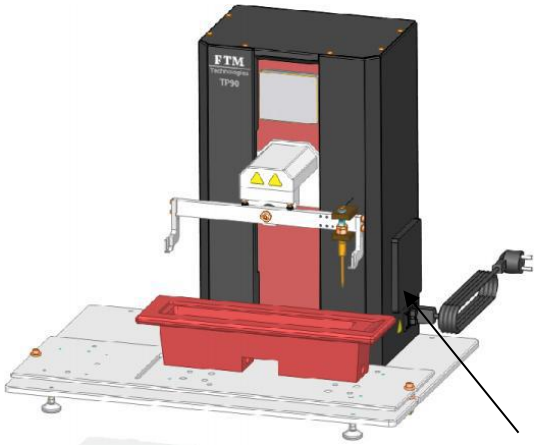
Pick-up points under the plate

Dismantling of the machine

Pollution when disposing of the equipment: Refer to the manuals of the suppliers of the various components of the machine, observing the standards and directives in force on the date of disposal.

2. Electric panel

Localisation



Buttons

Panel		
Type	Function	Colour
Main switch	Machine powered up	Black

Connetion

Electrical connection: On standard socket outlet with earth - 220V - 50Hz.

3. Presentation of the machine

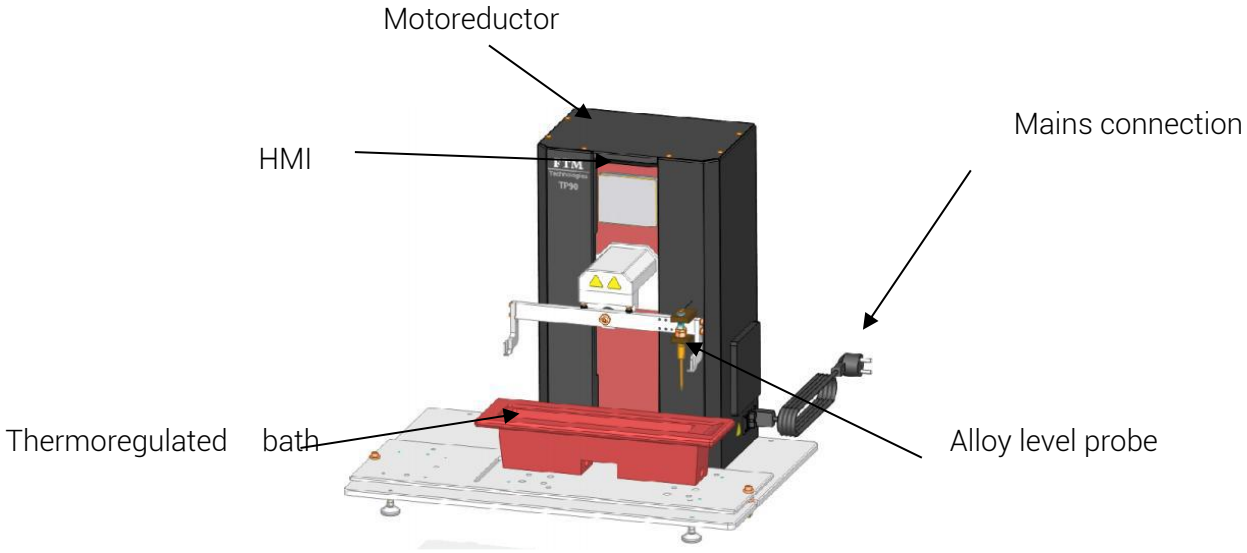
Main function

This machine is intended to perform the tinning of components contact.

Operating cycle:

1) Selection and transfer of the program corresponding to the product to be tinned.
2) Installation of the contacts to be tin plated on the laying.
3) Cycle start.
4) Lower the tool until the tin level is detected.
5) Movement of the tool towards the pre-heating position.
6) Lowering of the laying in position 2 for tinning.
7) Raising the tool.

Construction of machine assemblies



Cycle time

The cycle time is variable, it depends on the program selected for the type of contacts to be tinned.
The different speeds are variable.

Preventive maintenance

Preventive maintenance				
OP N°	INTERVENOR	FREQUENCE	STATE OF THE MACHINE	INTERVENTION
1	Production	Daily	Switched off	Machine cleaning and visual inspection.
2	Maintenance	Monthly	Switched off	Lubrication of sliding units.

HUMAN MACHINE INTERFACE

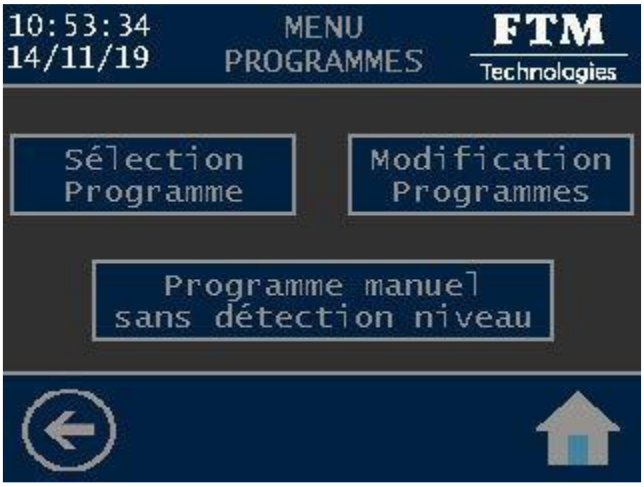
1. Opening window « MENU »

This menu allows navigation between the different pages of the HMI.

Button	Password	Description
Programs	No	Access to Programs menu
Paramètres	Yes	Access to Parameters menu
Manual Mode	Yes	Allows access to the Manual Mode page, the operating mode "Manu" is activated
Défaults	No	Access to historical page of defaults
System	Yes	Access to System menu
Cycle counter	No	Access to Cycle counter menu
Production	No	Allows access to the Production page, if no fault is active the "Auto" operating mode is activated
	No	Return to the previous page
	No	Return to the Menu page

2. Programs menu window

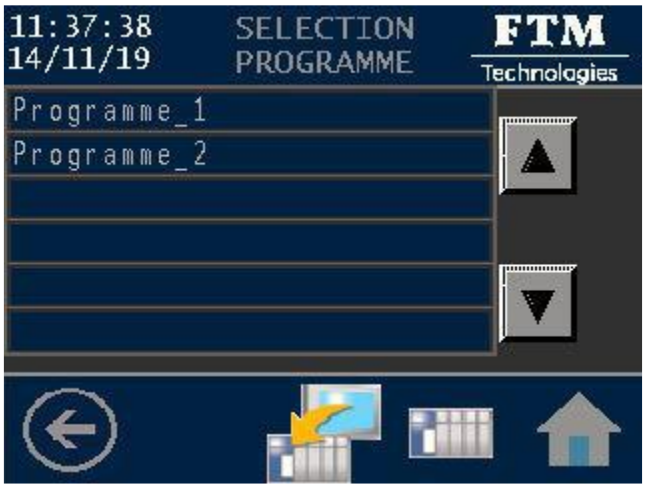
This page allows access to the different pages for selecting and modifying programs.

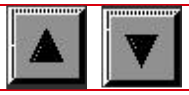


Button	Password	Description
Program selection	No	Allows access to the Program Selection page if the "Titanium finger" parameter is activated
Program modification	Yes	Allows access to the Change Programs page
Manual program without level detection	Yes	Allows access to the Manual program page if the "Titanium Finger" parameter is disabled
	No	Return to the previous page
	No	Return to the Menu page

3. Program selection window

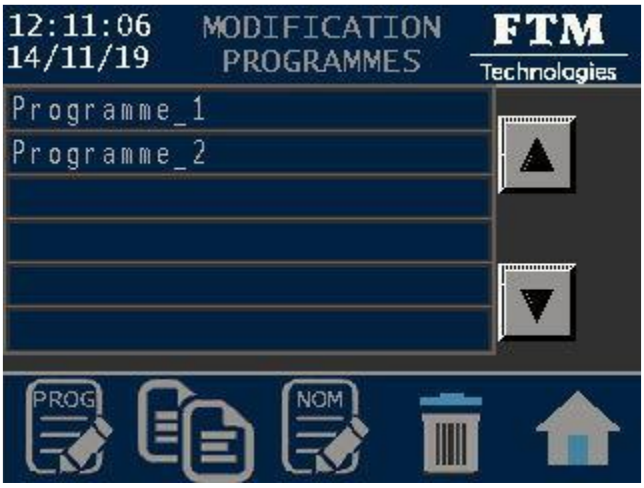
This page is used to view the list of saved programs, to transfer the selected program to the machine and to view the content of the machine program..



Button	Description
	Pressing the line highlights the program selected
	Allows you to navigate in the list of recorded programs
	Used to transfer the selected program to the machine. A message appears to indicate that the transfer was successful.
	Used to view the content of the machine program.
	Return to the previous page
	Return to the Programs menu page

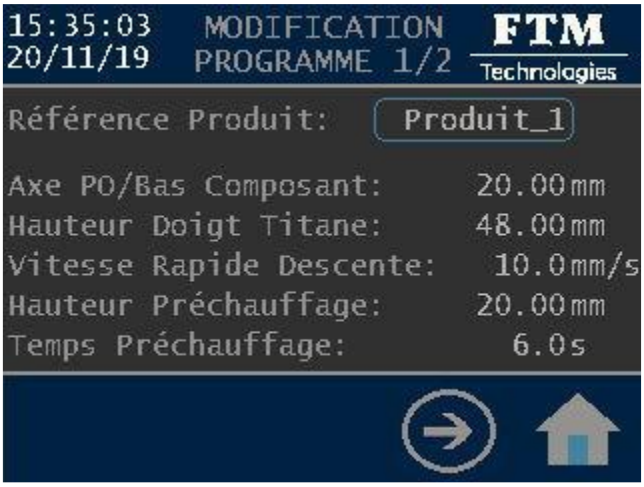
4. Program modification window

This page is used to view the list of saved programs, to modify a program, to copy a program, to modify the name of a program and to delete a saved program.



Button	Description
	Pressing the line highlights the program selected
	Allows you to navigate in the list of recorded programs
	Allows access to the Program Modification pages
	Allows you to copy (duplicate) the selected program
	Change the name of the selected program
	Used to delete the selected program, after confirmation
	Return to the previous page
	Return to the Programs menu page

This page is used to define the program values to modify or create, the other program values will be defined on the next page.



Button	Description
	Pressing the framed part allows you to define a product reference associated with the program (max: 10 alphanumeric characters)
	Pressing the value allows you to modify the height between the axis of the tool holder and the bottom of the component (min: 0.0 and Max: 60.0mm)
	Pressing the value changes the height of the titanium finger mounted on the machine (min: 0.0 and Max: 100.0mm)
	Pressing the value on the right (10.00 mm / s) allows you to define the rapid descent speed (min: 5.0 and max: 15.0 mm / s)
	Pressing the value on the right (15.00 mm) allows you to define the preheating height, distance between the bottom of the component and the bath level (min: 0.0 and max: 60.0 mm)
	Pressing the value on the right sets the preheating time (min: 0.0 and Max: 1000.0 s)
	Return to the previous page
	Return to the Programs menu page

*

This page allows you to define the last values of the program to modify or create, then to save the program.

Button	Description
Référence Produit: Produit_1	This area displays the product reference defined on the previous page.
Vitesse Entrée Etamage: 5.0mm/s	Pressing the value on the right (5.0 mm / s) allows you to define the tinning input speed (min: 1.0 and Max: 15.0 mm / s)
Profondeur Etamage: 3.00mm	Pressing the value on the right (3.00 mm) allows you to define the tinning depth (min: 0.00 and Max: 40.00 mm)
Temps Arrêt Etamage: 2.0s	Pressing the value on the right (2.0 s) allows you to define the tinning stop time (min: 0.0 and Max: 60.0 s)
Vitesse Sortie Etamage: 5.0mm/s	Pressing the value on the right (5.0 mm / s) allows you to define the tinning output speed (min: 0.1 and Max: 20.0 mm / s)
Vitesse Rapide Montée: 15.0mm/s	Pressing the value on the right (15.0 mm / s) allows you to define the rapid rate of climb (min: 1.0 and Max: 20.0 mm / s)
	Return to the previous page
	Icon allowing, after confirmation, to save the modified or created program
	Return to the Programs menu page

5. Manual program window for bath level

When the titanium finger, for automatic detection of the bath level, is not used, therefore deactivated in the "Parameters" page, the manual program must be used.
This page allows you to teach the machine the level of the tinning bath, with the "INIT" command, make the initial machine reference to determine the level 0.00mm.

With the "Up" and "Down" commands, position the bottom of a component tangent to the bath, then press the "Validate Level" key, the learned level value is displayed to the right of the key. To define the other values of the manual program go to the next page.

Button	Description
	Pressing the value allows you to modify the descent speed (min: 0.0 and Max: 15.0mm / s)
	Pressing the value allows you to modify the climb speed (min: 0.0 and Max: 15.0mm / s)
	Pressing the value on the right (20.00mm) allows you to define a maximum relative displacement value (value between 0 and 100mm)
	The absolute position relative to the machine origin is displayed in the central part
	Pressing the key activates homing if the pressure is maintained. The ascent will be made at high speed to the origin sensor, then a descent, at slow speed, will be made automatically to exit the sensor. , the position counter will be set to 0
	Pressing the key activates the climb, if the key is held down the maximum displacement achieved will be the value entered on the Displacement line on the right side (20.00mm)
	Pressing the key activates the descent, if the key is held down the maximum displacement achieved will be of the value entered on the Displacement line on the right side (20.00mm)
	Return to the previous page
	Icon indicating the presence of an active alarm, pressing this icon allows access to the "Fault History" page

	Icon allowing access to the next page
	Return to the Programs menu page

6. Manual program window

This page is used to define the values of the manual program, for the other values of the manual program go to the next page.

Button	Description
	Pressing the framed part allows you to define a product reference associated with the program (max: 10 alphanumeric characters)
	Visualize the height, compared to the original zero point, of the bath level learned on the previous page
	Pressing the value on the right (10.00mm / s) allows you to define the rapid descent speed (min: 5.0 and Max: 10.0mm / s)
	Pressing the value on the right (15.00mm) allows you to define the preheating height, distance between the bottom of the component and the bath level
	Pressing the value on the right sets the preheating time (min: 0.0 and Max: 18.0s)
	Icon allowing access to the next page

This page is used to define the last values of the manual program and to transfer the manual program to the machine.

Button	Description
Référence Produit: PRODUIT M	Allows you to view the product reference defined on the previous page
Vitesse Entrée Etamage: 5.0mm/s	Pressing the value on the right (5.0mm / s) allows you to define the tinning input speed (min: 1.0 and Max: 15.0mm / s)
Profondeur Etamage: 3.00mm	Pressing the value on the right (3.00mm) allows you to define the tinning depth (min: 0.00 and Max: 40.00mm)
Temps Arrêt Etamage: 2.0s	Pressing the value on the right (2.0s) allows you to define the tinning stop time (min: 0.0 and Max: 60.0s)
Vitesse Sortie Etamage: 5.0mm/s	Pressing the value on the right (5.0mm / s) allows you to define the tinning output speed (min: 0.1 and Max: 20.0mm / s)
Vitesse Rapide Montée: 15.0mm/s	Pressing the value on the right (15.0mm / s) allows you to define the rapid rate of climb (min: 1.0 and Max: 20.0mm / s)
	Used to transfer the selected program to the machine. A message appears to indicate that the transfer was successful
	Icon allowing access to the next page
	Return to the Programs menu page

7. Parameters window

This page allows you to define the configuration parameters related to the machine.

Button	Description
	Enables or disables the exchange of information between the bath thermoregulator and the machine. This information indicates when the bath is hot enough and authorizes the descent into the bath (see instructions below)
	Allows you to enable or disable the detection of the bath level by the titanium finger. When this parameter is disabled only the manual program can be used
	Allows you to define a time on the activation of the "bath ready" information, the cycle start will be authorized after this time has elapsed (min: 0 and Max: 60 min)
	Allows you to define a time on deactivation of the "bath ready" information, the cycle start will no longer be authorized after this time has elapsed (min: 0 and Max: 60 min)
	Height linked to the machine: distance between the level of the work surface and the upper level of the bath (+ 10.00mm safety). This height is used to calculate the approach course at high speed.
	Icon allowing access to the next page
	Return to the Programs menu page

Instructions for using the bath thermoregulator to configure the operating temperature alert (valid for baths with Fuji PXF4 thermoregulators)

This paragraph specifies the operations to be carried out in order to create a dependence between the tinning bath and the robot.Its goal is to :

- Configure a reference temperature which ensures the liquidus of the alloy (a time delay programmed in the tin bath parameters allows to guarantee a lag time between reaching this temperature and releasing the robot start command.)
- Create a referral of information between the bath and the tinning robot
- Like this,
  - The operator ensures that he has the operating temperature required for his tinning process
  - The titanium finger cannot be damaged by coming into contact with an insufficiently molten alloy.

1) Creation of the reference temperature:
   a. at. Short press on SEL
   b. Go down with the arrow down to AL2
   c. Short press on SEL and adjust temperature by up and down arrows
   d. Confirm by short press on SEL
2) Configure communication with the TP90
   a. at. Long press on SEL
   b. Go down to CH7 with the down arrow
   c. Short press on SEL
   d. Go down to LEV2 with down arrow
   e. Short press on SEL
   f. Use arrows to reach the value 0111
   g. Validate by short press on SEL
3) Connect the cord connecting the two M12 outputs of the bath and the robot

8. Manual mode window

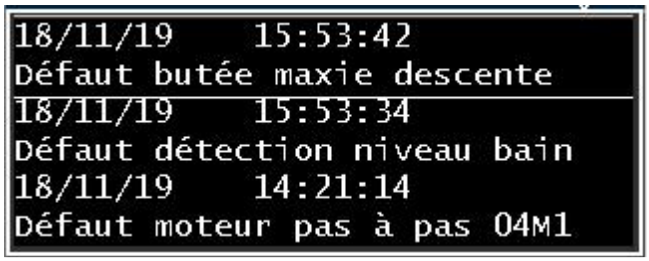
This page is used to activate the descent and ascent movements by pressing and holding a key. To activate a downward movement, you must first have taken an origin by pressing the "INIT" key.

Button	Description
	Pressing the value allows you to modify the descent speed (min: 0.0 and Max: 15.0mm / s)
	Pressing the value allows you to modify the climb speed (min: 0.0 and Max: 15.0mm / s)
	Pressing the value on the right (20.00mm) allows you to define a maximum relative displacement value (value between 0 and 100mm) The absolute position relative to the machine origin is displayed in the central part
	Pressing the key activates homing if the pressure is maintained. The ascent will be made at high speed to the sensor origin, then a descent, at slow speed, will be made automatically to exit the sensor. , the position counter will be set to 0. INIT touch will become light blue.
	Pressing the key activates the climb, if the key is held down the maximum displacement achieved will be the value entered on the Displacement line on the right side (20.00mm)
	Pressing the key activates the descent, if the key is held down the maximum displacement achieved will be of the value entered on the Displacement line on the right side (20.00mm)
	Return to the previous page
	Icon indicating the presence of an active alarm, pressing this icon allows access to the "Fault History" page

	Icon allowing access to the next page
	Return to the Programs menu page

9. Faults window

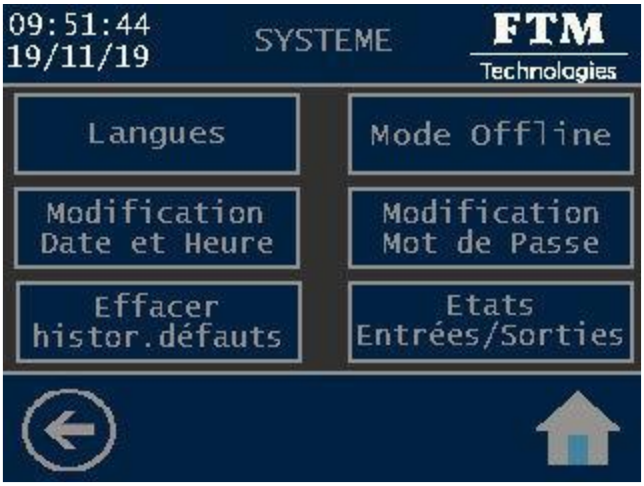
The fault history page brings together all faults that have occurred on the machine, these faults are time-stamped.

Button	Description
	Fault display area, the time stamp corresponds to the appearance of the fault, the selected fault is framed
	Icon for navigating in the fault display area
	Icon indicating the presence of an active alarm, pressing this icon allows access to the "Fault History" page
	Icon allowing access to the next page

	Return to the Programs menu page

10. System window

This window allows access to the different system setting and visualization pages..



Buttons	Description
Language	Allows access to the page for selecting the HMI display language (French / English)
Offline mode	Allows access to the HMI offline mode, this mode is reserved for advanced HMI settings
Date and time modification	Allows access to the date and time modification page of the GUI
Password modification	Allows access to the password modification page.
Faults history clearing	Allows access to the Clear fault history page. Unacknowledged faults will not be erased
Input/output state	Allows access to the visualization pages of the logic states of the inputs (sensors) and outputs (actuators) of the machine
	Icon allowing access to the previous page
	Return to the Programs menu page

11. Cycle counter window

Button	Description
	Display area showing the number of cycles performed
	Allows zeroing of the cycle counter, access with password
	Icon allowing access to the previous page
	Return to the Programs menu page

12. Production window

This window is used to perform tinning cycles according to the parameters of the selected program.
When the cycle is started, a "Stop" key is displayed to stop the cycle at any time, the icon back to the home page is then inoperative.

Button	Description
	Message display area for the operator, these messages provide information on the operation in progress
	Display area for the name of the program selected for production
	• Display area for cycle start and stop buttons. • • "Start" button allows cycle start • • "Stop" key causes the cycle to stop • • "Init" key allows you to return to the top point of the machine after a cycle stop or at the start of production mode
	Display area of the active fault in progress, pressing this area displays the "Fault history" page, where the active fault, after taking into account, can be acknowledged
	Return to the Programs menu page Inoperative when the cycle is in progress

13. Software structure

Architecture : GP PRO EX 4.08

OPERATING MODE

1. Wired part

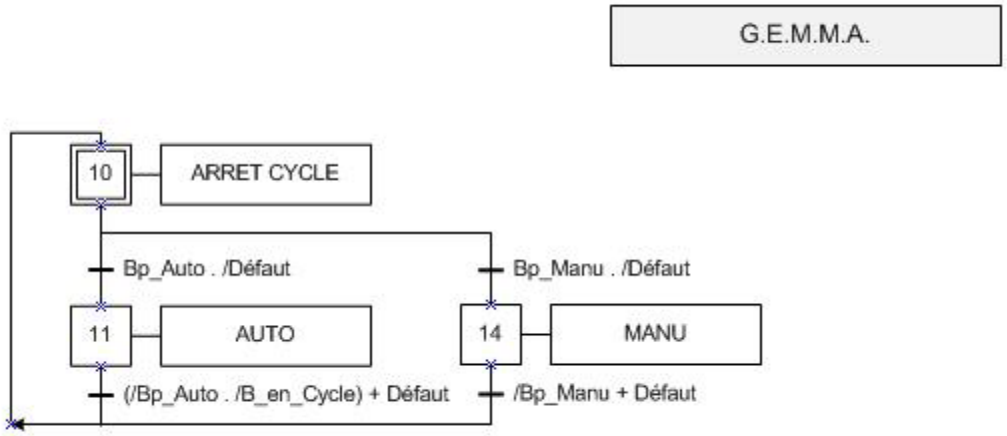
Commissioning

To put the machine into service:
• Close all the casings of the machine
• Connect the electric cable
• Position the disconnector on the side of the control box on I.
• Wait for the display to start up

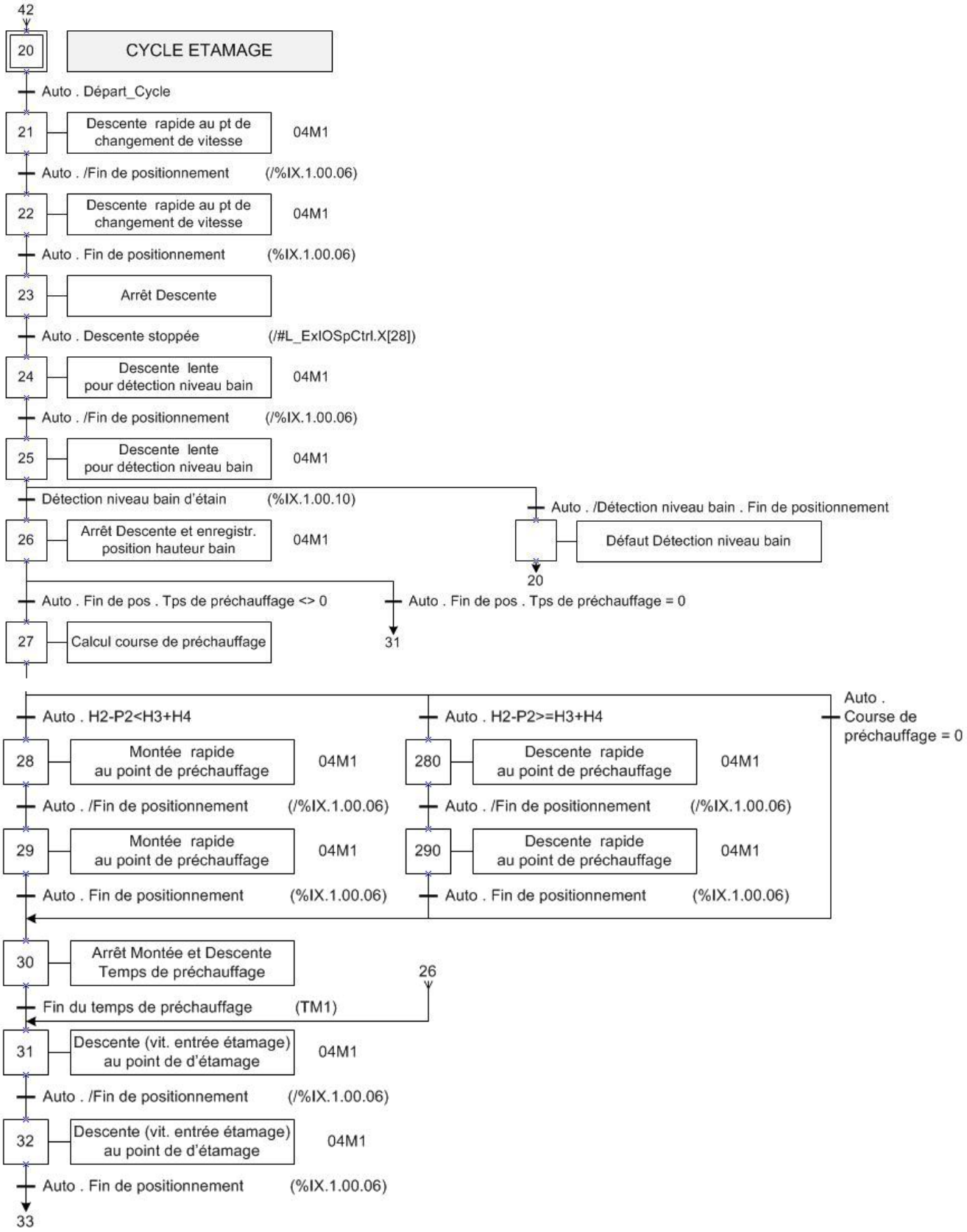
Decommissioning

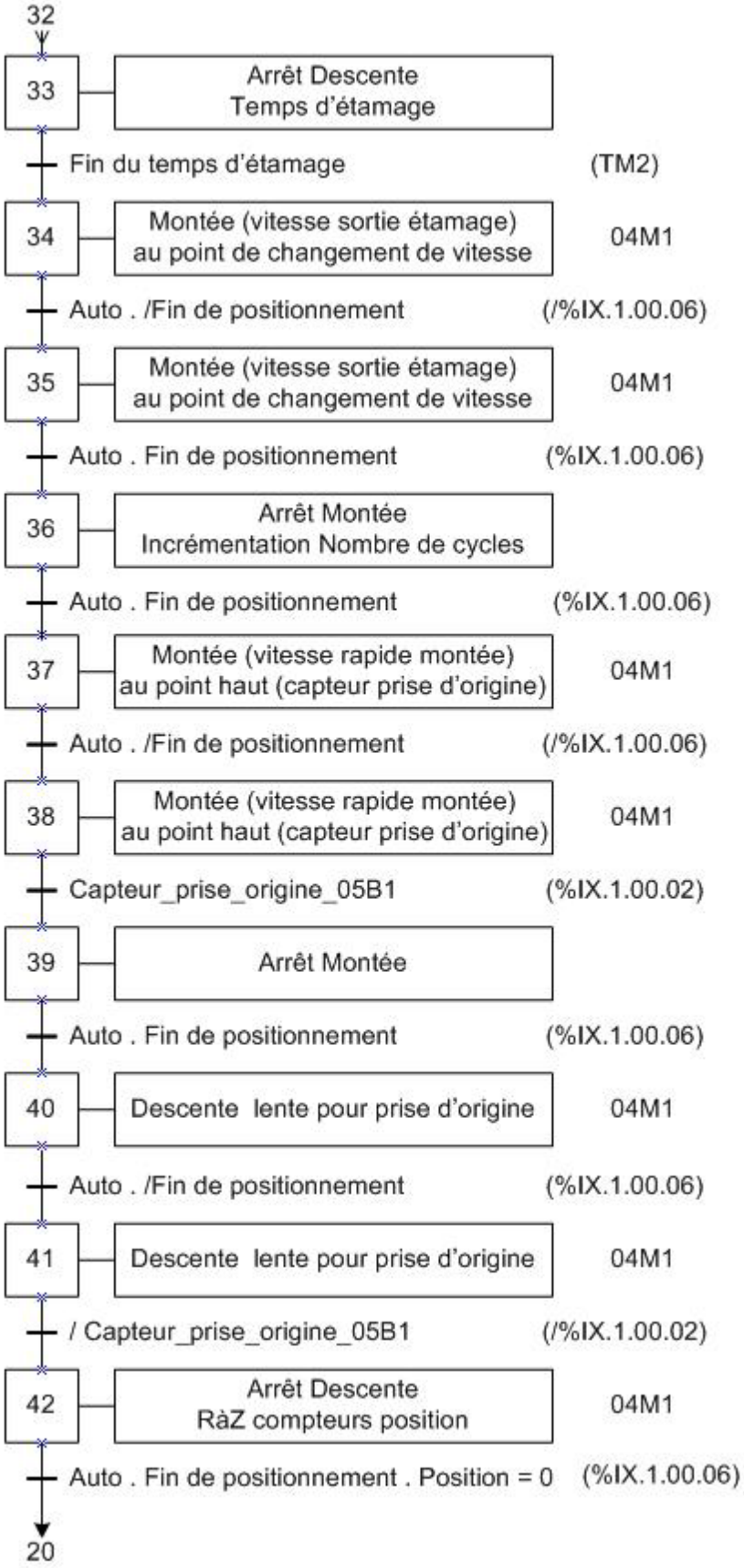
To put the machine out of service:
• Turn off the on / off button
• Disconnect the electric cable

2. Grafcet of on and off modes

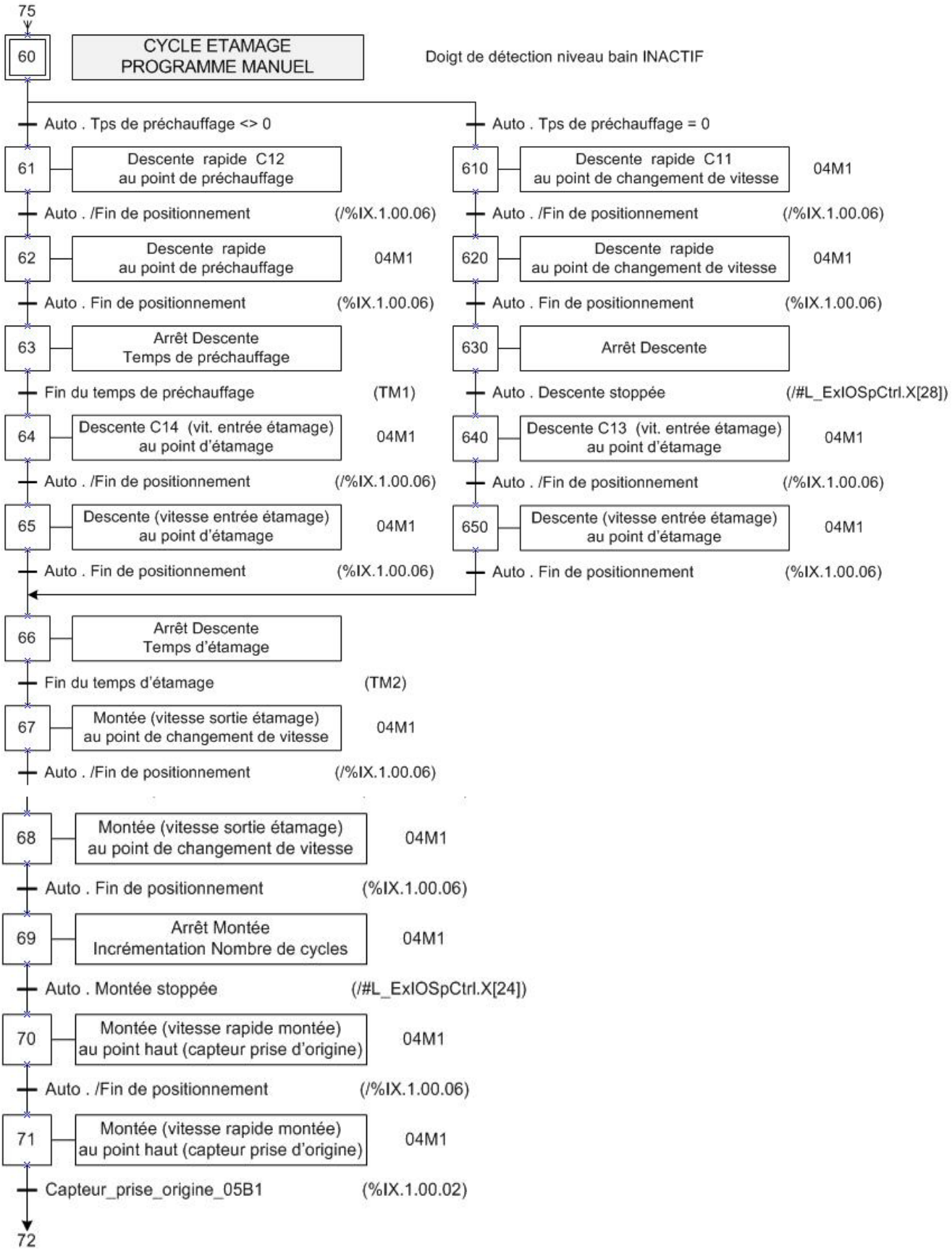


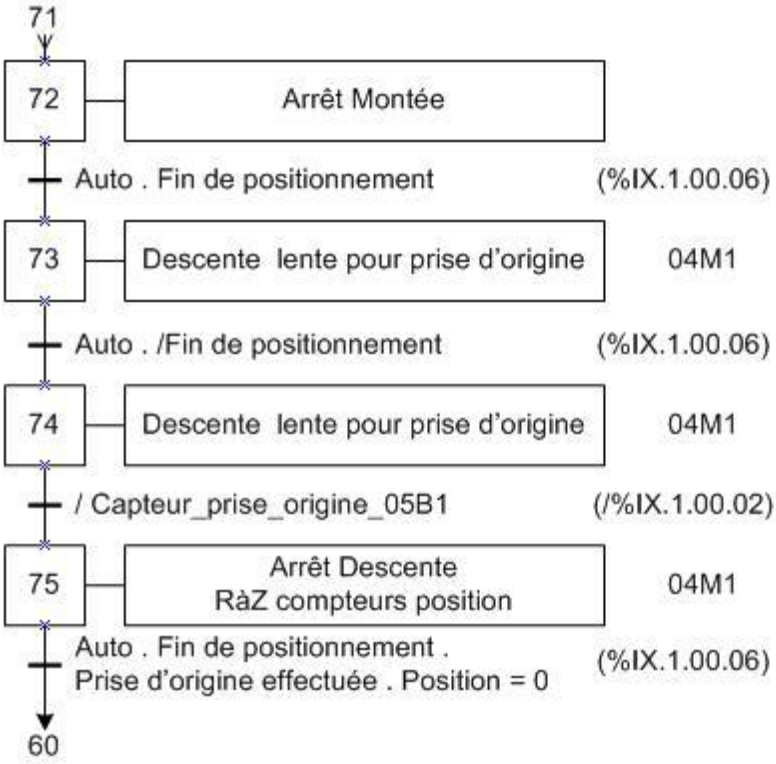
3. Grafcet of tinning cycle



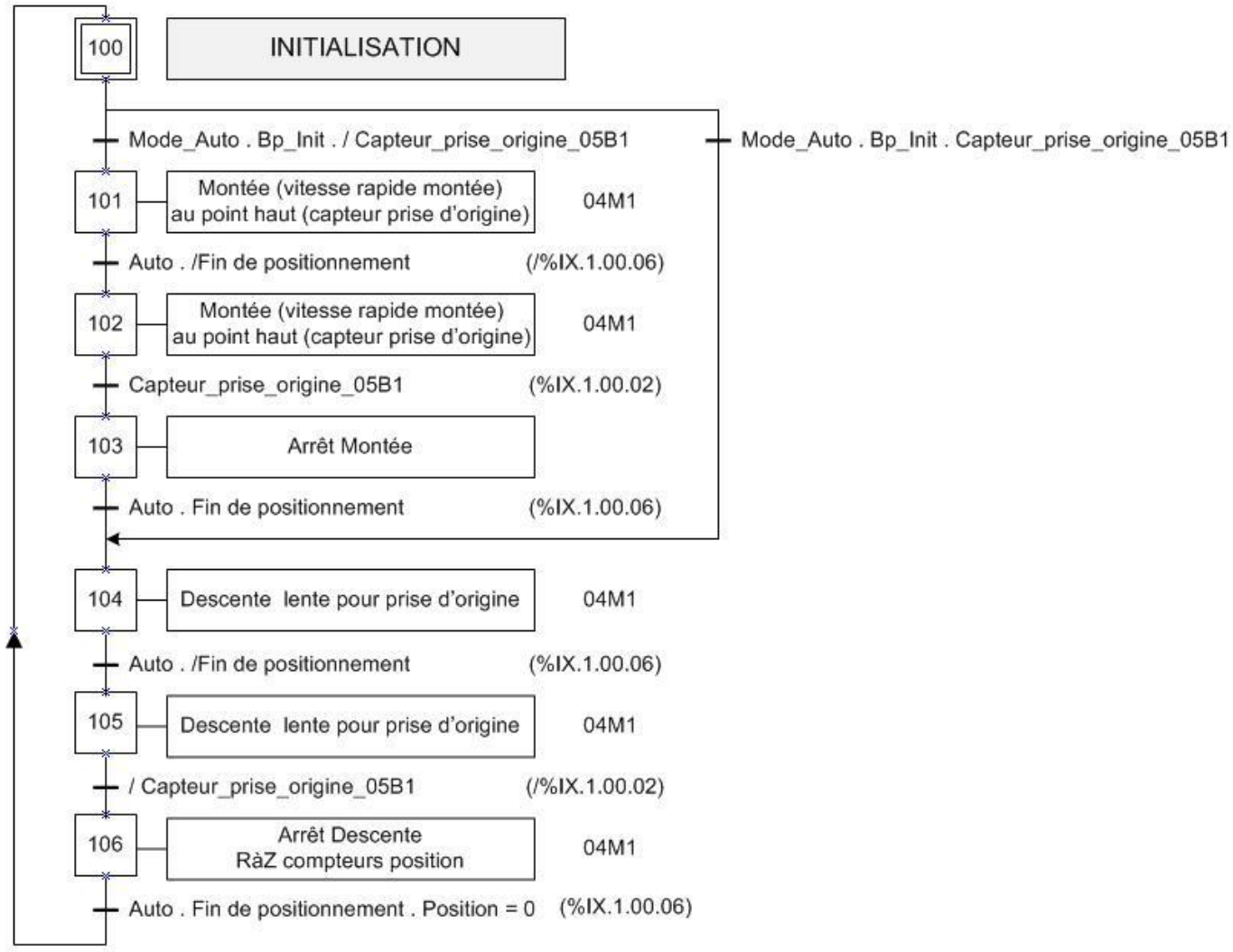

32
33
Arrêt Descente
Temps d'étamage
Fin du temps d'étamage (TM2)
34
Montée (vitesse sortie étamage)
au point de changement de vitesse
04M1
Auto . /Fin de positionnement (/%IX.1.00.06)
35
Montée (vitesse sortie étamage)
au point de changement de vitesse
04M1
Auto . Fin de positionnement (%IX.1.00.06)
36
Arrêt Montée
Incrémentation Nombre de cycles
Auto . Fin de positionnement (%IX.1.00.06)
37
Montée (vitesse rapide montée)
au point haut (capteur prise d'origine)
04M1
Auto . /Fin de positionnement (/%IX.1.00.06)
38
Montée (vitesse rapide montée)
au point haut (capteur prise d'origine)
04M1
Capteur_prise_origine_05B1 (%IX.1.00.02)
39
Arrêt Montée
Auto . Fin de positionnement (%IX.1.00.06)
40
Descente lente pour prise d'origine
04M1
Auto . /Fin de positionnement (%IX.1.00.06)
41
Descente lente pour prise d'origine
04M1
/ Capteur_prise_origine_05B1 (/%IX.1.00.02)
42
Arrêt Descente
RàZ compteurs position
04M1
Auto . Fin de positionnement . Position = 0 (%IX.1.00.06)
20

4. Grafcet of manual mode tinning cycle




71
72
Arrêt Montée
Auto . Fin de positionnement
(%IX.1.00.06)
73
Descente lente pour prise d'origine
04M1
Auto . /Fin de positionnement
(%IX.1.00.06)
74
Descente lente pour prise d'origine
04M1
/ Capteur_prise_origine_05B1
(/%IX.1.00.02)
75
Arrêt Descente
RàZ compteurs position
04M1
Auto . Fin de positionnement .
Prise d'origine effectuée . Position = 0
(%IX.1.00.06)
60

5. Grafcet Initialiszation – Back to top



LIST OF FAULTS

Message fault	Fault condition	Possible cause	Actions
Motor fault Step by step 04M1	Loss of entry: % IX.1.00.05 Absence_Alarm_ Motor_04m1 Motor overload	Excessive engine temperature Engine overspeed Pulse control error Overvoltage protection Undervoltage	Refer to the drive technical documentation to analyze the cause of the fault and remedy it Acknowledge the fault on the "Fault History" page
Bath level detection fault	During the level detection phase, lowering into slow speed, the race was reached without level detection	Problem with the electrical connection of the detection system. 05B2-05KA2 Incorrect values of parameters or program	Check the operation of the level detection using the "Manual Mode" page Check the values of the parameters and the selected program Acknowledge the fault on the "Fault History" page
Faulty maximum lowering stop	Position> 40mm below the detected bath level	Incorrect parameters or program values	Check the values of the parameters and the selected program Acknowledge the fault on the "Fault History" page

GUARANTEE

All sets are guaranteed for 1 year, parts and labor, provided that you have used the product in accordance with its destination and the instructions in the user manual. For the implementation of this warranty, you will have to attach a photocopy of the original invoice specifying the date of purchase.

Warranty exclusions:
- modification or alteration of the above document,
- type and / or serial number of the product made unidentifiable,
- interventions on the product carried out by any unauthorized person,
- damage caused by a cause external to the device and in particular by lightning, fire, water damage or negligence,
- modification or adaptation of the product.

The guarantee does not cover the deterioration of accessories and spare parts of usual consumption.