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USERGUIDE

S900-II
Version 2.1

⚠ **WARNING - Reliance on this Manual Could Result in Severe Bodily Injury or Death!**

This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate, and/or incomplete and cannot be used, followed, or relied upon. Contact Conair at info@conairgroup.com or 1-800-654-6661 for more current information, warnings, and materials about more recent product manuals containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

Logo definitions :

 Warning, risk

 Sepro robotique inventions

 What to do ?

 Document evolutions

 Handy hints

 Example

 Innovation or information concerning a particular software version

– CONTENTS –

I – PRESENTATION

I – 1. General information

S900–II is an electronic control system for Cartesian robots equipped with 3 to 5 simultaneous numeric axes. These robots are designed to unload Injection Moulding Machines (IMM) from above.

It is simple to use thanks to its ideographic keyboard and its large screen showing clear messages, and new cycles can be easily created with a System for Assisted Programming (SAP). It is possible to program very sophisticated applications with S900–II (palletizing, overmoulding, robot peripheral unit management ...).

The functioning described in this manual corresponds to a basic configuration of the S900–II control system.

I – 1. 1. System architecture

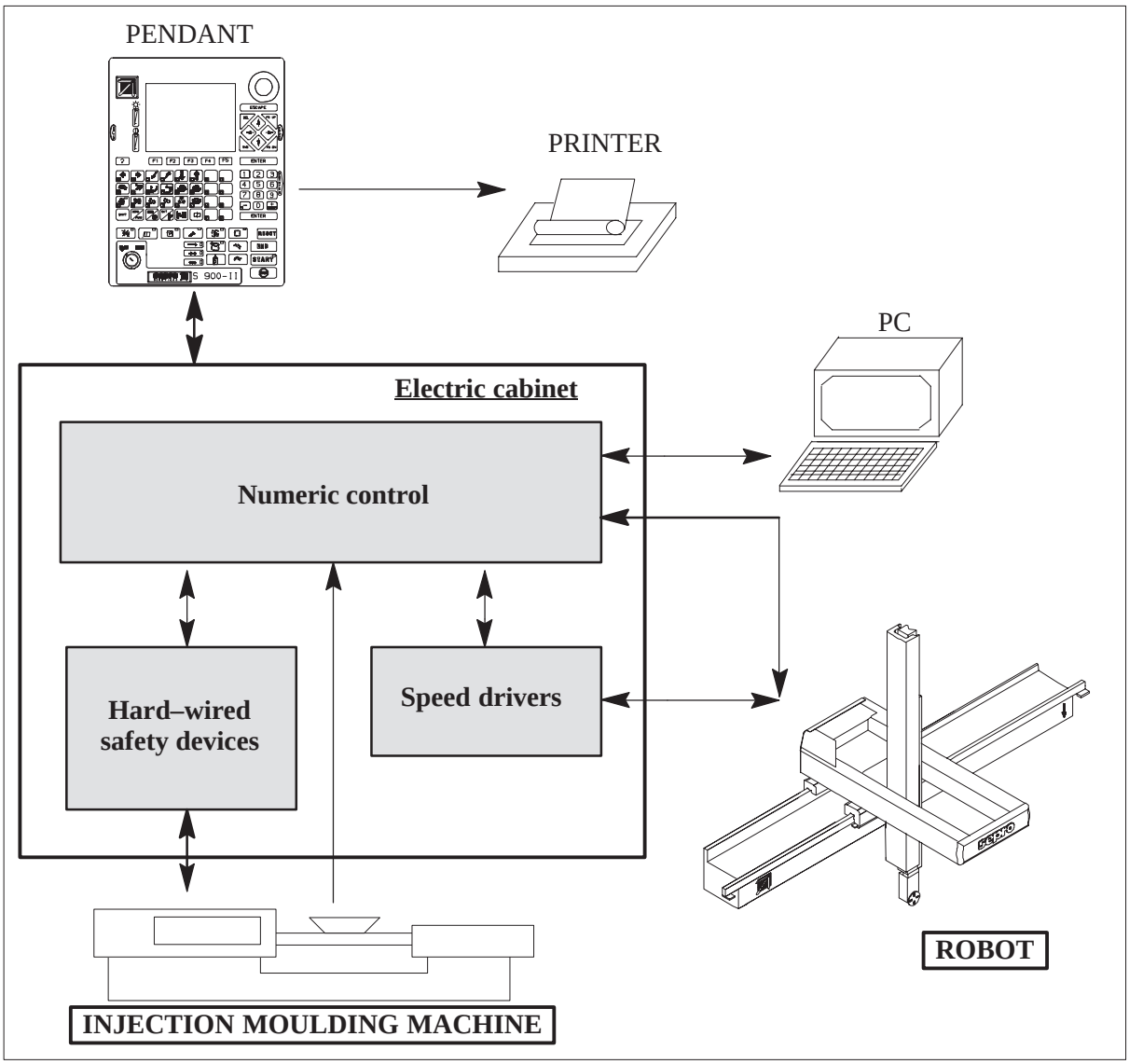


Figure 1 : General block diagram

I – 1. 2. Counting

To enable the robot movement and in order to know the real position of the robot at all times, the S900–II control needs to be able to measure each axis' movement. This is called COUNTING .

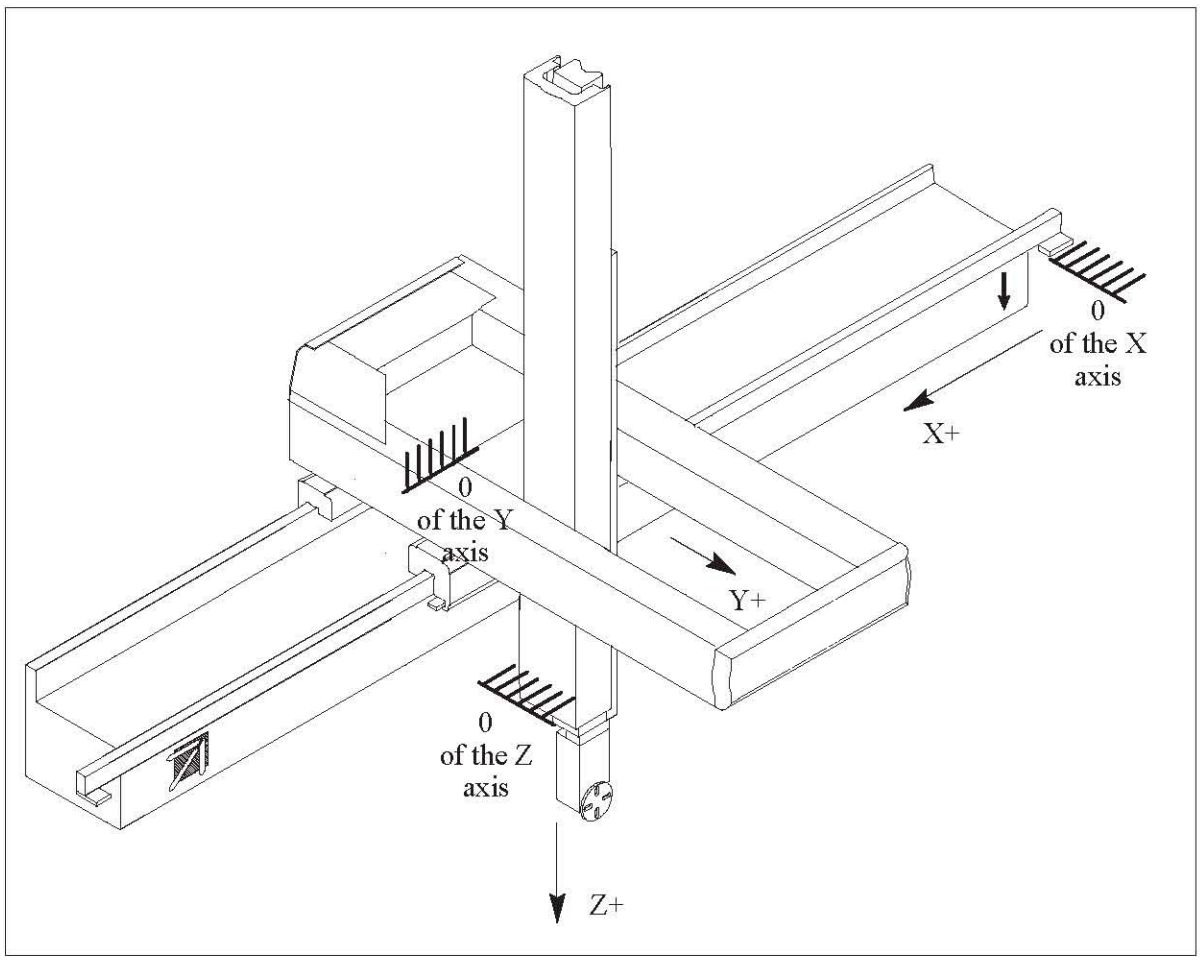


Figure 2 : Counting direction and zero

The Sepro robots counting direction by default is that indicated in the figure above.

The S900–II needs to know the axes' ZERO to be able to count. The zero must be inaccessible for the counting to be positive.

The COUNTING uses these ZEROS as its reference, following the INITIALIZATION procedure. (See chapter III – 2. page 14 or the "Quick Reference Manual").

I – 2. Safety devices

I – 2. 1. Use

The robot must only be used on an injection machine in a safe environment. Safeguards must be installed for a part to be removed from the inside of the IMM : these safeguards limit access to the work area. Access for operations such as maintenance or part manipulation by operators must only be carried out after a shut–down procedure or following a special safeguard conception.

Warning : A robot which is immobile is not stopped.
A robot which is stopped is not shut–down.

I – 2. 2. Work areas

The cams and the sensors placed on the 3 axes, demarcate the work areas in which the robot can safely move in automatic mode.

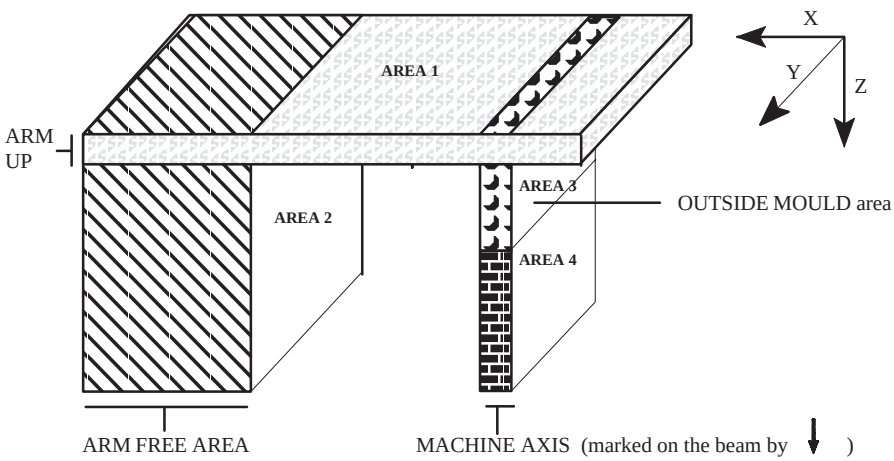
AREA 1 : Robot arm up area in which the robot can move when the machine is in motion.

AREA 2 : Robot arm free area in which the robot can descend when the machine is in motion. The Tool Change Position (PCO) is generally in this area.

AREA 3 : Robot outside mould area in which the robot can descend even if the Mould Open (MO) information is not present.

The out of mould area cam (ZHM) defines the approach stroke that is possible for the robot in the machine axis whilst waiting for the mould to open. After having taken the part from the mould, the IMM closing is validated as soon as the arm moves into the “out of mould area” (ZHM).

AREA 4 : Robot in machine axis area in which the robot can only descend if the Mould Open information (MO) is present. A safety stop is activated if the Mould Open information (MO) is lost before arriving at the Out of Mould Area (ZHM) or Arm up area (BH). (See “Anticipated restart” in the “Programming Level 1” Manual).



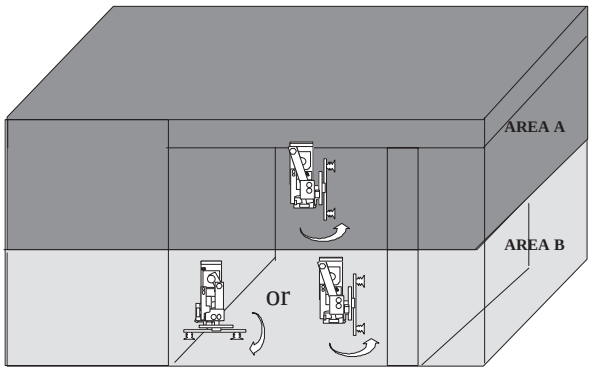
WARNING ! In Adjust mode :

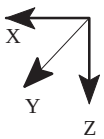
. the robot no longer acknowledges these areas; it is the operator who is responsible,

. only the safety stop devices stay active (hitting the emergency stop, IMM gate closed (PF), overtravel).

Figure 3 : Safety areas

Certain robots have two other safety areas. This is the case when the arm cannot move up completely (Z axis) in a certain part grip position (risk of collision with another part of the robot).





Area A :

- ▶ Gripper base plate must be vertical,
- ▶ Gripper base plate must not be horizontal.

Area B :

- ▶ No restrictions on the gripper base plate position.

Figure 4 : Rotation safety

Note : If the gripper base plate is not vertical in Area A, the robot will react as if it is in overtravel.

I – 2. 3. Robot / IMM interface

The robot / IMM interface is the definition of the information exchanges between the robot and injection moulding machine.

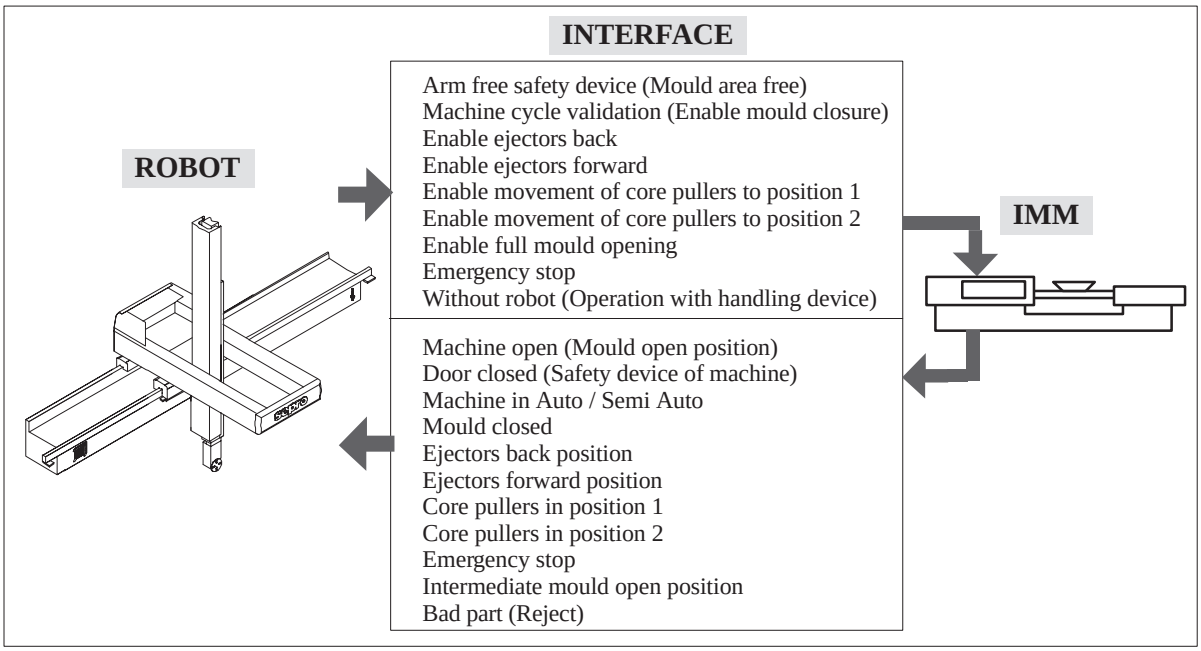


Figure 5 : Robot / IMM interface

The interface is cabled according to the EUROMAP 12 protocol (standard). It is possible to ask for an SPI (American) or Japanese protocol.

I – 3. Options

The following options are possible on the robot :

▶ IMM restart box (BRP)

This small box is a simplified version of the pendant and enables IMM cycles to be restarted without having to use the pendant.

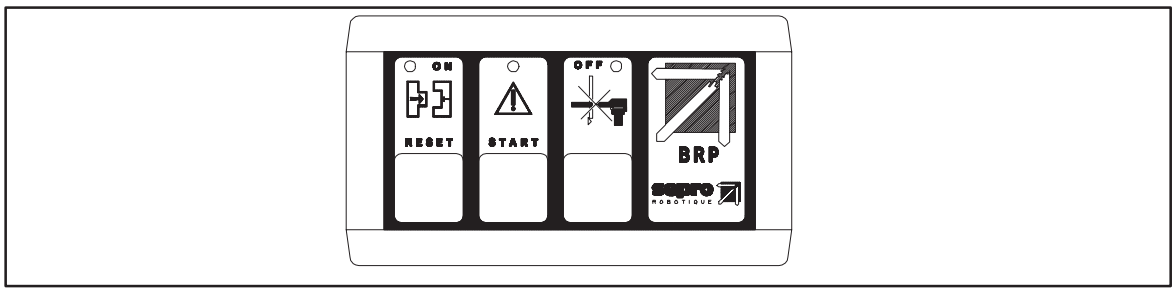
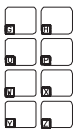


Figure 6 : IMM restart box (BRP)

▶ Customized keys

On the pendant, the  keys can be programmed for particular actions (specific to each robot).

▶ Euromap 17 (Complete robot / IMM interface),

▶ JBUS (operating mode management by a network supervisor),

▶ PC option (Off–line programming, AS900–II program editor functioning in Windows).

See respective documentation for information concerning these options.

▶ Using 2 printers simultaneously, the first on the cabinet, the second on the pendant.

▶ Anticipation of the IMM restart saves and anticipates the times separating :

- the machine cycle command validation (VCM),
- the actual start of the mould movement.

▶ Memory extension (32 Kbytes basic, can be extended to 128 Kbytes).

▶ A external memory module for the 16 or 64 Kbyte memories (Dial board must be present).

▶ Mould chasing.

▶ Area safety.

II – COMMAND AND VISUALISATION DEVICES

II – 1. The pendant

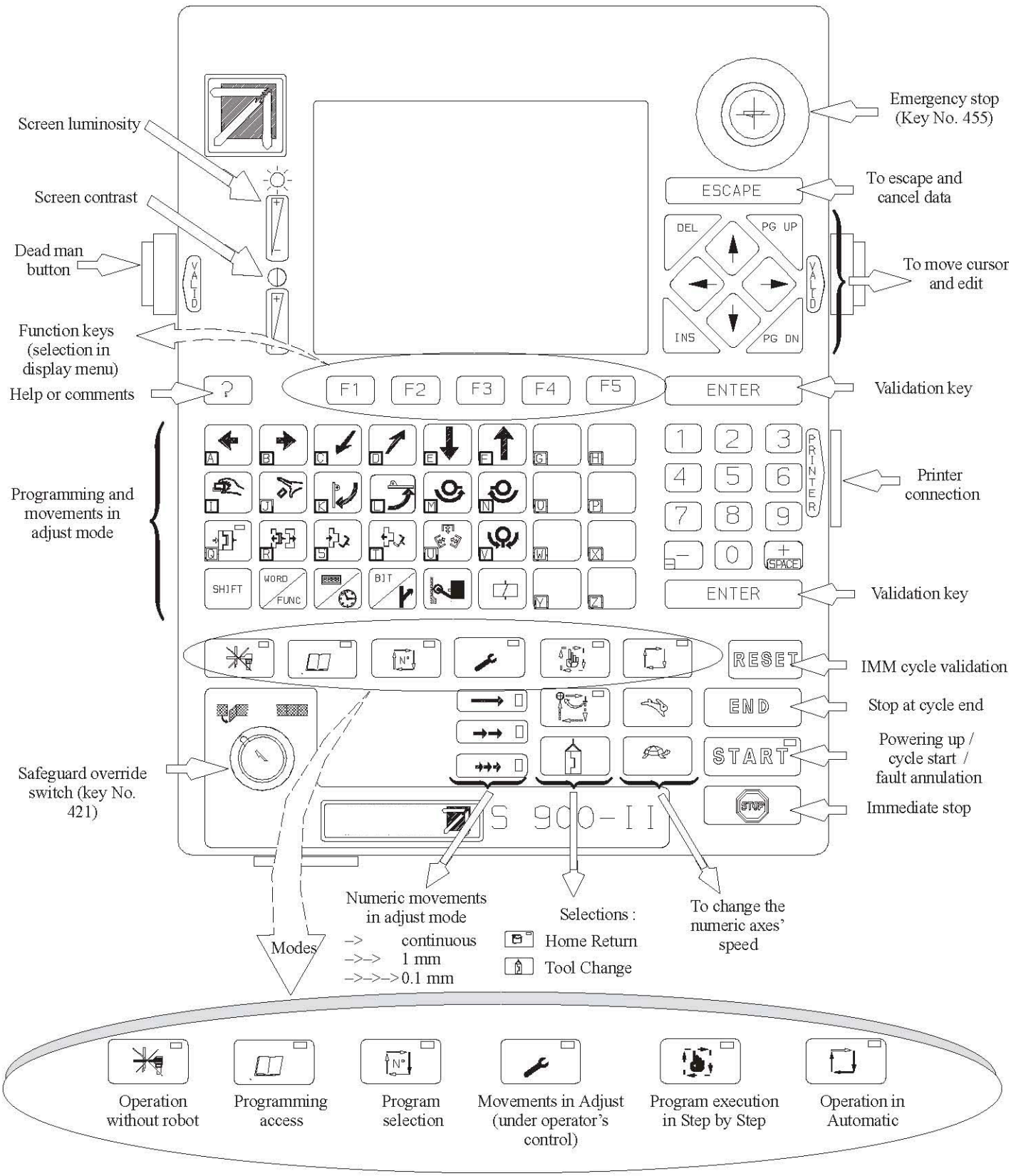


Figure 7 : Presentation of the mobile pendant

II – 1. 1. Display

The display contents depends on the operating mode or the selected menu.

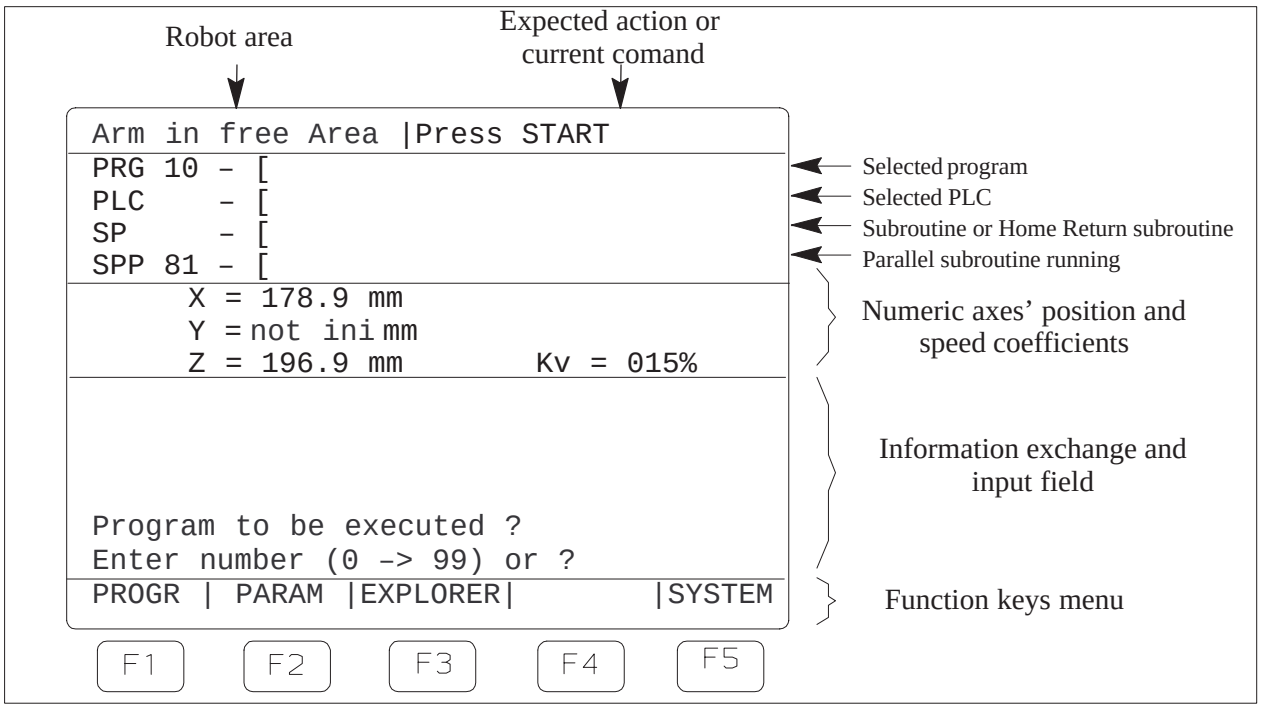
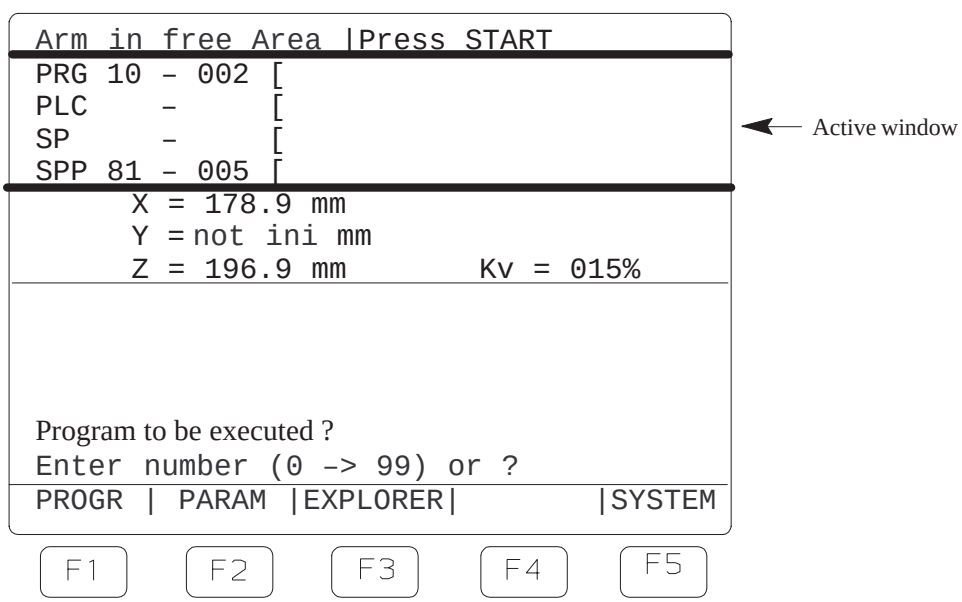


Figure 8 : Display

When the program number window is active, it is also possible to see the number of the activated steps by pressing [?] .



II – 1. 2. Cursor movement

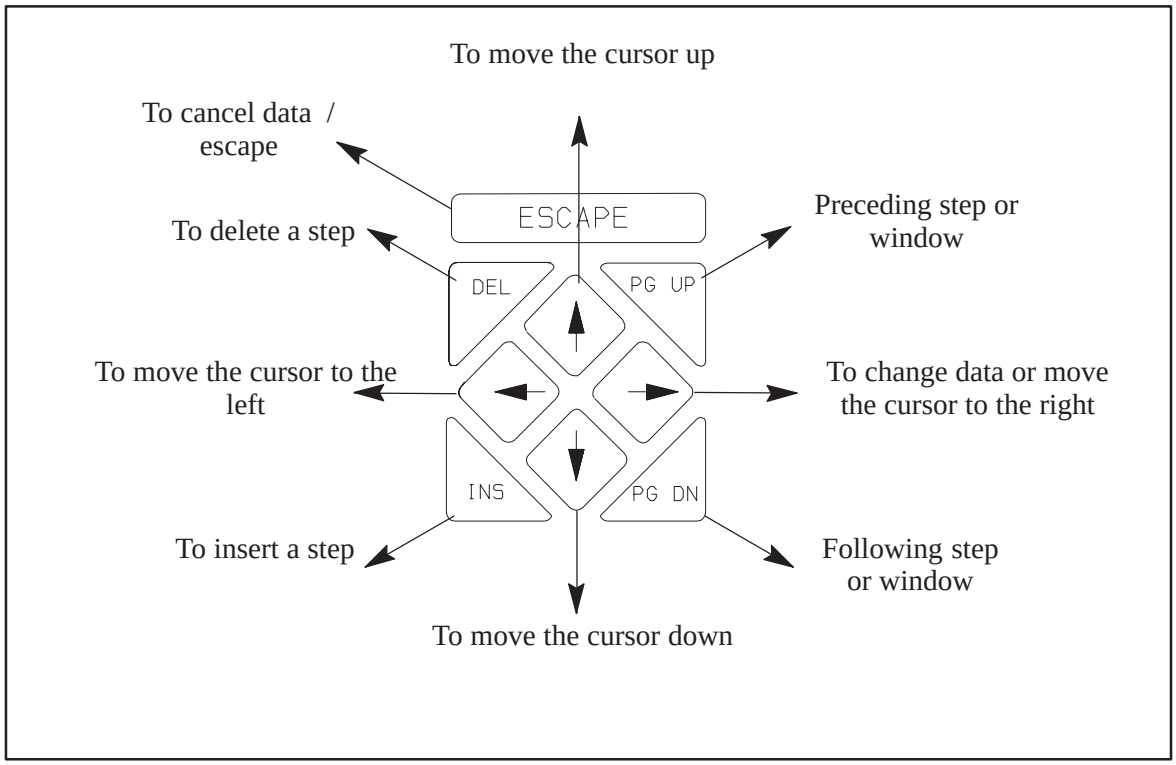


Figure 9 : Cursor movement

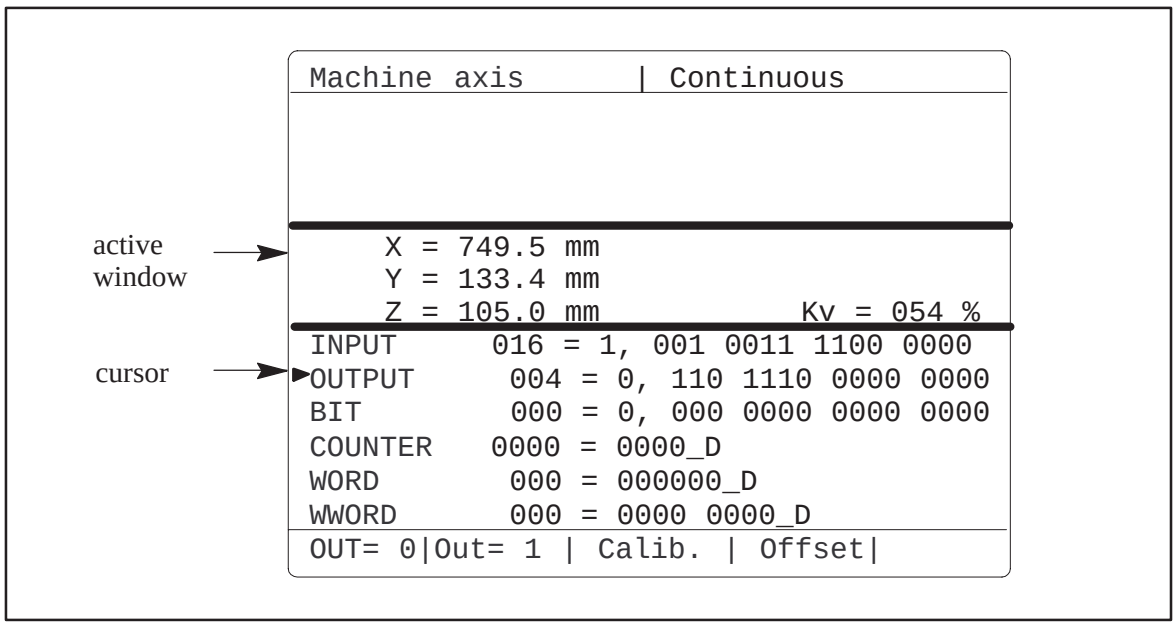


Figure 10 : Cursor

II – 1. 3. Entering values and text

Text is entered using the following alphanumeric keys :

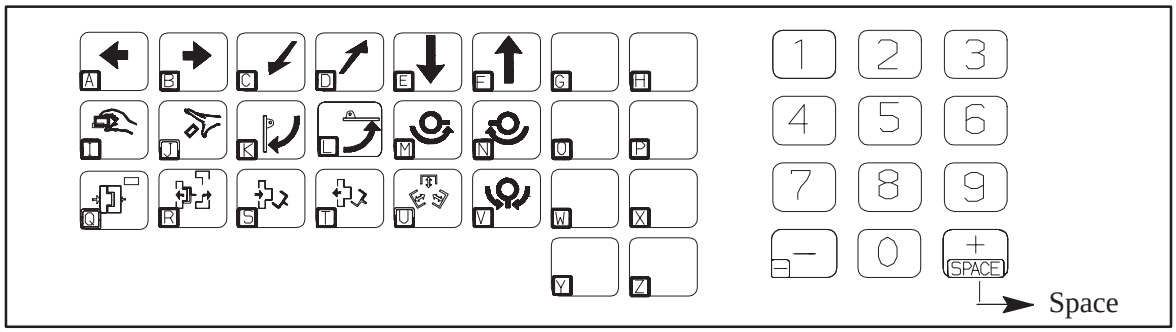


Figure 11 : Alphanumeric keys

Numeric or alphanumeric data is validated by one of the ENTER keys.

II – 1. 4. Selecting movements and specific programming functions

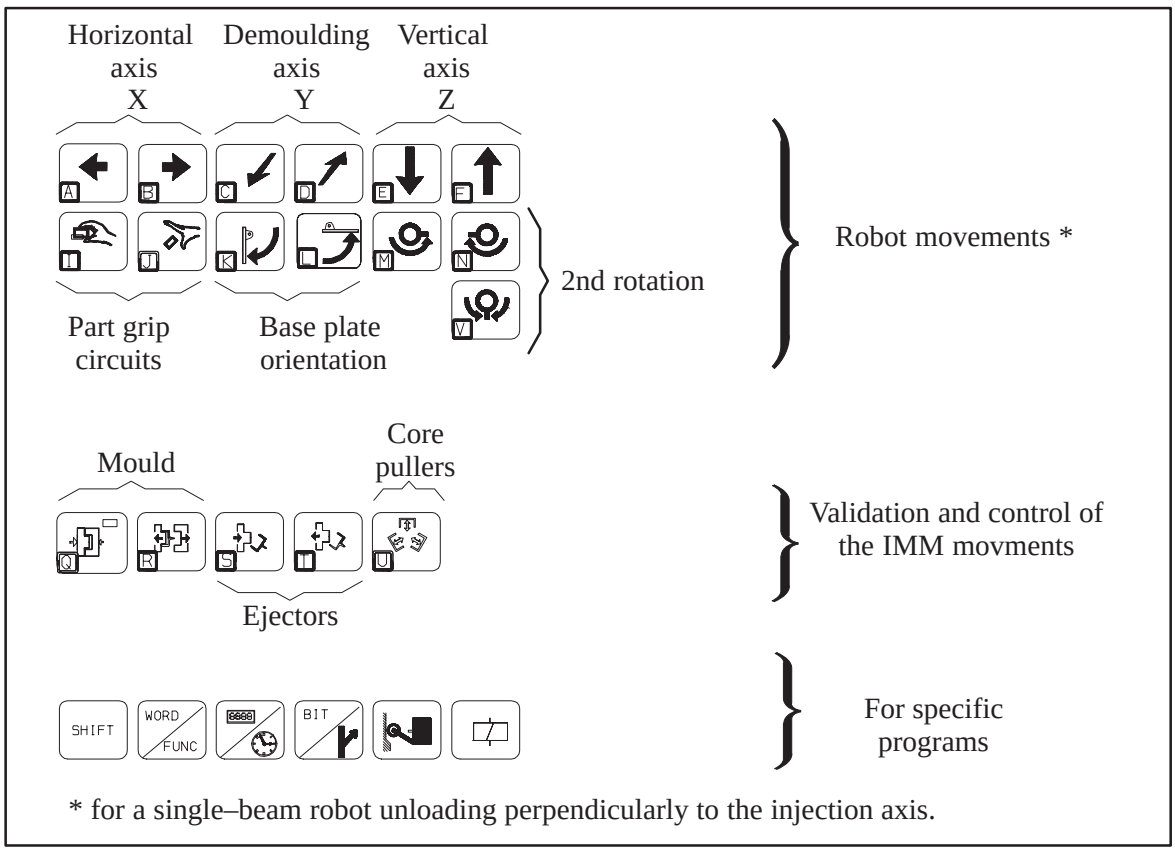
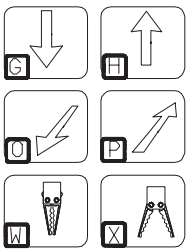


Figure 12 : Movement and programming keys

Pressing SHIFT and the WORD FUNC keys simultaneously gives access to WORD BIT .

II – 1. 5. Example of the allocation of customized keys

For a second pneumatic arm :



vertical movement

demoulding movement

mechanical gripper

II – 1. 6. Locking modes

It is possible to lock mode changing (using parameters) so that passwords must be used.

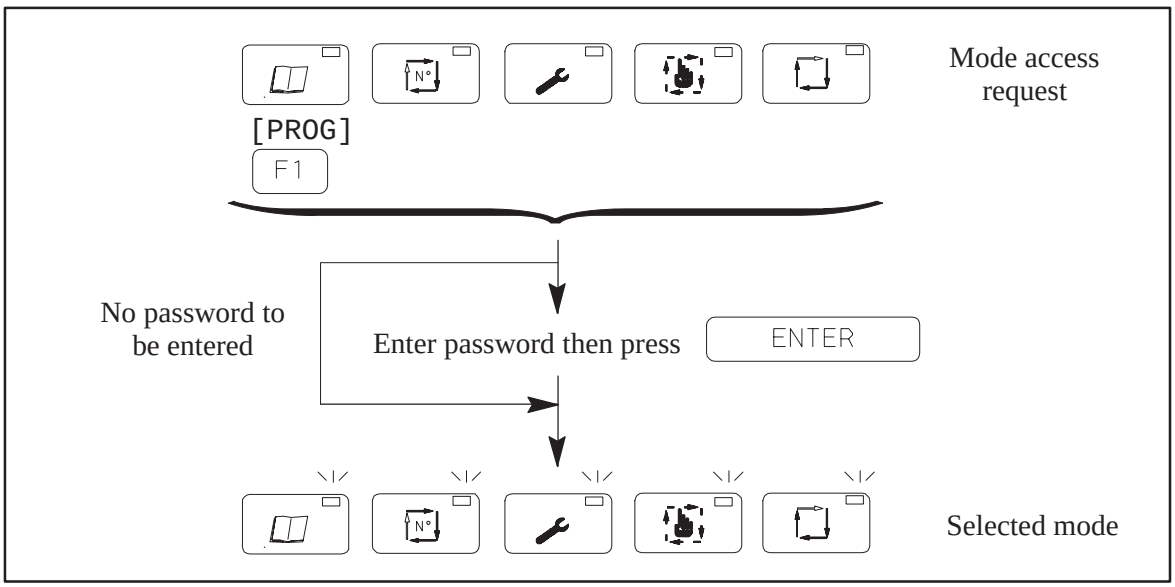


Figure 13 : Password for mode access

II – 2. Control cabinet

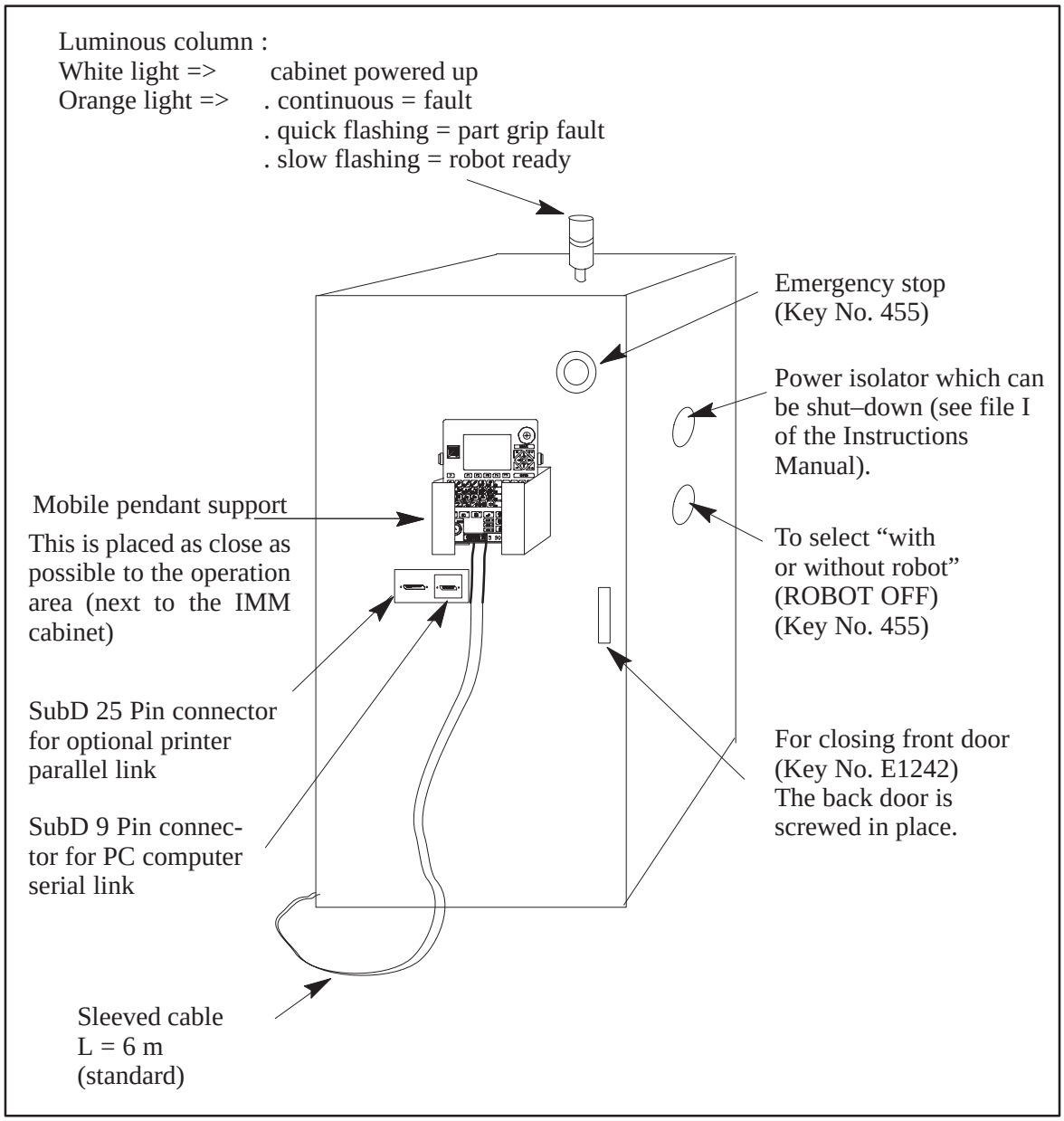


Figure 14 : Control cabinet

With a special option, it is possible to disconnect the pendant so that it can be moved over a large distance without stopping the robot. See the “Detachable pendant option” manual.

II – 3. IMM restart box (BRP)

This small box is a simplified version of the pendant which enables IMM cycles to be restarted without having to use the pendant.

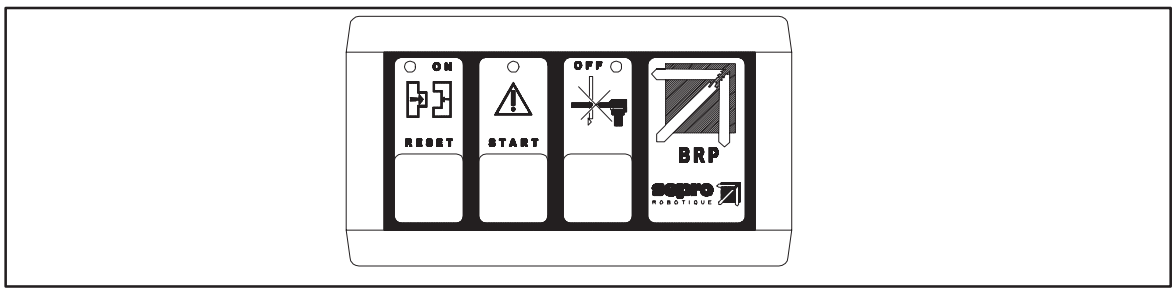


Figure 15 : IMM restart box (BRP)

The keys on the BRP have the same functions as the corresponding keys on the pendant, except for the START key. This key cannot be used to cancel faults apart from the “Part grip” fault.

The robot state is shown by indicator lights :

- ▶ green light : IMM cycle authorised,
- ▶ yellow light : “Without robot” mode
- ▶ red light : Fault. If the START key remains inactive, read the instructions on the pendant display

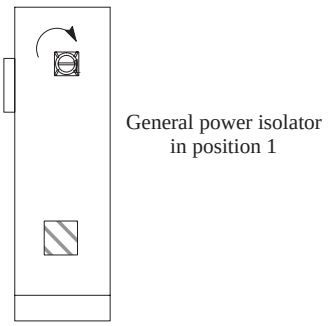
In an emergency, use the closest “Emergency stop” button, which in fact will be that of the IMM control as the BRP box is installed next to it.

V 2.0

Note : The BRP commands can be integrated into the IMM’s control cabinet. In this case, other commands are available. Consult the “S900–II commands integrated into the Injection Moulding Machine” manual.

III – SETTING–UP

III – 1. Powering–up



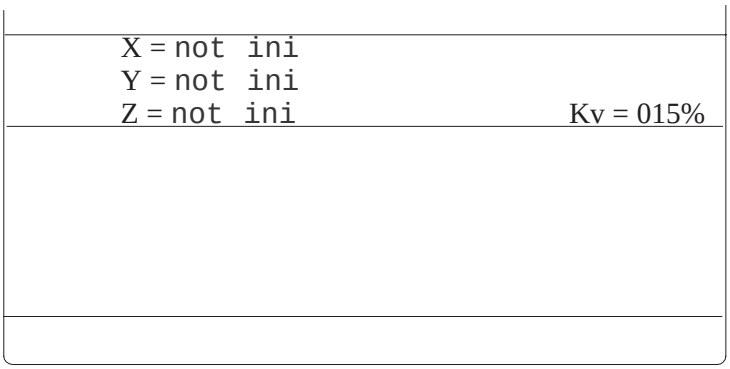
Does the message on the screen disappear ?

	YES	YES but ... ... the message "Axi(e)s in overtravel." appears as soon as START is released	NO
ROBOT STATUS	The robot is ready to operate.	A numeric movement is close to a mechanical limit.	The robot is powered down.
WHAT TO DO	Initialize the numeric movement if asked to do so on the screen, following the "Initializing an axis" procedure chapter III – 2. page 14.	Follow the "Moving out of overtravel" procedure chapter III – 3. page 14.	Find out why with the help of the messages given on the pendant screen.

Figure 16 : Powering–up

III – 2. Initializing an axis

The axes are initialized in adjust mode [🔧].



[🔧] => [START] then [A←], [B→], [C↙], [D↗], [E↓] or [↑] until the message "not ini" disappears. If the message "D_1 : NO POWER – Axi(e)s in overtravel." appears, carry out the procedure described in chapter III – 3. page 14. Once you have moved the axis out of overtravel, look for the initialization in the opposite direction.

III – 3. Moving out of overtravel

Press [🔧].

Look to see which axis is in overtravel and in which direction it must be moved.

Press the key for the axis in overtravel [A←], [B→], [C↙], [D↗], [E↓] or [↑] .

V 2.13 robot

If the axis does not move, hold down [START] whilst pressing the key that moves the axis.

III – 4. Moving out of a prohibited area

If the robot is outside the work areas defined in chapter I – 2. 1. page 3, it must be moved in adjust mode :

[🔧] => [START] * then [A←], [B→], [C↙], [D↗], [E↓] or [↑] (* held down to move out of a prohibited rotation area).

V 2.13 robot

Note : when you hold [START] down, beeps will be heard and the message SAFETIES DEACTIVATED BY START ! appears.

IV – STARTING–UP

IV – 1. Changing production

Before changing production, the preceding production must be stopped.

IV – 1. 1. Stopping production

The robot is in automatic mode . Pressing END activates a stop at the end of the cycle.

The IMM will be stopped once the last piece has been unloaded and the robot will stop after this final unloading cycle.

IV – 1. 2. Moving into tool change position

=> => START * => => RESET (* press until the “Tool change SR finished.” message appears).

The IMM is now autonomous and the robot has cleared the mould, so the mould can now be changed.

IV – 1. 3. Changing the gripper head

Move the robot into an area where the gripper head is easily accessible. The information concerning movements in adjust mode is in chapter V – page 30.

▶ Removing and placing a gripper head

The gripper head is placed using the quick locking system situated at the end of the arm. The Sepro robotique “Kit” components have been developed so that the gripper head can be quickly placed starting from a base plate. Do not forget to consult our “Kit” catalogue.

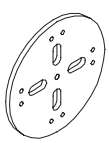
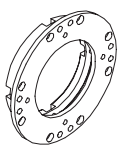
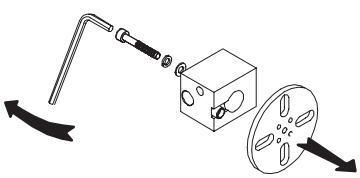
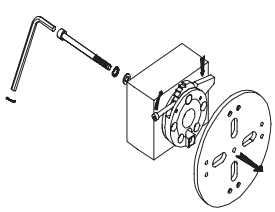
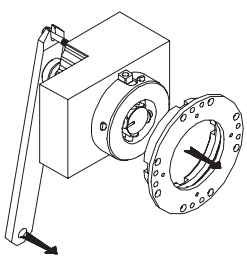
Type of base plate		 or 	
Unlocking method			
Maximum load	The maximum load depends on the robot type, the arm stroke and/or the associated dynamics. This load is marked on the Characteristics sheet File B.		

Figure 17 : Locking / unlocking a gripper head

▶ Electrics installation :

The robot arm is equipped with a lockable SUB D – 25 pin type connector for rapid connection of the gripper head electric circuits

* The Sub D 25 pin connector screws enable the locking and unlocking.

Leave the stopper in place if the gripper head does not have an electric connection. For further information concerning electric connections, see the electric diagrams in the Instruction Manual File Q.

▶ Pneumatic installation :

The robot arm is equipped with polarized connectors for rapid connection of the gripper head pneumatic circuits .

* **Dump the robot** using the manual dump valve, situated in front of the air conditioning, before disconnecting.

* Lock or unlock by turning the key 90 degrees (diagram opposite).

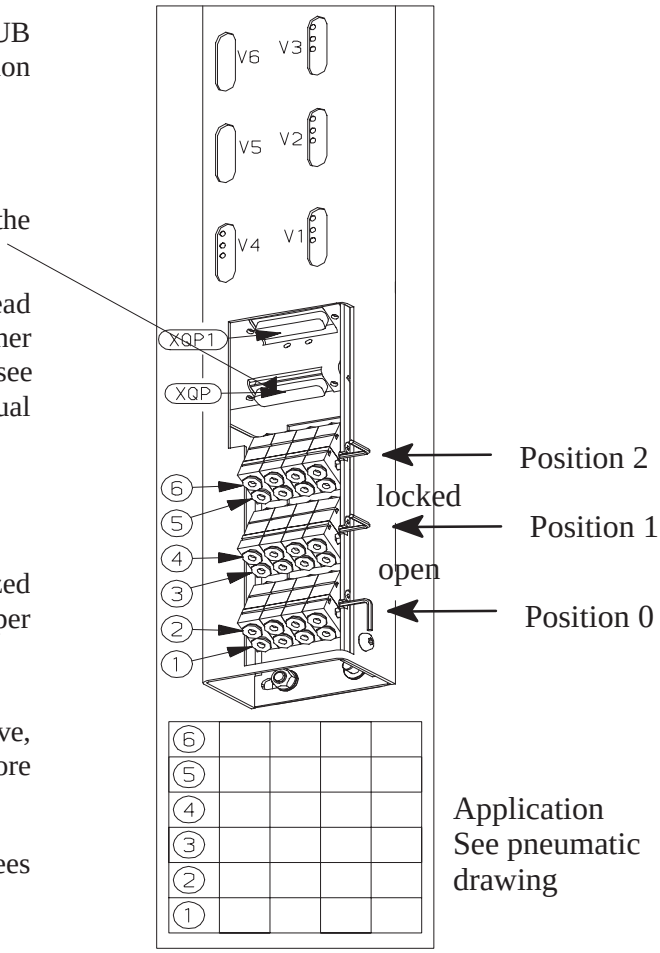


Figure 18 : Connection at the end of the arm

IV – 1. 4. Program selection

Two situations are possible when changing production :

SELECTION AND CREATION	SIMPLE SELECTION
1. The mould and the gripper head have never worked together on the IMM with the robot. In this case, the program does not exist and must therefore be created.	2. The mould and the gripper head have already worked together on the IMM with the robot. In this case, the program already exists. See chapter IV – 2. page 23.

First, move the robot into adjust mode so that it can be positioned in the IMM (Machine axis sensor active and gripper head inside the mould).

The first adjustments to be made are to find a mould open position where the part can be removed by the robot.

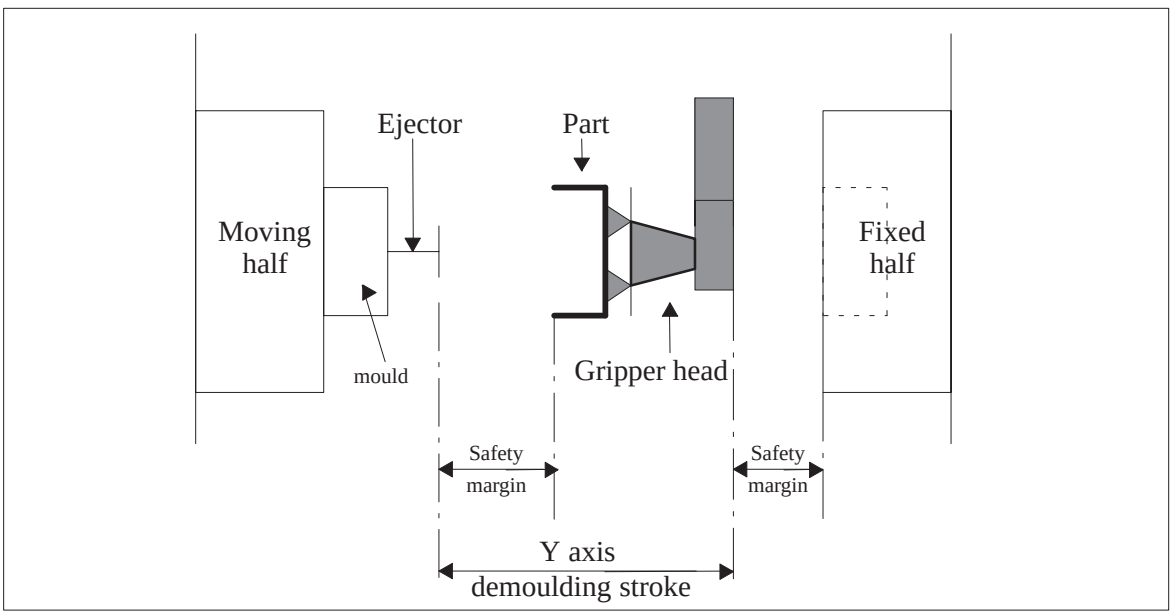


Figure 19 : Position in the mould

It is necessary to adjust the mould opening stroke and the ejector strokes in order to obtain the safety margins. Obviously, the smaller the safety margins, the shorter the robot intervention time in the mould.

The robot memory contains a certain number of predefined cycles for the most usual applications. The cycle types are called “SAP source programs” (see description sheets).

The S900–II control system can create a new program itself. You just have to mark from which SAP source program the new program must be created. This new program has the same structure as the SAP source program used for its creation.

The specific positions in this new program need to be taught when the first cycle is executed.

▶ Choosing the SAP source program

It is necessary to analyse the application to be run in order to choose the source program (part ejection sequence, type of part grip cycle, type of release ...).

Then choose a program that corresponds to the application to be run amongst the existing source programs (see description sheets).

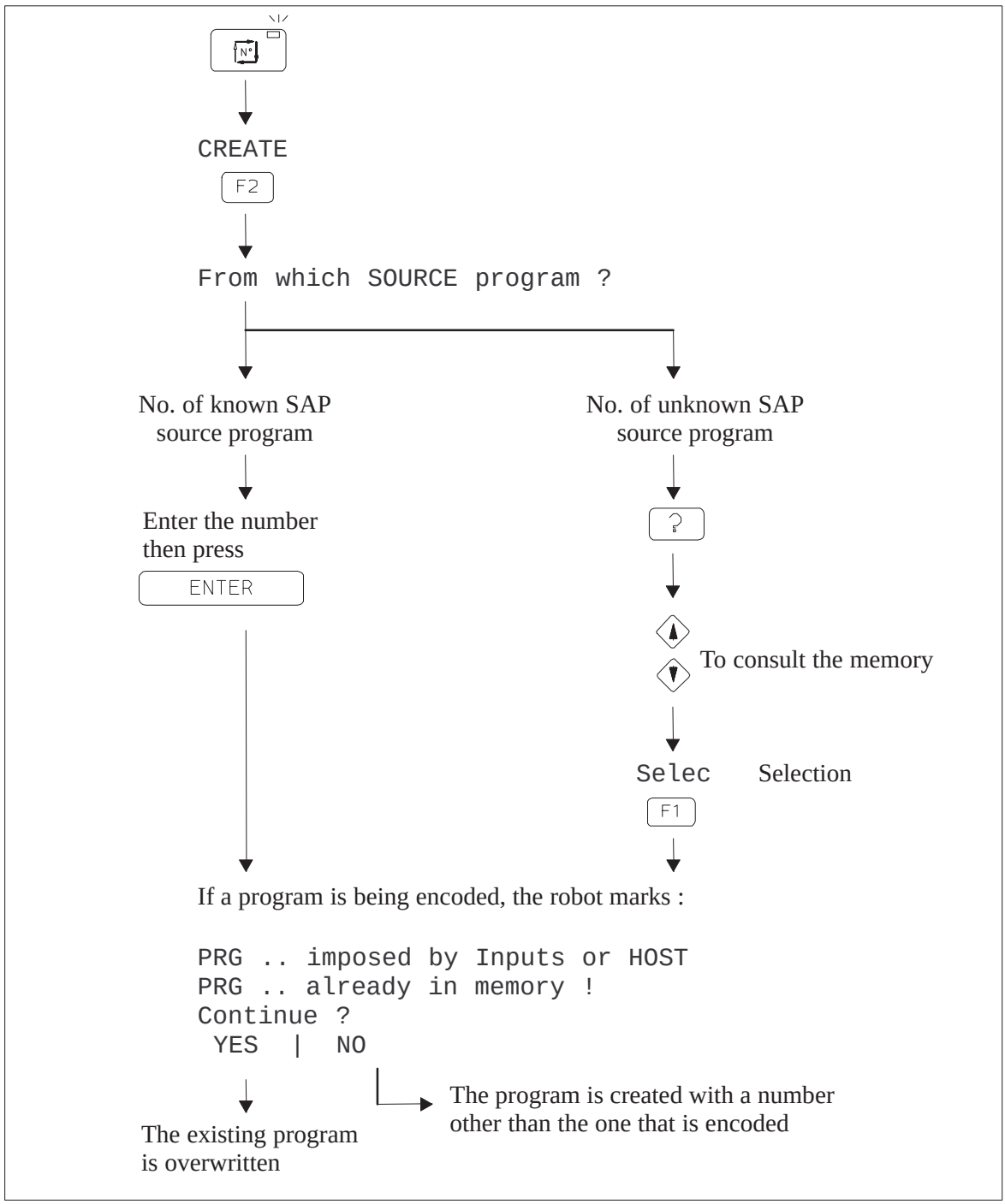


Figure 20 : SAP source selection

Once the source program has been selected, a new program is created.

▶ Naming a program

Each program has a name. You are advised to choose a clear, simple name for each program created. (For example, the mould number : Cover D120 mould 96032).

```
PRG 03 [ COVER D120 MOULD 96032

      –> Associated commentary

ENTER or ↓ to confirm
```

Enter the program name using the alphanumeric keys.

Confirm by pressing [ENTER].

▶ IMM simulation

```
Execution with machine simulation
 YES  |  NO   |       |       |
```

Note : If the IMM is in automatic mode, this question will not be asked. IMM simulation is not possible.

Answer : YES

- The robot simulates part fabrication, the cycle machine validation signal is not given to the IMM.
- The safety devices are still active (gate opening = emergency stop).
- The ejector and core puller validation and controls remain operational.
- The part present controls remain active.
- The robot cycle time control in the IMM is no longer active. You have plenty of time for any adjustments and to teach positions.
- The simulation will stop as soon as the automatic mode is selected on the IMM.

Answer : NO

- This is the normal operating mode. The IMM will carry out an injection cycle for each robot cycle.

▶ Printing program points

Before teaching the points, it is possible to print the program points.

For further information, see chapter VIII – page 48.

```
Print Program Points ?
 YES  |  NO   |       |       |
```

It is recommended to print the program points in order to check that all the points have been taught when the cycle is executed.

▶ Teaching program points

The program has been created and named. You now only need to teach the points' position. There are two methods of teaching :

1. In Step by Step mode  (normal method).

The robot is in the position described on page 17.

2. In Adjust mode 

This method is useful in long and sophisticated programs where the whole program must be described sequentially (including subroutines and home returns).

Method described in chapter V – 7. page 34.

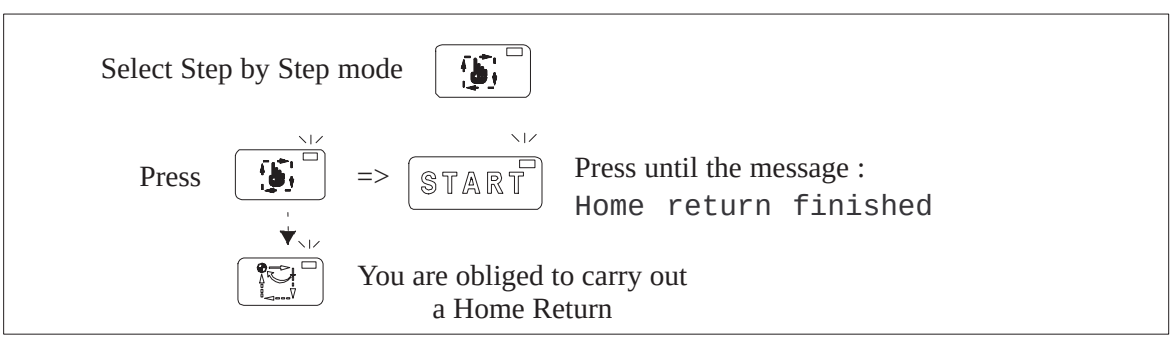


Figure 21 : Teaching points in Step by Step mode

Teaching a point can be requested during the Home Return execution.

```
P03 – End of return after part grip
Movement     Y     to be taught
Confirm positions with ENTER
```

In this case, the operator must move the axi(e)s marked in the message on the screen with the keys  or  .

Once the robot is in the position marked on the screen, the position must be memorised by pressing ENTER.

Cross off this point on the print–out.

Press the START key and keep it held down.

When the display indicates "`Movements finished`", release and then press the START key again.

Each time a point must be taught :

- move the axes concerned to the point to be taught,
- confirm the position by ENTER,
- continue cycle execution in step by step by pressing START.

At the end of the cycle, it is preferable to execute the new program in full in step by step mode to check that the points taught are coherent.

It is possible to teach the points again in adjust mode . See chapter V – 7. page 34.

Other changes to the points are described in chapter VI – page 35.

Check on the print–out that all the points have been taught.

Additional information concerning the teaching of the waiting point above the mould :

The position of the Z axis when waiting above the mould is secured by a cam called "Area out of mould" (ZHM). This cam's position defines the lowest area in which the robot can wait for the IMM to open. As this cam can be adjusted, it is necessary to check for each program, that the lowest position of the arm on the ZHM cam does not provoke a collision between the gripper head and the mould during mould movements.

Note : You can also execute the program in automatic mode. At each point you come across that is to be taught, the system automatically goes into step by step and teach mode .

Teaching can only be abandonned by a Home Return (simple or total). The teaching of a Home Return cannot be abandonned.

▶ Teaching a stacking sequence

A stacking sequence enables the parts manipulated by the robot to be released in a certain order, in X rows, in Y columns and Z layers. The data needed :

- the number of parts released per axis,
- the gap separating two parts on an axis.

```
PRG 03 [ BOX OF 60 PARTS
SP  41 [ OVERMOULDING K98

No. of parts X   : 5 – Gap...: 12
 ″  ″   ″    Y   : 2 – Gap...: 20
 ″  ″   ″    Z   : 3 – Gap...: 10

Choose with ↑ ↓

Exit by ESCAPE
```

To select the axis

0 ... 9 To enter the value

– and + Value sign

ENTER To confirm

ESCAPE To cancel data and return to point teaching

Defining a stacking sequence :

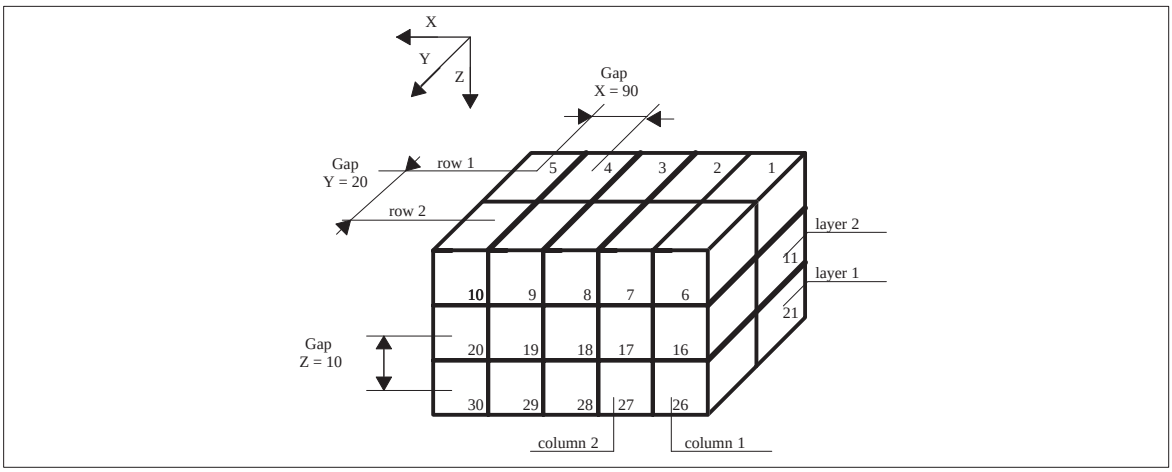


Figure 22 : Part stacking

Once the stacking heading has been entered, you must continue teaching the points.

Note : The position of the first part of a stacking sequence must be taught taking into account the defined gaps.

IV – 2. Starting up production

IV – 2. 1. Program selection

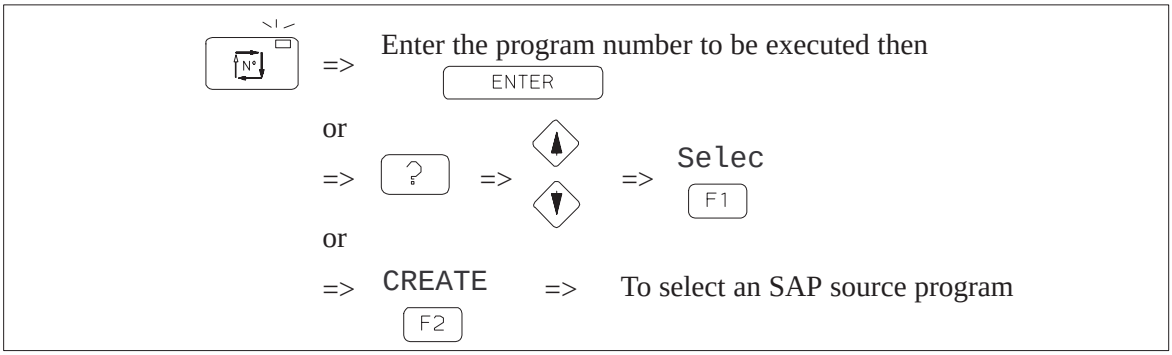


Figure 23 : Program selection

Using a program code :

When the program is selected , the robot offers the program number coded on the inputs or given by the IMM. If you try to validate another program, the message "`PRG .. imposed by Inputs or HOST`" appears. The coding principle is described in the "Configuration" manual.

IV – 2. 2. Home return execution

The home return is a robot disengaging sequence. This procedure can be different for each program or for different parts of a program.

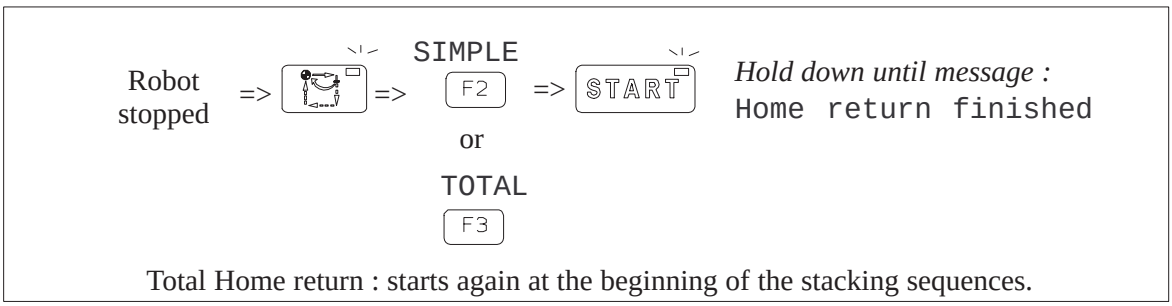


Figure 24 : Home return execution

IV – 2. 3. Program execution in step by step

All the actions and the movements of a program step are executed whilst START is held down.

The numeric movements are executed at 15% of the programmed speed.

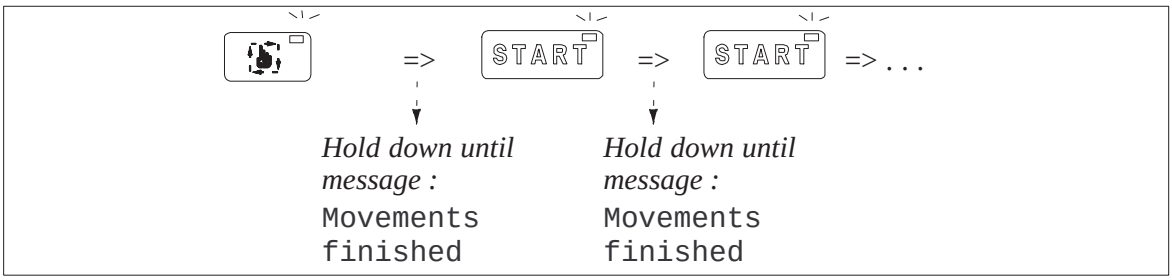


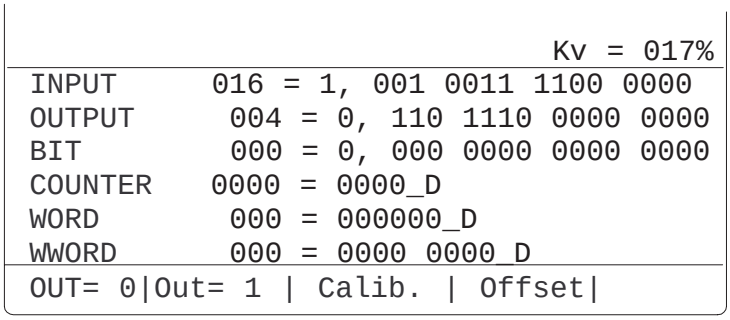
Figure 25 : Program execution in step by step

IV – 2. 4. Starting up in automatic

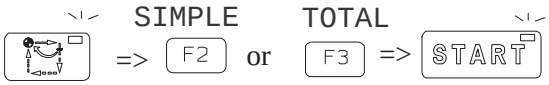
The execution of the first cycles in automatic can be carried out at a reduced speed.

Before moving into automatic mode :

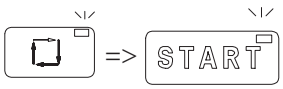
hold down until desired speed



Kv represents the percentage of the maximum speed for the numeric axes.



Hold down until the message :
`Home return finished`



Execute a complete cycle and increase the speed progressively with the  key.

IV – 3. <u>Stopping the robot</u>

There are several ways of stopping the robot.

IV – 3. 1. Stopping at the end of the cycle

The robot is in automatic mode  .

The robot stops at the end of the cycle if you press  .

The IMM will not restart after the last part has been unloaded and the robot will stop after this last unloading cycle.

IV – 3. 2. Immediate stop

The robot is in automatic. Pressing  or  or  or  stops the robot immediately, using the deceleration of the robot (controlled stop).

IV – 3. 3. Emergency stop

The electric power supply to the motors is cut if one of the emergency stop buttons is pressed. The numeric movements will therefore stop brutally.

An emergency stop does not necessarily cut the pneumatic air supply, which means that :

- ▶ the pneumatic movements in progress are finished,
- ▶ it is necessary to dump the pressure before intervention on the robot.

IV – 4. Operation without the robot

This operation mode enables the IMM to operate autonomously.

It is possible to select the “Without robot” mode via :

- ▶ the “With or without robot” key on the cabinet,
- ▶ the [ ] key on the pendant keyboard and on the BRP (optional).

IV – 4. 1. The “without robot” key [ ]

Note : This key can be found on the pendant keyboard and on the BRP box (optional).

This key enables the IMM to be used without the robot. When the robot is in automatic, it will stop at the end of the cycle if the [ ] key is pressed.

The key flashes until the robot stops. When the key is continuously lit up, the “without robot” mode is selected.

⚠ The mode is validated by pressing [RESET]. The IMM movements are only authorized once this key has been pressed.

To quit the “Without robot” mode, the [ ] key must be pressed a second time (the light will no longer be lit up).

IV – 4. 2. The “With or without robot” key

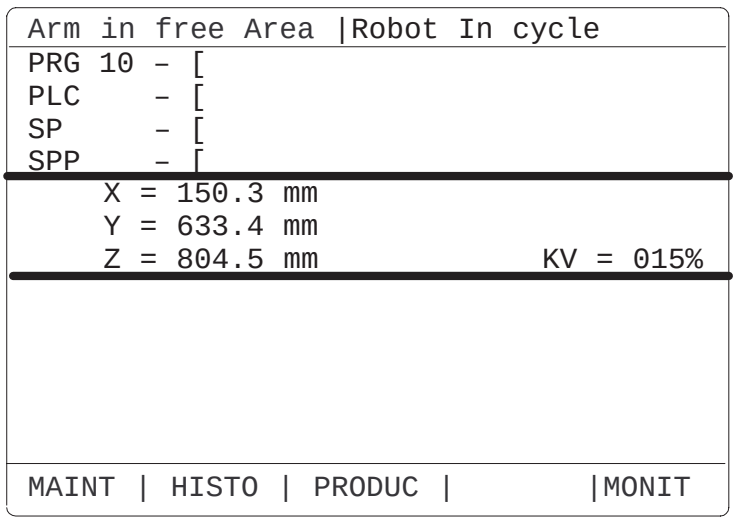
You are advised to only use this key if the robot is stopped for a long time, for example, during production without the robot. It is then possible, if the robot is stopped at the end of the beam on the “Tool change position” (PCO) cam, to power–down the robot cabinet.

If the key is moved to the “Without robot” position, the robot will stop at the end of the cycle as described in chapter IV – 4. 1. page 25.

IV – 5. Visualisation and modification of production data

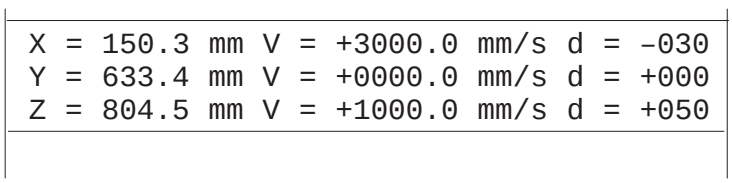
By default, the display shows the following menu.

The actual position of each axis as well as the speed coefficient Kv, are always displayed on the pendant display.



F3 To access production menu

If the axes evolution window is active, it is possible to see the immediate speed and the tracking error for each axis by pressing ?.

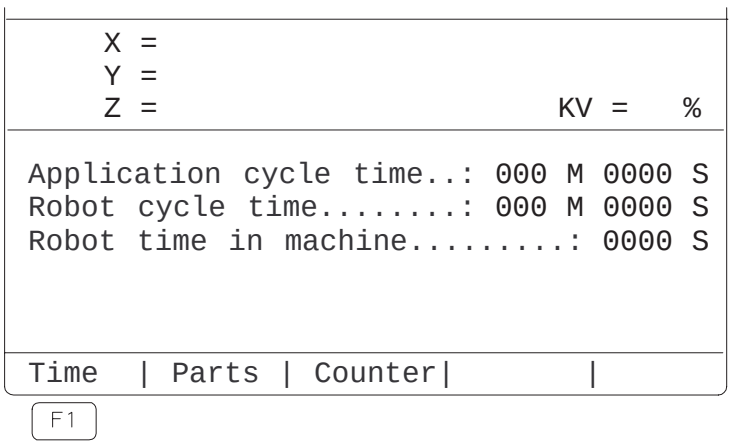


V = Immediate speed

δ = Immediate tracking error

IV – 5. 1. Cycle time

It is possible to see the cycle time by pressing the function key F1 in the production menu.



The times display is updated once the robot has executed a complete cycle.

The application cycle time : is the cycle time in the IMM.

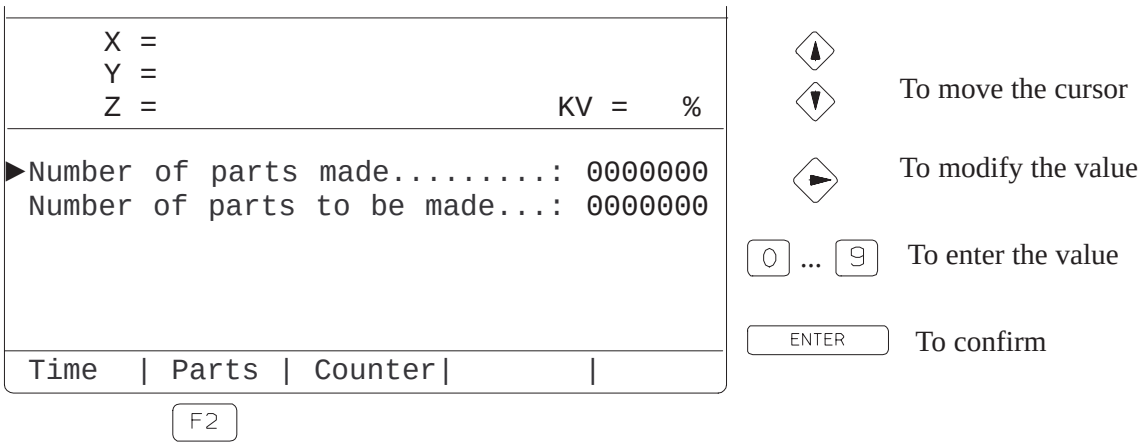
The robot cycle time : is the cycle time, without taking into account the time during which the robot is stopped above the IMM.

The robot time in the machine : is the time during which the IMM is immobilised by the robot. It is the length of time between the end of the IMM opening and the IMM cycle restart by the robot.

IV – 5. 2. Part counters

It is possible to see the part counters by pressing the function key [F2] in the production menu.

It is possible to initialize the counters when they are visible. You must enter the code 1234 to change these counters.

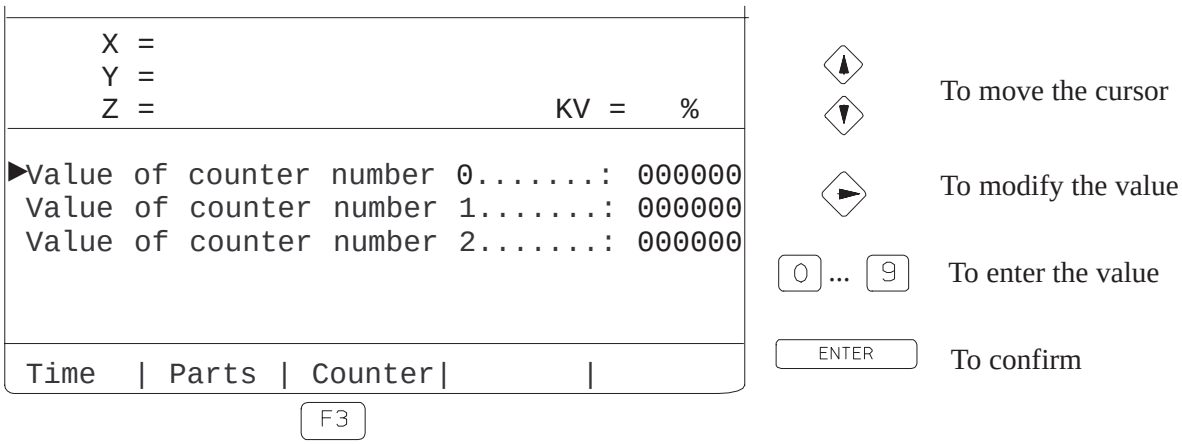


The robot can count the number of parts made if this has been programmed. Once this number is reached, a special action can be programmed to trigger certain events such as stopping at the end of the cycle, an alarm, a quality test ...

IV – 5. 3. The counters

It is possible to see counters number 0, 1 and 2 by pressing the function key F3 in the production menu.

It is possible to initialize the counters 0, 1 and 2 when they are visible. You must enter the code 1234 to change these counters.



These counters must be allocated values in the program.

The robot can count various actions, such as the number of reject parts, number of boxes filled, ..., if this has previously been programmed.

IV – 5. 4. Duration of pneumatic high speeds

V 1.3 robot
V 0.5 PC Editor

Principle :

The accelerations of the second arm's pneumatic axes can be modified :

- ▶ to optimize the movement times of the second arm's axes,
- ▶ to compensate for the load changes,
- ▶ so that the end of movement damper does not come to a halt too violently.

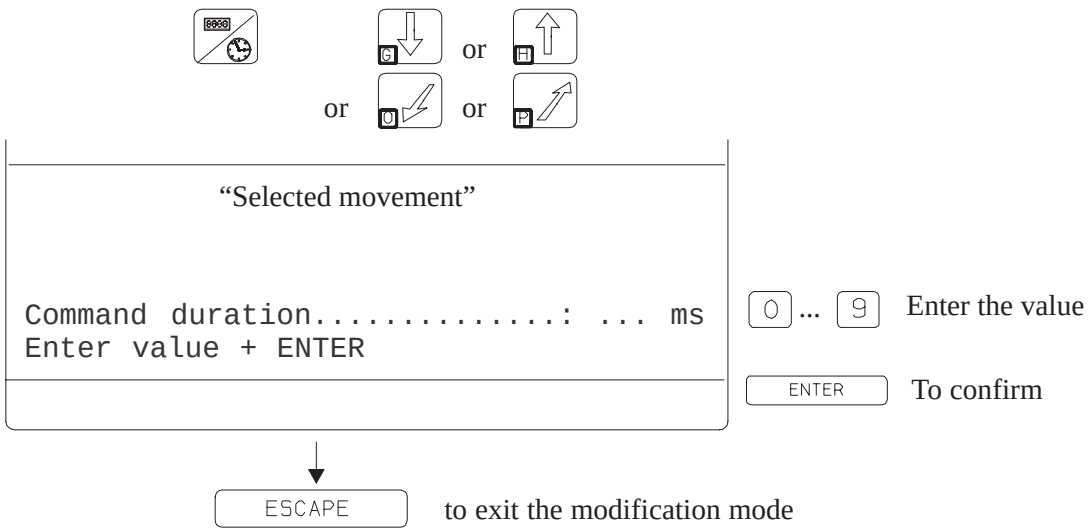
The principle is to :

- ▶ momentarily create a free exhaust (quick purge of the cylinder chamber),

then, after a time delay that can be adjusted :

- ▶ limit the exhaust flow to slow the movement down.

Adjustment :



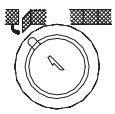
The value increase is limited to + 30 % of the old value. The decrease is not limited. If the initial value is 0, the maximum increase allowed is 100 ms.

V – MANUAL CONTROL OF THE INSTALLATION

The mobile pendant can be removed from its support for robot movements in adjust mode  .

V – 1. Access to the protected area

It may be necessary to access the protected zone in order to install an application or for maintenance operations.

The safeguard override key  on the pendant, authorizes robot movements in adjust 

and Step by Step  mode even if the protection grids are open.

Note : The power is maintained by pressing one of the two “Dead man” buttons.

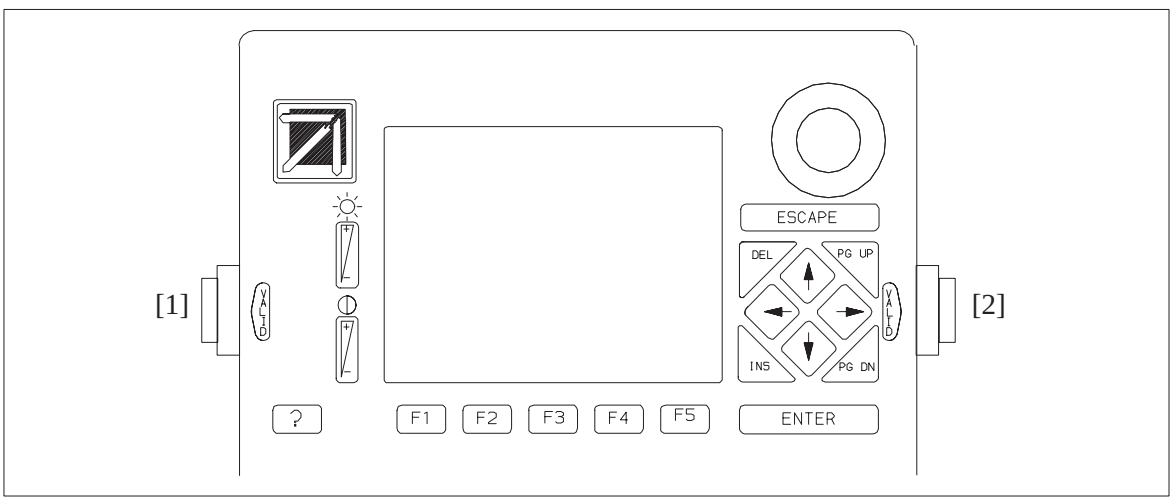
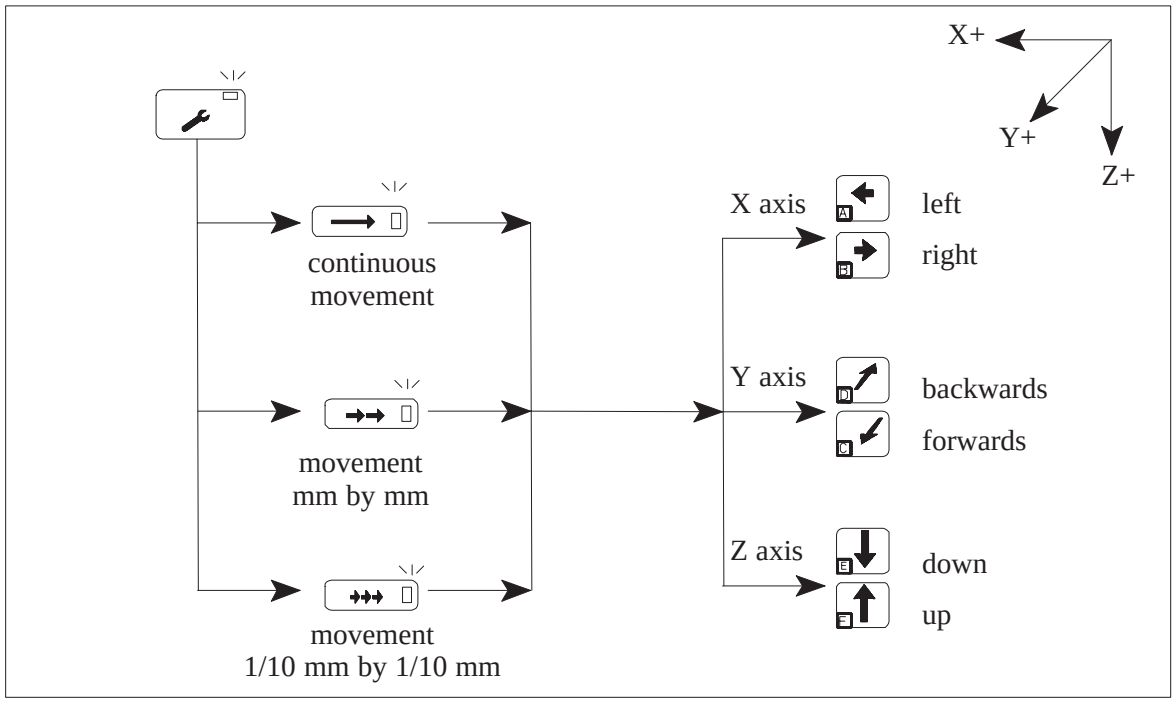


Figure 26 : “Dead man” buttons

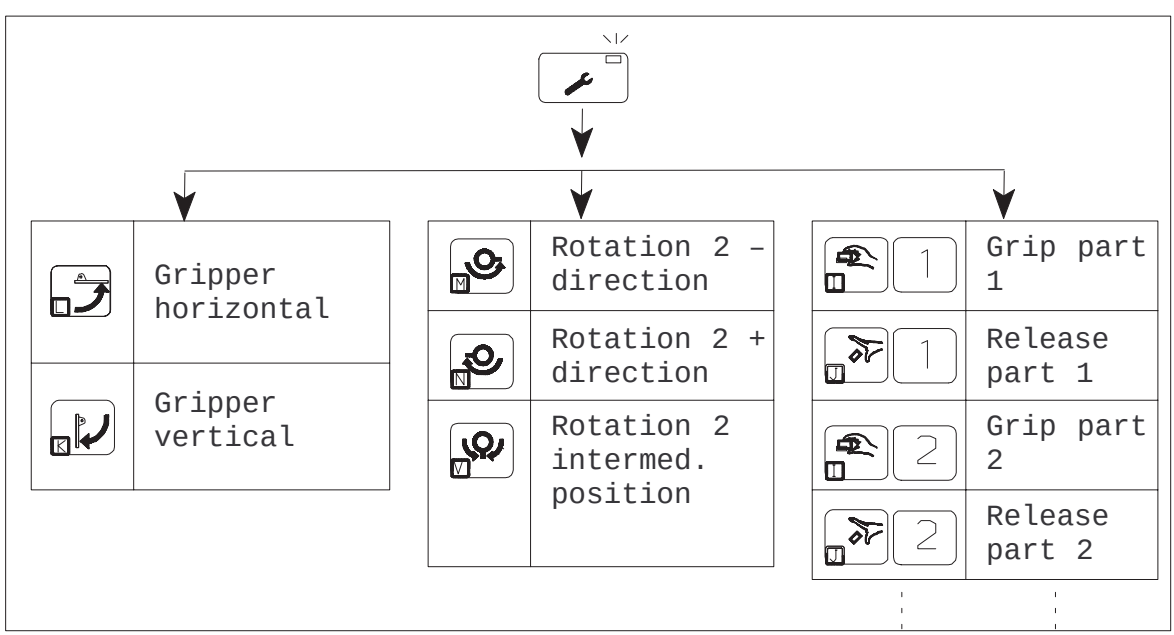
V – 2. Numeric movement control



: to increase the numeric axes speed (up to 100 %).

: to decrease the numeric axes speed (down to 15 %).

V – 3. Pneumatic movement control



Note : Whilst the key is held down, the Action code, as well as the inputs and outputs associated with the pneumatic movement requested, appear on the screen.

ACT_10 –>S_007–> E_022 = 1 (E_021 = 0)

V – 4. IMM movement control

	Robot with 1 IMM	Robot with 2 IMMs	
Ejectors	S	S 1	Ejectors 1 out
	T	T 1	Ejectors 1 in
		S 2	Ejectors 2 out
		T 2	Ejectors 2 in
Core pullers *	U 1	U 1	Validation core puller 1_1
	U 2	U 2	Validation core pullers 2_1
		U 3	Validation core puller 1_2
		U 4	Validation core pullers 2_2

Figure 27 : Manual control of the IMM movement

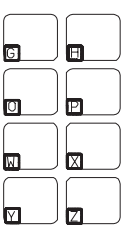
* Core puller 1 : Injection position according to EUROMAP 12.

Core puller 2 : Demoulding position according to EUROMAP 12.

V 2.0

If you press Q or R, the IMM information page appears. See page 43.

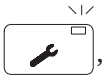
V – 5. Customized actions control



These keys can be programmed for certain actions, specific to each installation (2nd arm, movements on gripper head, ...). See example in chapter II – 1. 5. page 10.

Figure 28 : Customized actions

V – 6. Output control

In an adjust mode screen  , the input, output or bit status is marked before the comma, followed by the status of the next 15 inputs, outputs or bits.

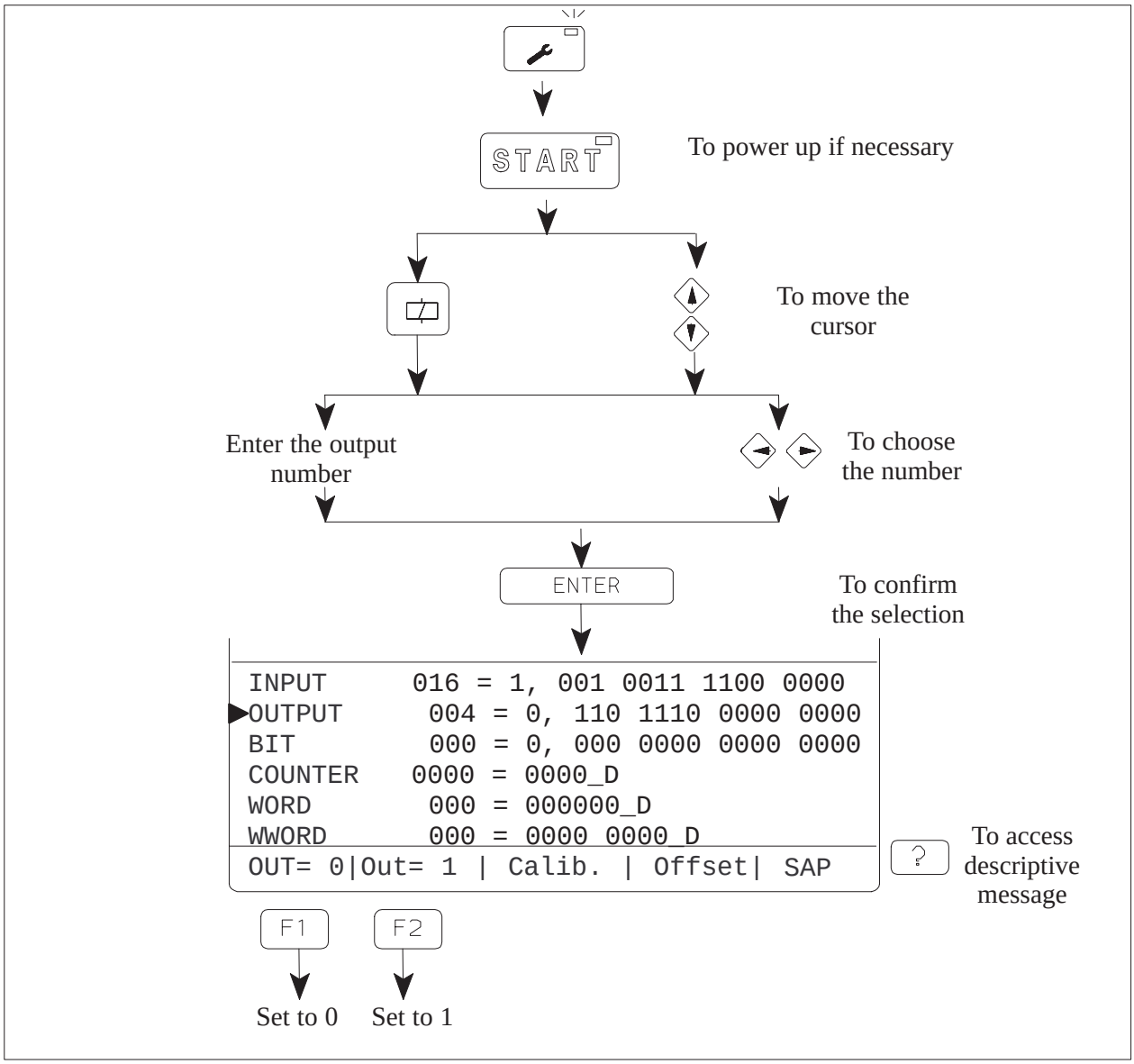


Figure 29 : Output control

Note : The outputs for Arm Free Safety (SBD), Machine Cycle Validation (VCM), Without Robot Mode, Overtravel Forcing and the pneumatic High Speed outputs cannot be controlled.

V – 7. Teaching SAP points in adjust mode

Once a program has been created from an SAP source program, it is possible to teach the points or the imprecisions (or teach them again) in adjust mode.

This method is useful for long and sophisticated programs where the whole program has to be described sequentially (including subroutines and home return).

The axes must be initialized.

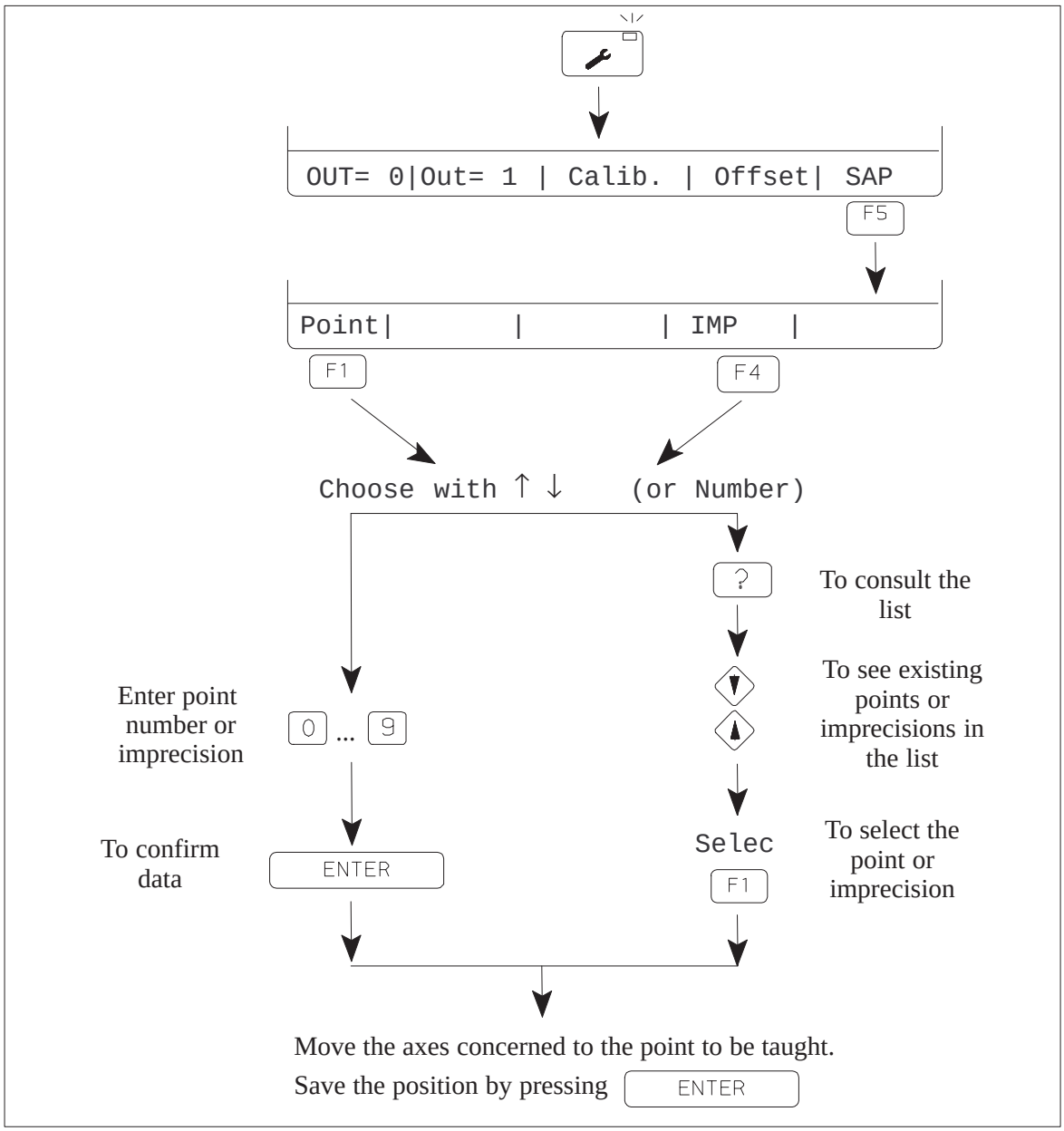


Figure 30 : Teaching SAP points in adjust mode

If the program does not contain any SAP markers, the following message is displayed : `PRG without SAP marker`.

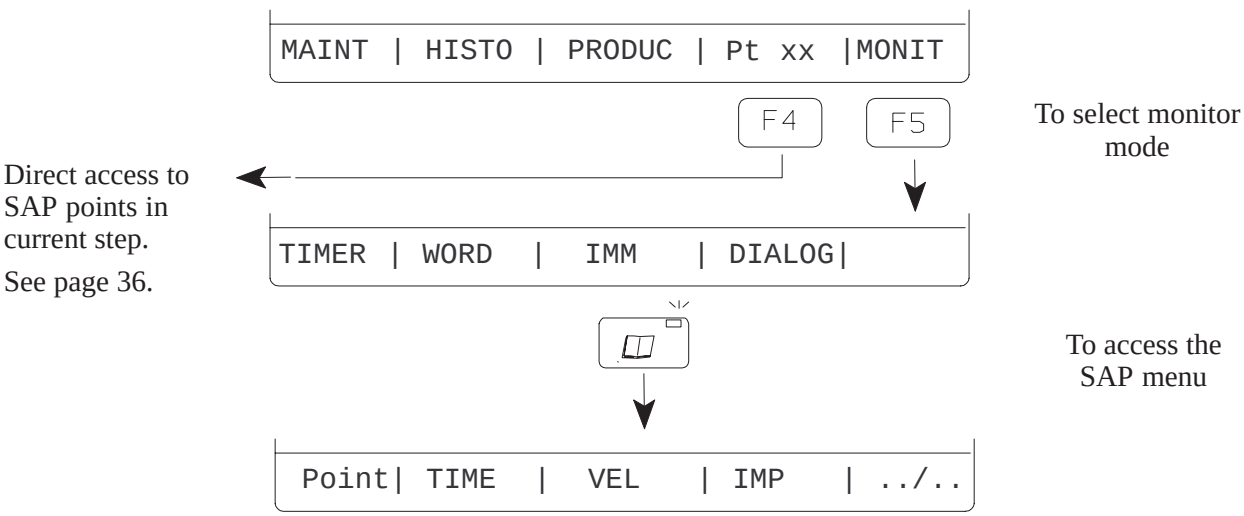
It is possible to teach a position again that has already been taught.

It is then possible to check the program in step by step (see chapter IV – 2. 3. page 23).

VI – CHANGING AN SAP MARKER

VI – 1. Accessing the SAP menu in extended Monitor mode

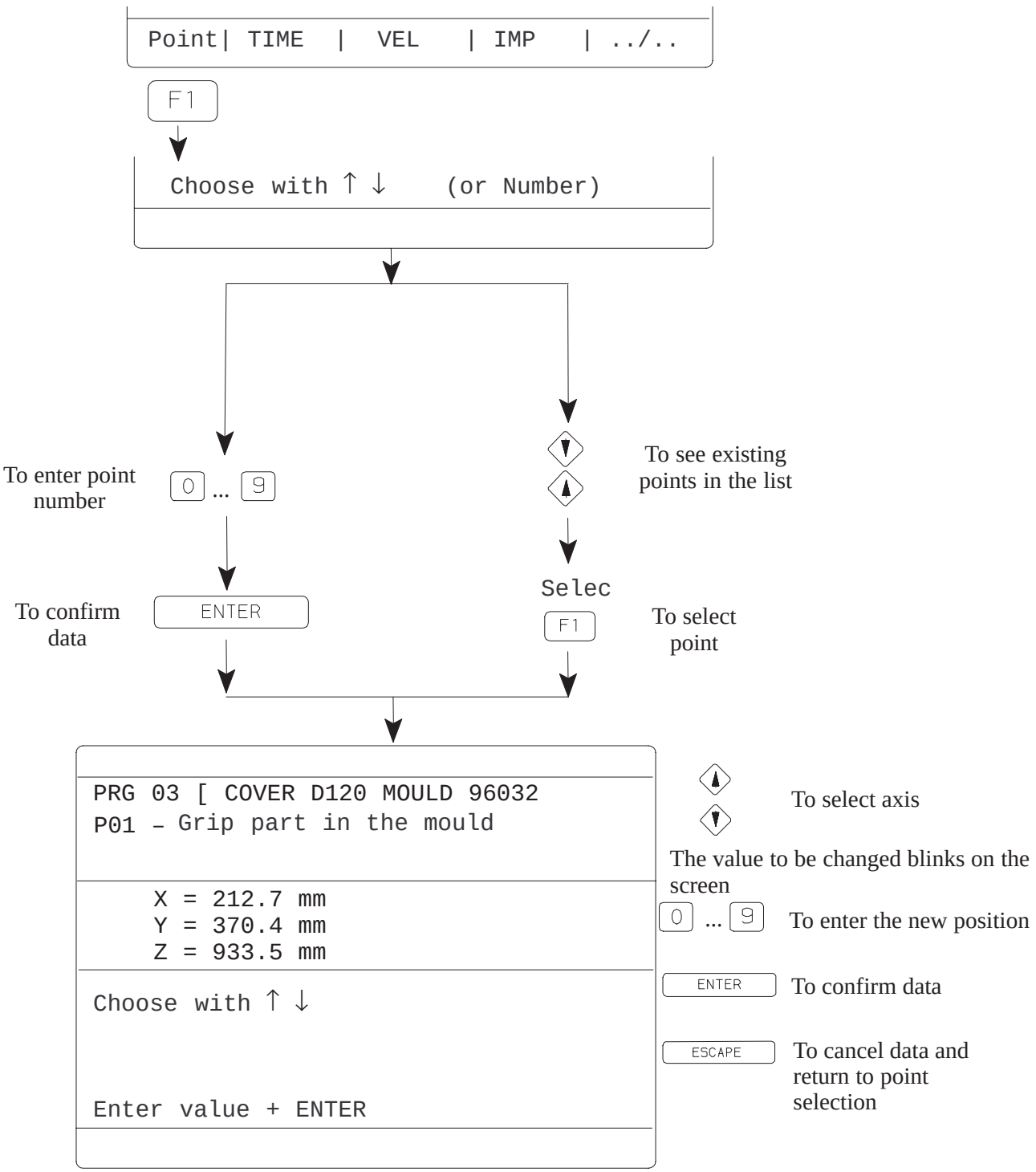
The robot is in step by step  or automatic  mode.



VI – 2. Quitting the SAP menu

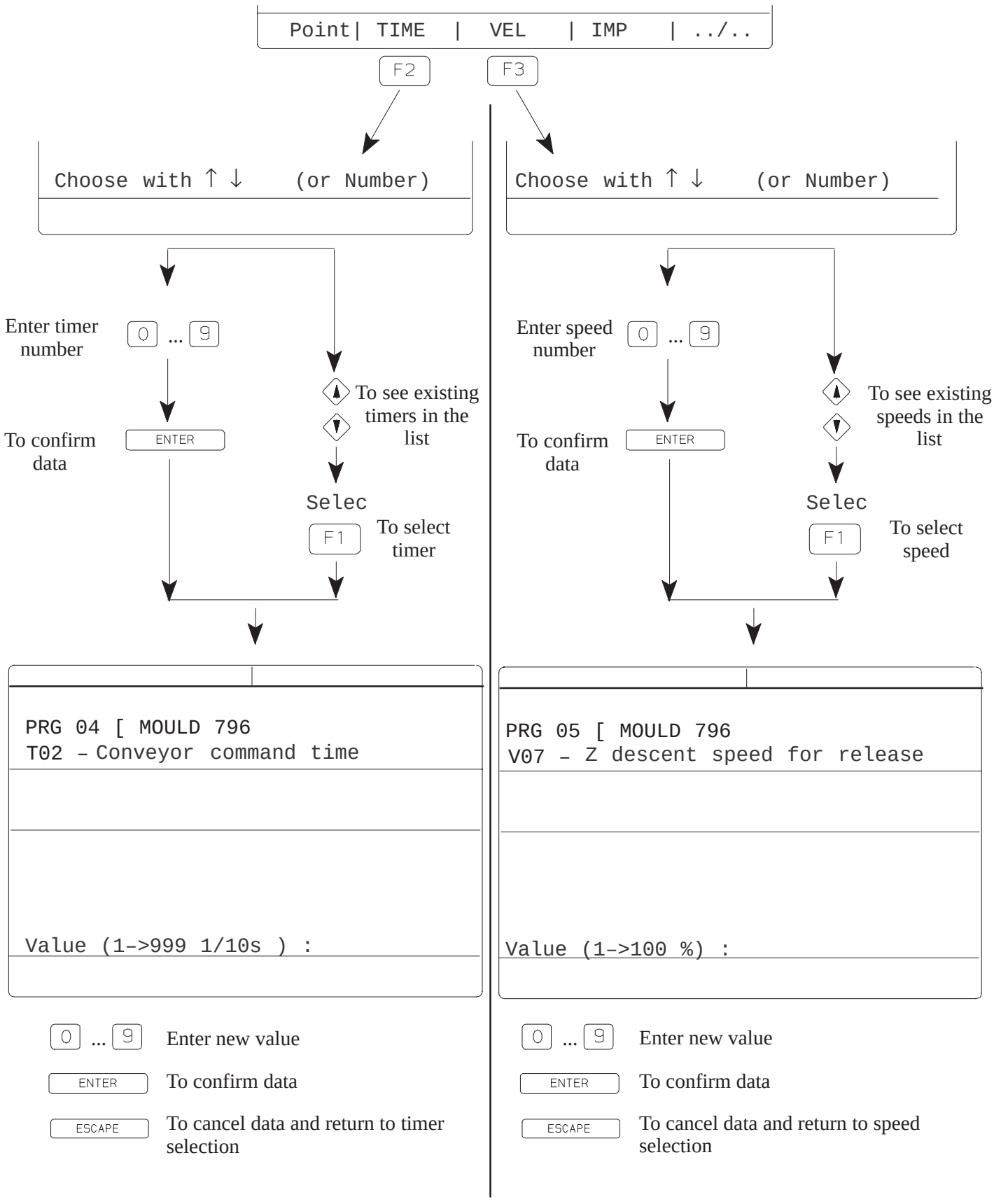
ESCAPE : press this key several times to quit the SAP menu then the monitor mode.

VI – 3. Changing an SAP point

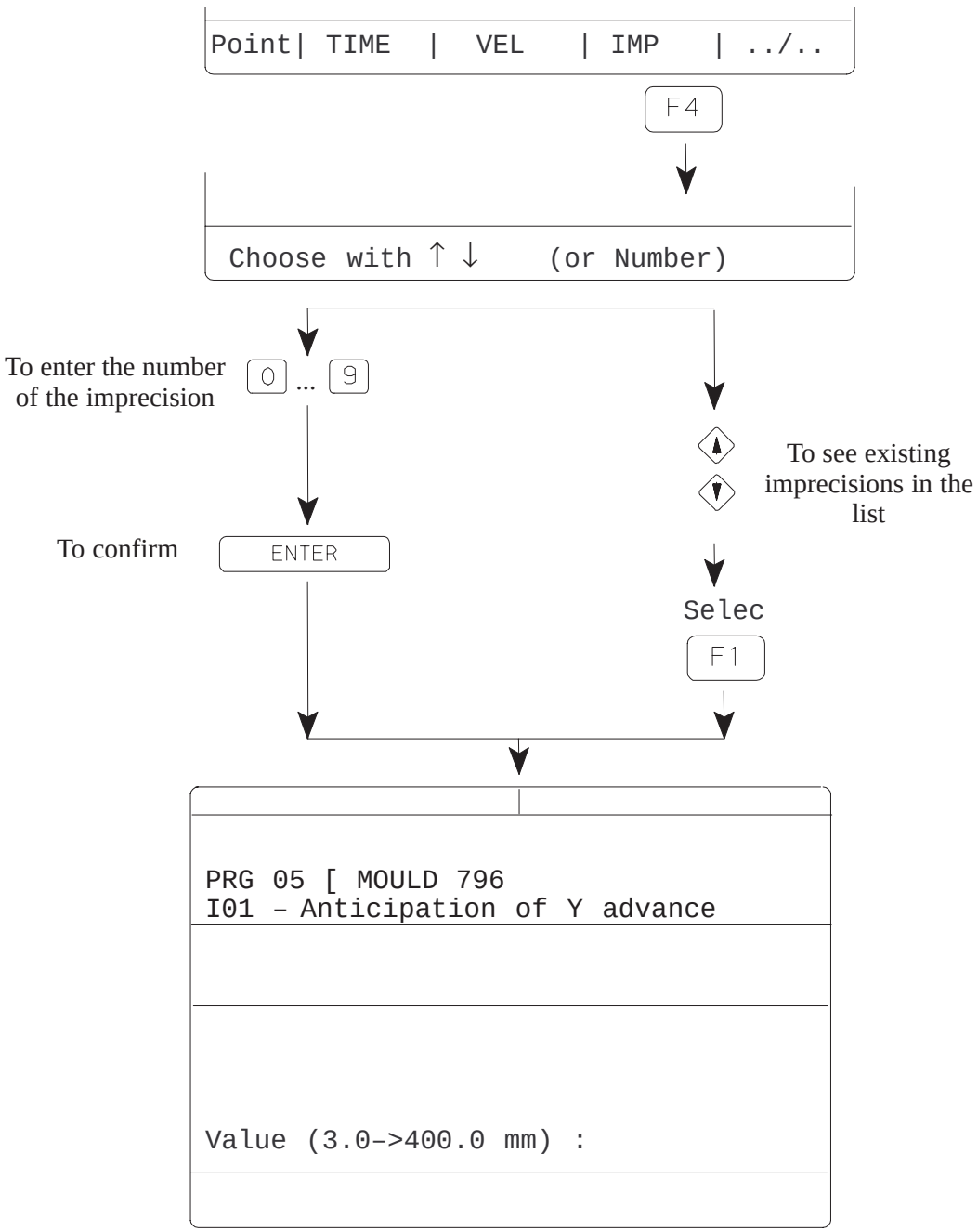


Note : For safety reasons, the position value change is limited to +/– 10 mm of the old value. However, if you are sure of your value, it is possible to repeat this 10 mm change several times.

VI – 4. Initializing the SAP timers and speeds



VI – 5. Changing an imprecise distance



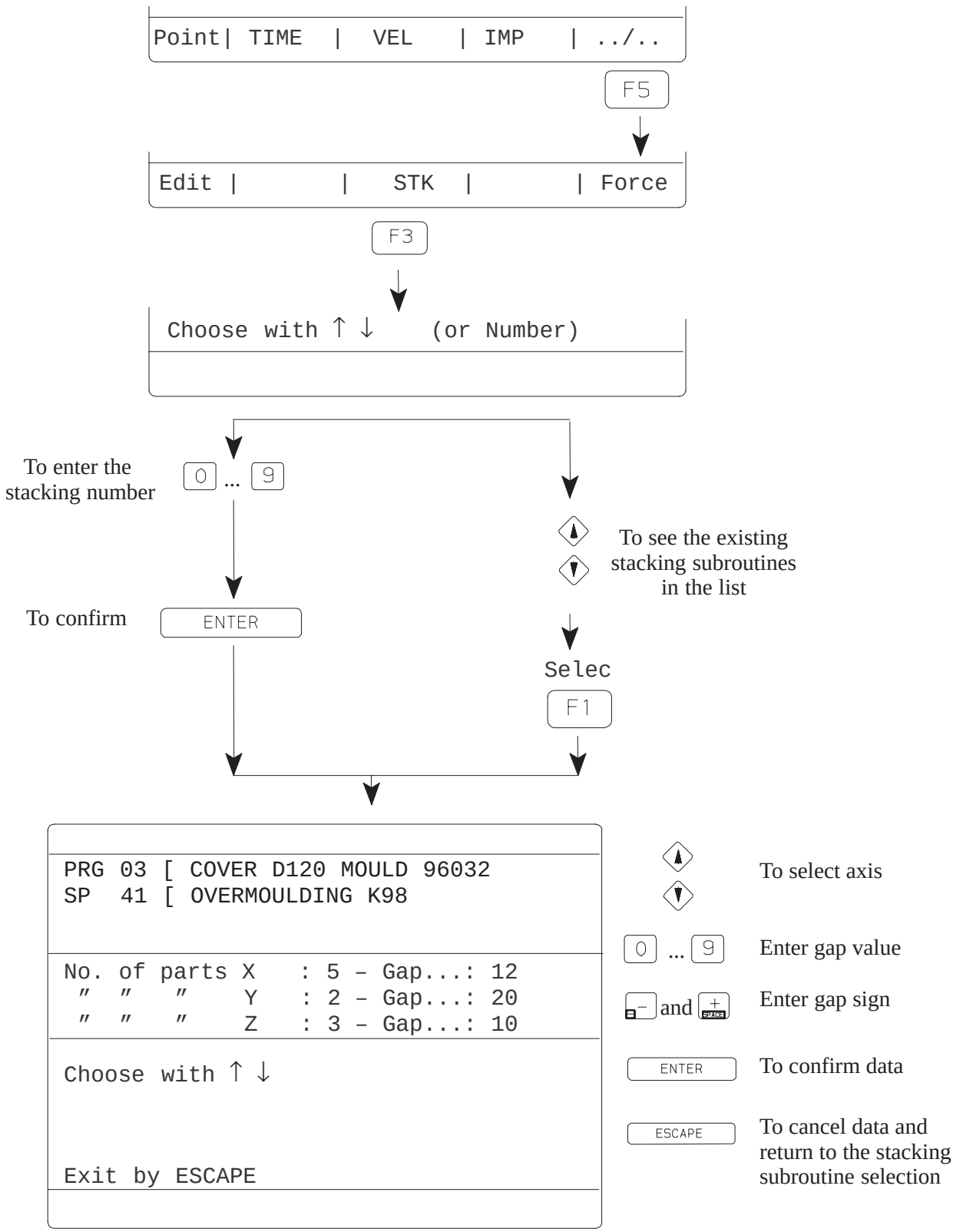
0 ... 9 To enter the new value (maximum 400 mm)

ENTER To confirm

ESCAPE To cancel and return to the selection of the imprecisions

Note : The value of the imprecision must not be greater than 400 mm in order to remain marked as an SAP and therefore changeable via the SAP menu.

VI – 6. Changing a gap in a stacking sequence



Note : For safety reasons, the position value change is limited to +/– 10 mm of the old value. However, if you are sure of your value, it is possible to repeat this 10mm change several times.

VII – TROUBLE–SHOOTING

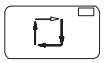
When there is a fault, it is important to :

- ▶ note the error message marked on the screen,
- ▶ note the status of the signalling on the speed drivers,

This will then be useful for a future diagnostic, if necessary.

VII – 1. Restarting after a fault

VII – 1. 1. Part grip fault in the mould

If there is a part grip fault in the mould, the robot will execute a home return in automatic mode  . To restart the robot, carry out one of the following procedures :

The robot must return to take the part in the mould :

Key on pendant or BRP 

Restart in automatic mode 

The IMM must produce a new part :

Remove the part(s) from the mould and the gripper head

Key on pendant or BRP 

Resets the part made memory to zero.

Key on pendant or BRP 

Restart in automatic mode 

If the fault occurs more and more frequently, check the following :

- ▶ the state of the suction cups and the gripper head,
- ▶ the mould opening strokes,
- ▶ the ejector and core puller strokes.

VII – 1. 2. Power loss

There are many causes of a power loss to the robot. Here are some of the most frequent :

- ▶ Emergency stop button pressed in or safeguards open (IMM door, gates,...). Check the different stop buttons and the gates, making sure that nobody is in danger in the robot work area.
- ▶ Robot in overtravel or outside an authorized area. If this fault occurs in automatic mode  :
  - ▪ check that it is not a program error in part of the program that has not been tested,
  - ▪ note the positions marked for the different axes,
  - ▪ if this occurs again, warn your maintenance team or call the Sepro After Sales Service.

To restart, follow the prodecure described on page 14.

VII – 1. 3. Other faults

▶ Carry out the following procedure for faults other than the part grip fault in the mould :

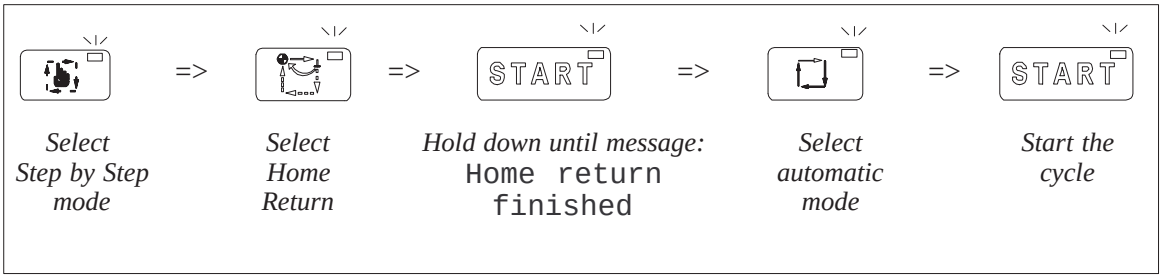


Figure 31 : Restarting after a fault

Note : It is sometimes necessary to carry out other procedures to quit certain faults.

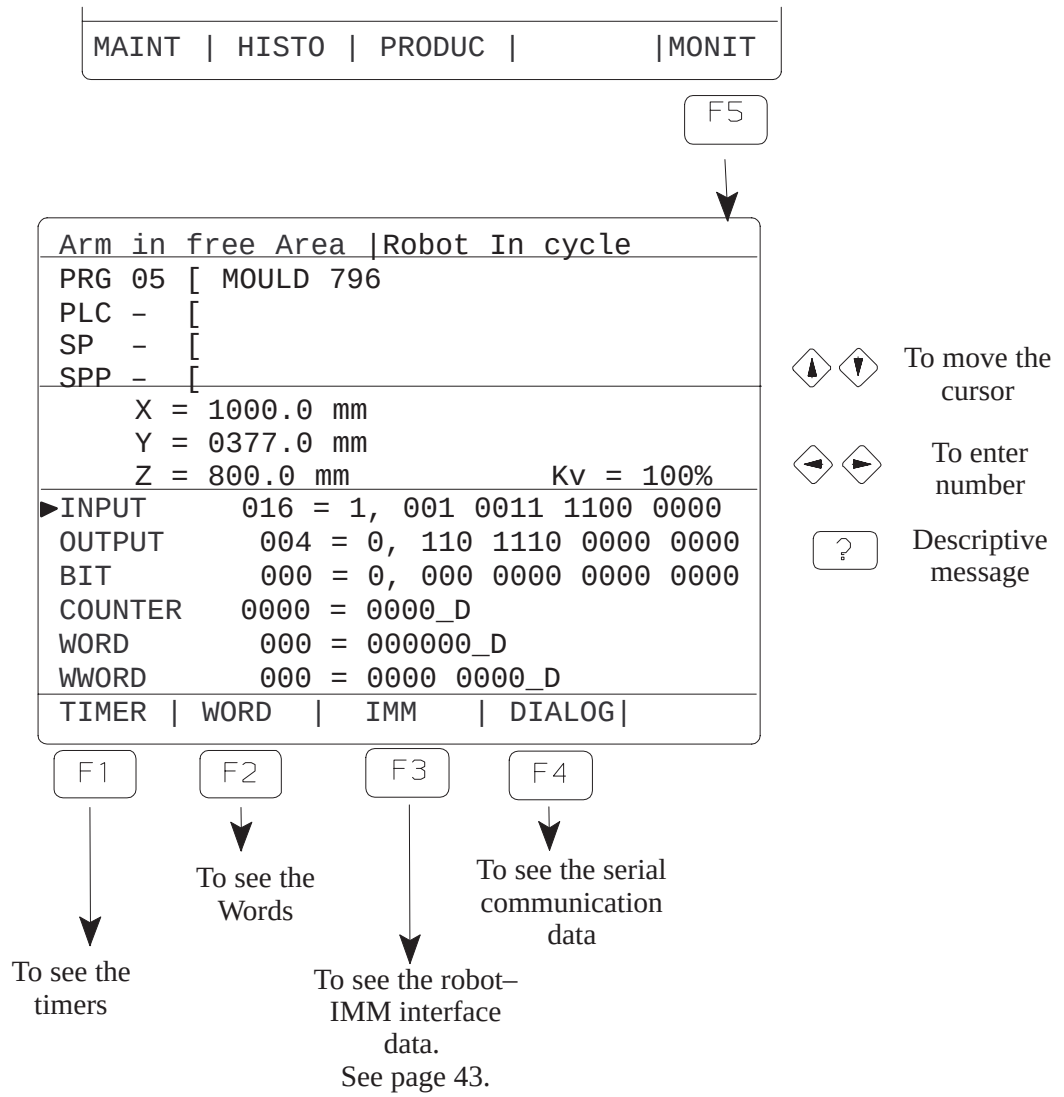
▶ Speed driver fault : if : "`D_2 : $ –SPEED DRIVER FAULT`" is marked on the display, quit the fault by pressing the button marked "Drive Reset" placed inside the cabinet.

▶ For other faults, you may need to correct the program. The help commentary, displayed with the fault, will give you an idea.

VII – 2. Analysis tool

VII – 2. 1. Monitor mode

The robot is in step by step or automatic mode.



Note : The status of the selected input, output or bit is marked before the comma, followed by the next 15 inputs, outputs or bits.

V 1.3 robot

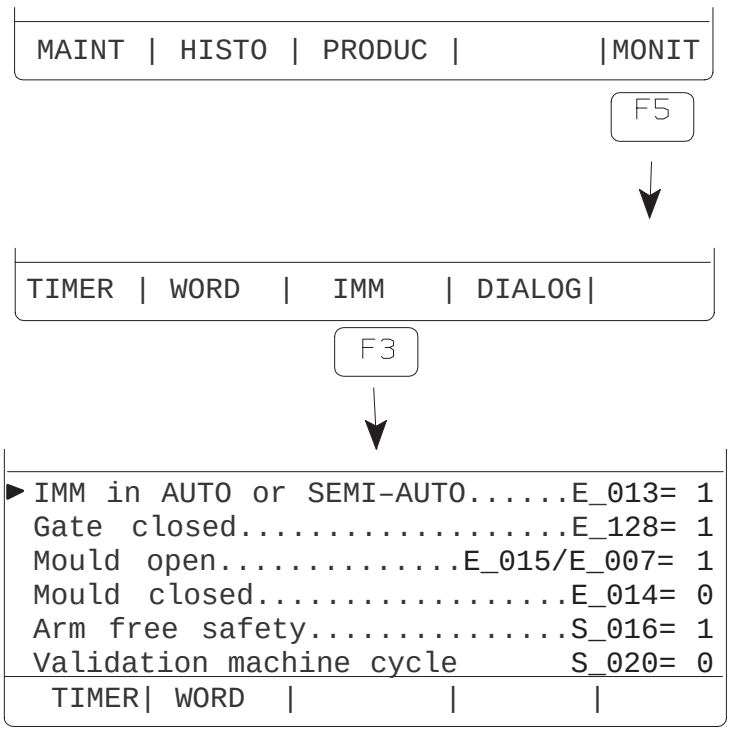
It is possible to consult the value of the counters, Word and WWord in decimal or in hexadecimal.

To move the cursor on the counter, Word or WWord line

and simutaneously to change from hexadecimal to decimal and vice–versa

V 2.0 robot

Information concerning the dialogue between the IMM and the robot can be consulted in the following window.

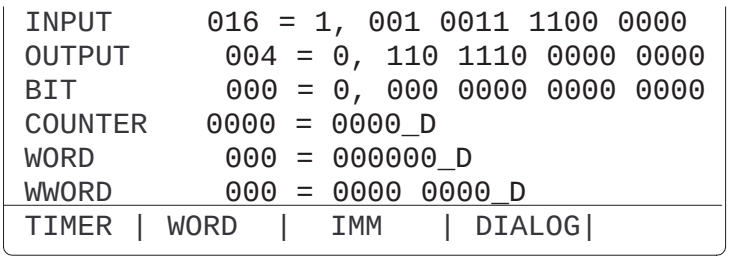


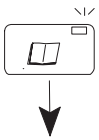
VII – 2. 2. Extended monitor mode: forcing a variable

It is possible to force the status of a bit, an input, an output, or change the value of a counter, a Word or a WWord. This forcing is done in extended monitor mode, accessible in Step by Step or automatic mode.

Forcing may lead to an unexpected functioning of the robot, and is therefore dangerous.

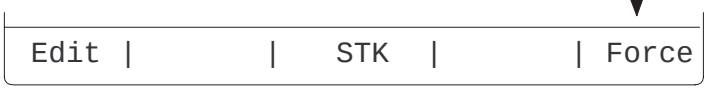
The robot is in monitor mode.





To access the SAP menu

F5 To access the forcing mode

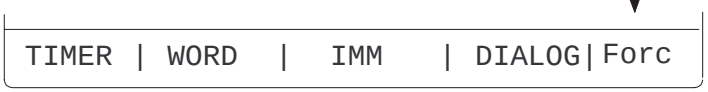


F1

to access the program editor

To move the cursor on the line containing the variable to be forced

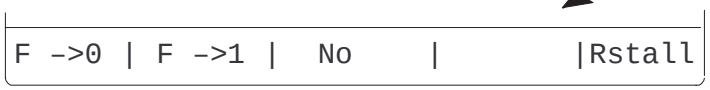
F5



F5

for the bits, inputs or outputs

for the counter, Word and WWord



F1 forced to 0

F2 forced to 1

F3 forcing cancelled for the selected variable

F5 forcing cancelled for all the variables

The changeable value flashes on the screen

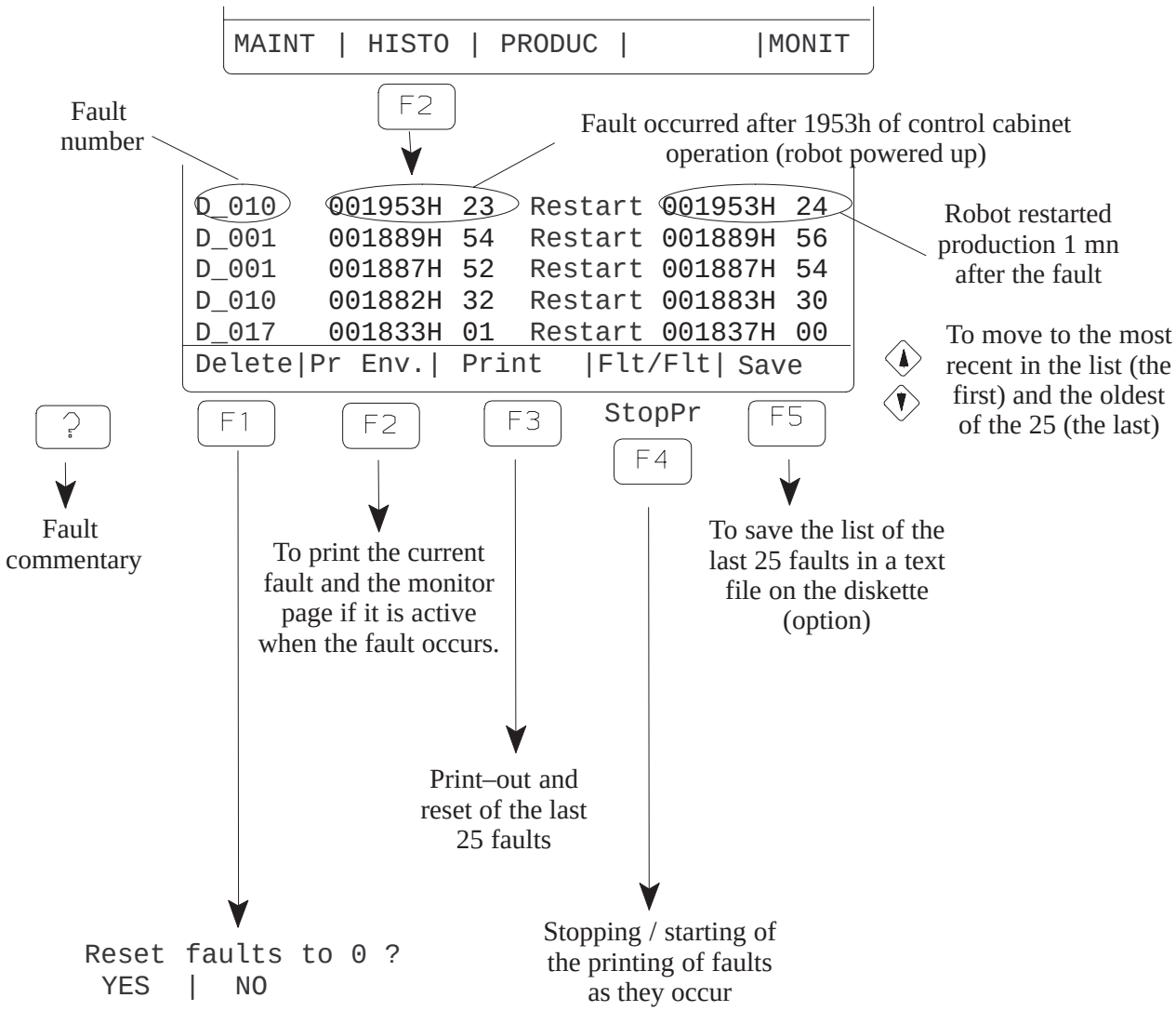
0 ... 9 To enter the new value

ENTER To confirm

ESCAPE To cancel

VII – 2. 3. Faults historic

The robot memorizes the list of the last 25 faults that have triggered a cycle stop.



Note : The times marked are the system times available on the Maintenance page. (Clock : see page 46).

VII – 3. Maintenance data

VII – 3. 1. Clock

In the maintenance menu, the following screen appears if you press [Times] F1 :

```
Robot powered up......: 020263 H 06 Mn
In Automatic mode.....: 017118 H 14 Mn
Time since restart....: 000125 H 43 Mn
Times | Date  |Language|Config  |Maint
```

Robot powered up : is the accumulated time that the robot cabinet has been powered up. It is the time which is taken into account in the faults memory.

In Automatic mode : is the accumulated time that the robot has been in automatic mode.

Time since restart : is the time since the cycle was last restarted.

V 2.03 robot

VII – 3. 2. Date

In the maintenance menu, you can enter the date and time by pressing [Date] F2. This data is used for saving the programs on the diskette (option).

Note : The date and time are only kept up to date whilst the robot cabinet is powered up.

VII – 3. 3. Language selection

It is possible to have two languages on the S900–II control unit. It is possible to change language in the maintenance menu by pressing F3.

VII – 3. 4. Robot configuration

In the maintenance menu, it is possible to access the options list (see chapter I – 3. page 5) and the robot specifications by pressing Config F4 .

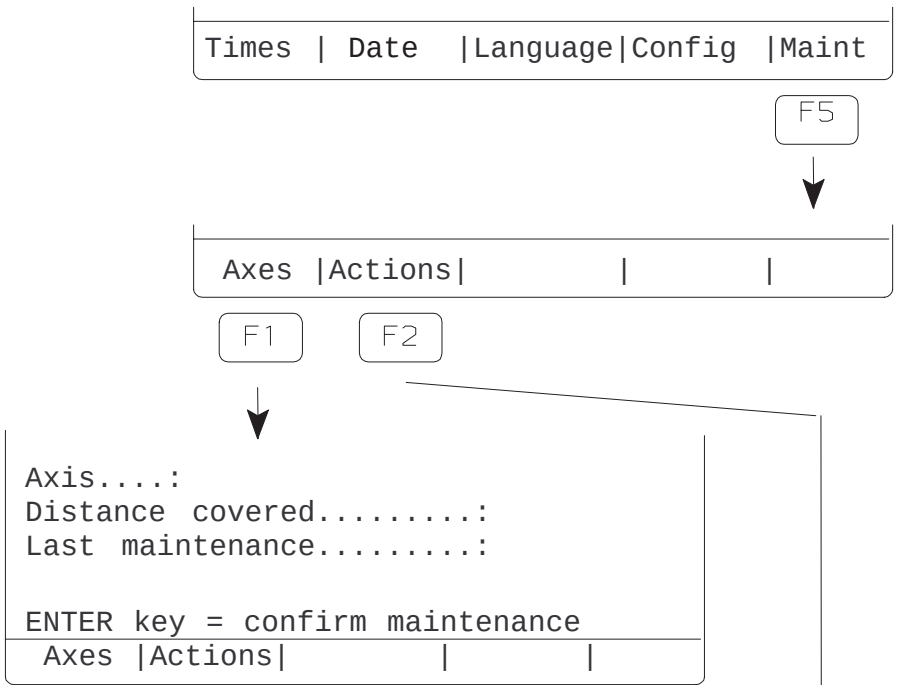
```
SEPRO Robotique            Version 2.1

Type : 3020BZ (000) Number : 00006000
Read with keys ↑ ↓
```

To see options list

```
Type : 3020BZ (000) Number : 00006000
Axes board 1 ..........20E79801–V= 0.3
Program memory size             32k x8
No module present.
PC option present........2400 Bd E= 01
E17 option present.......9600 Bd E= 01
2nd printer option present.............NO
Anticipated start option present......YES
Supervisor commands option present    YES
10L57111_GB
Latino Latino (Character font)
```

VII – 3. 5. Maintenance

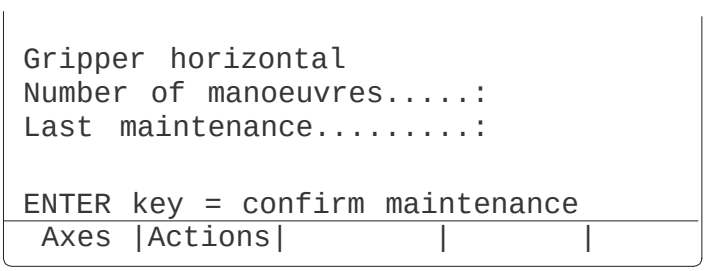


Note : The distance covered corresponds to the number of kilometres covered.

To see the data concerning the different axes and pneumatic movements, use the movement keys :

ENTER — To confirm the last maintenance

ESCAPE — To quit the page



Note : The number of manoeuvres marked for the pneumatic movements corresponds to the number of times the corresponding instruction has been found in the program.

VIII – USING THE PRINTER LINK

This enables the printing of programs, PLCs, parameters and faults.

VIII – 1. Type of printer and connection

The S900–II control unit is equipped with a printer link as standard, and a second one as optional.

Both links are Centronics standard parallel links and do not need any particular configuration.

The standard link is on the mobile pendant. The optional link is to be found on the front door of the cabinet.

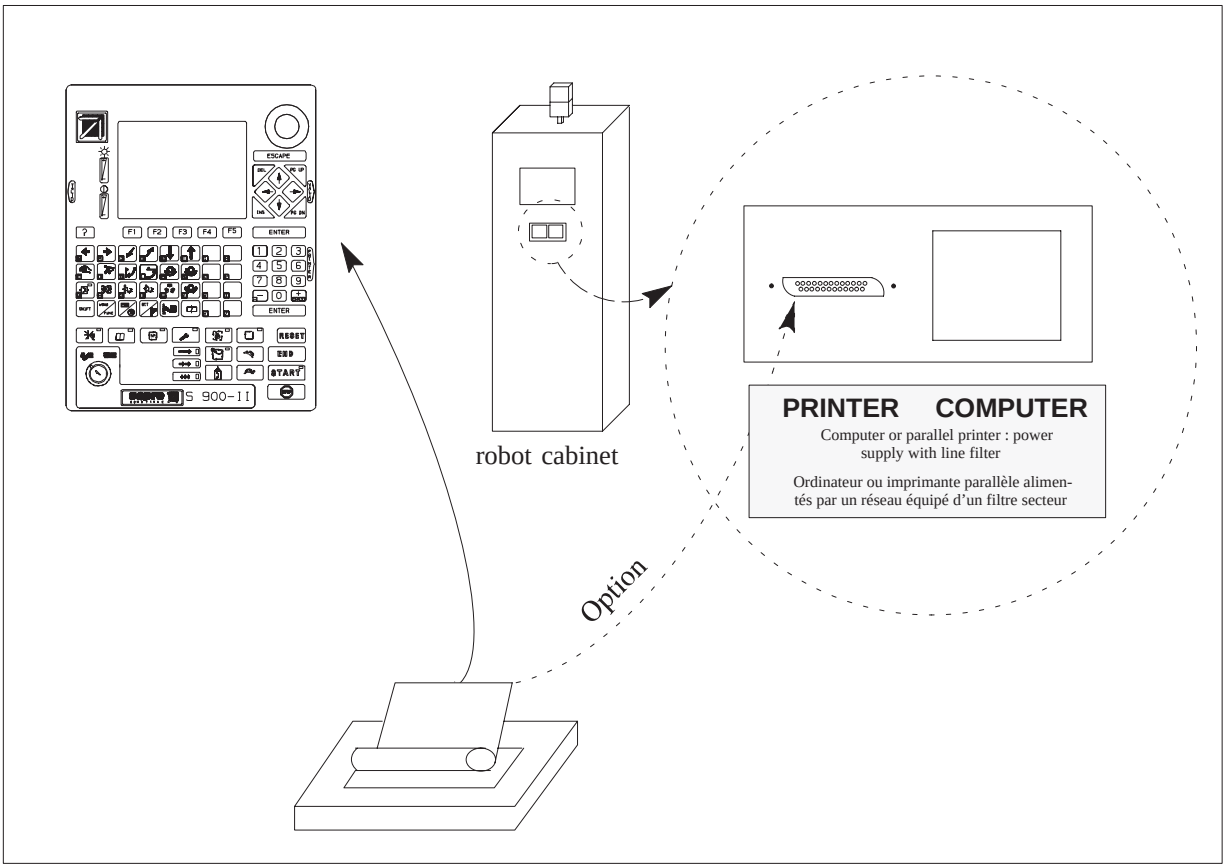


Figure 32 : Printer link

Sepro robotique principle :

The transmission is independant of optional control signals generated by certain printers. Only the ASCII codes for characters recognized by all international fonts are used to avoid any configuration problems.

VIII – 2. Printing a program

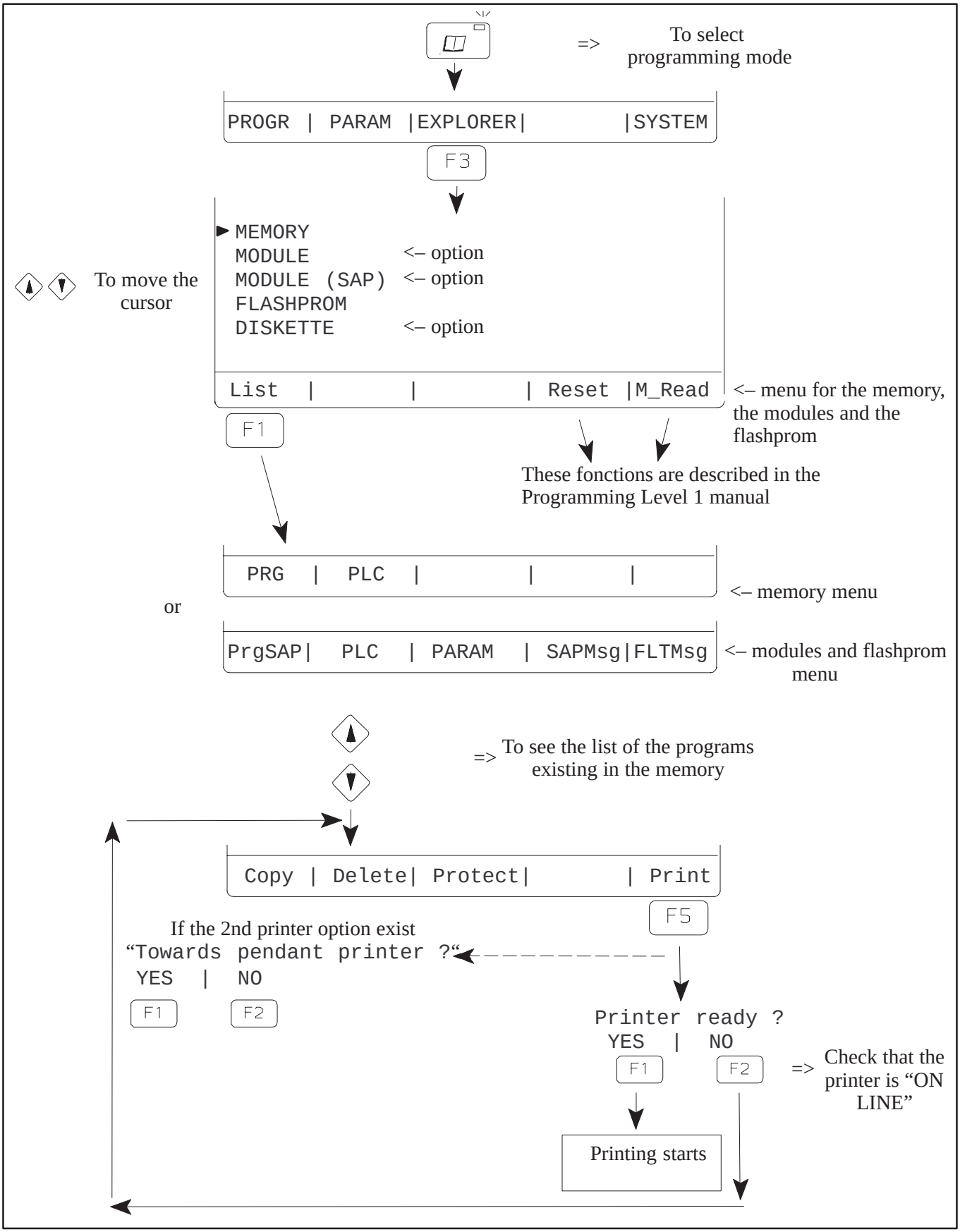


Figure 33 : Printing a program

VIII – 3. Printing the robot parameters

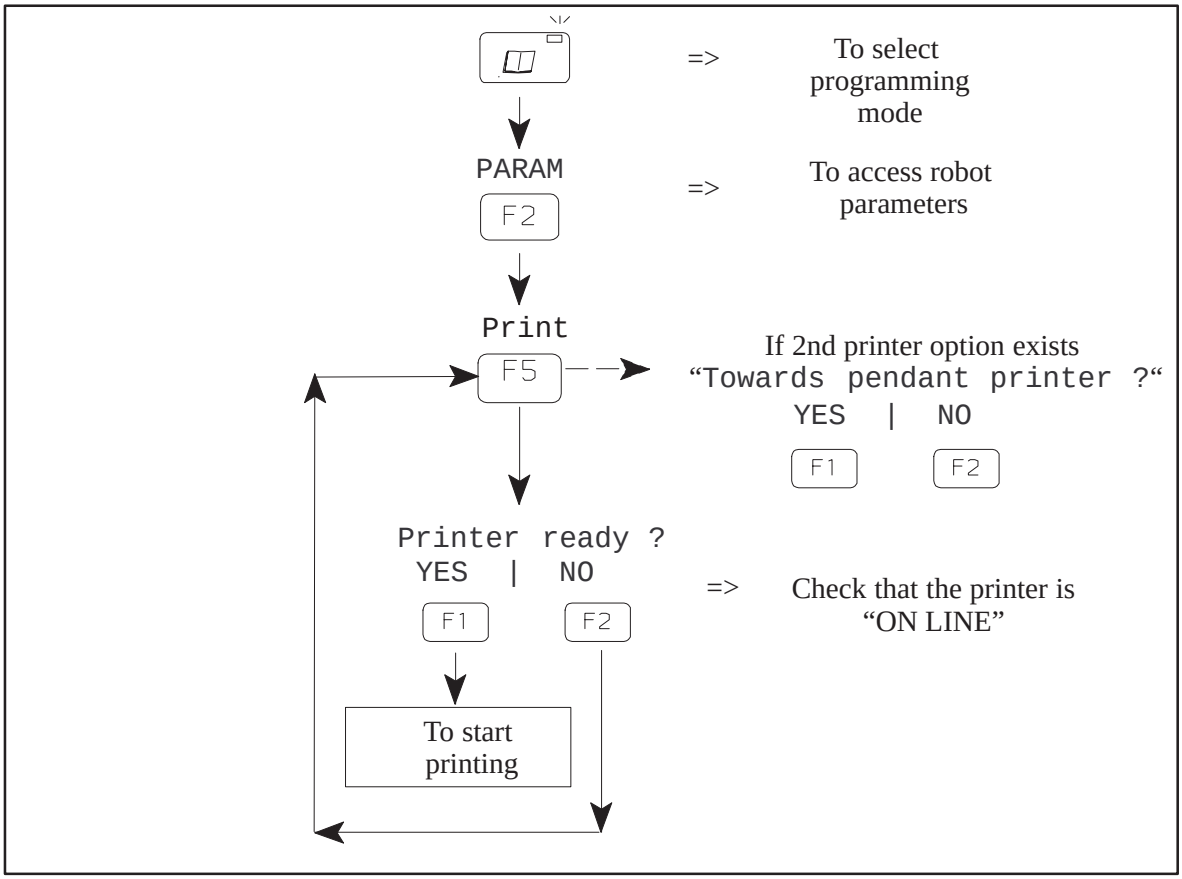


Figure 34 : Printing the robot parameters

Note : It is possible to put the robot into production once the printing has started.

VIII – 4. Printer configuration

It is possible to adjust the number of lines per page as well as the interline spacing.

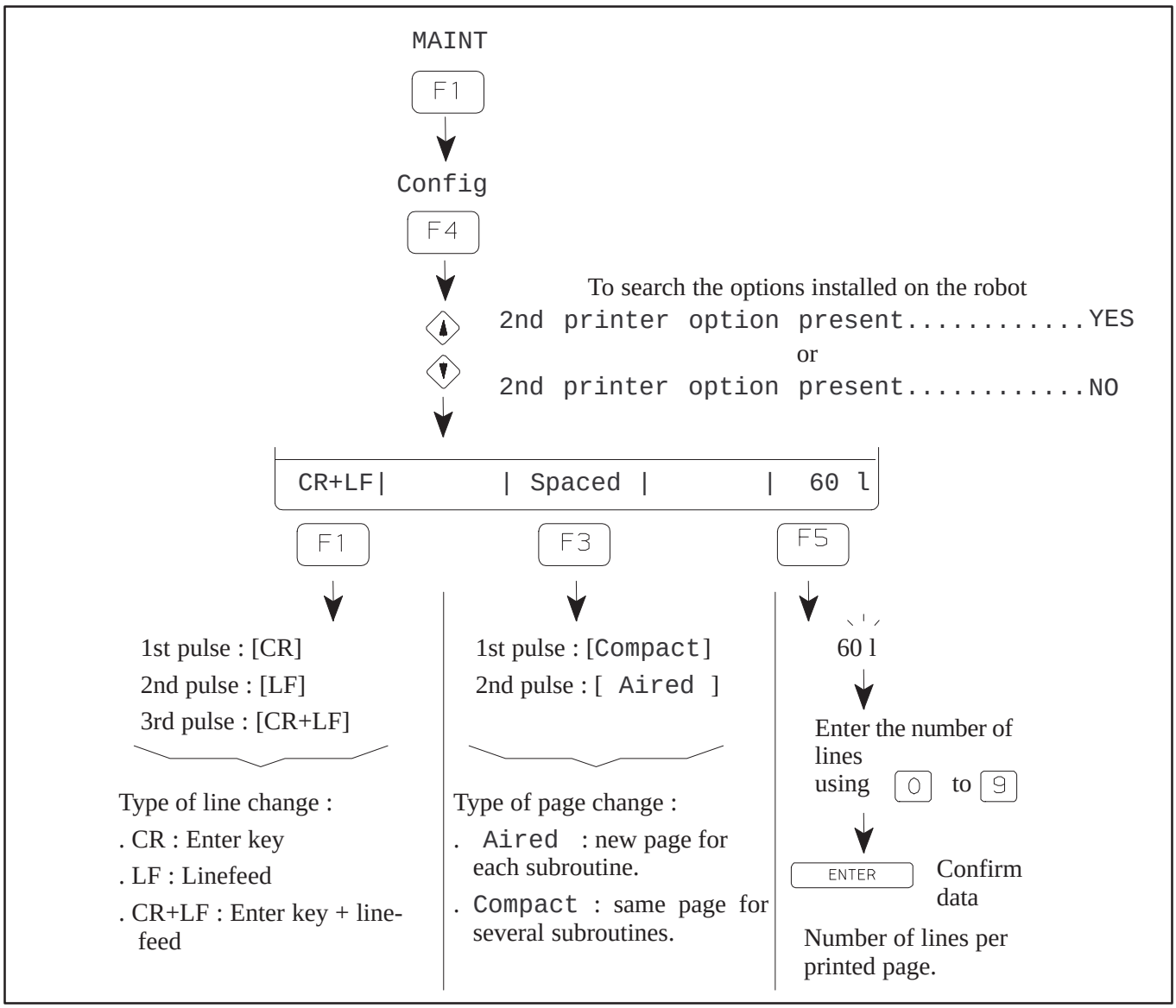


Figure 35 : Printer configuration

Note : The display indicates the selected configuration.

VIII – 5. Printing problems

As the Centronics interface does not need any special configuration, the printing problems are simple.

Carry out the following procedure if you have problems printing :

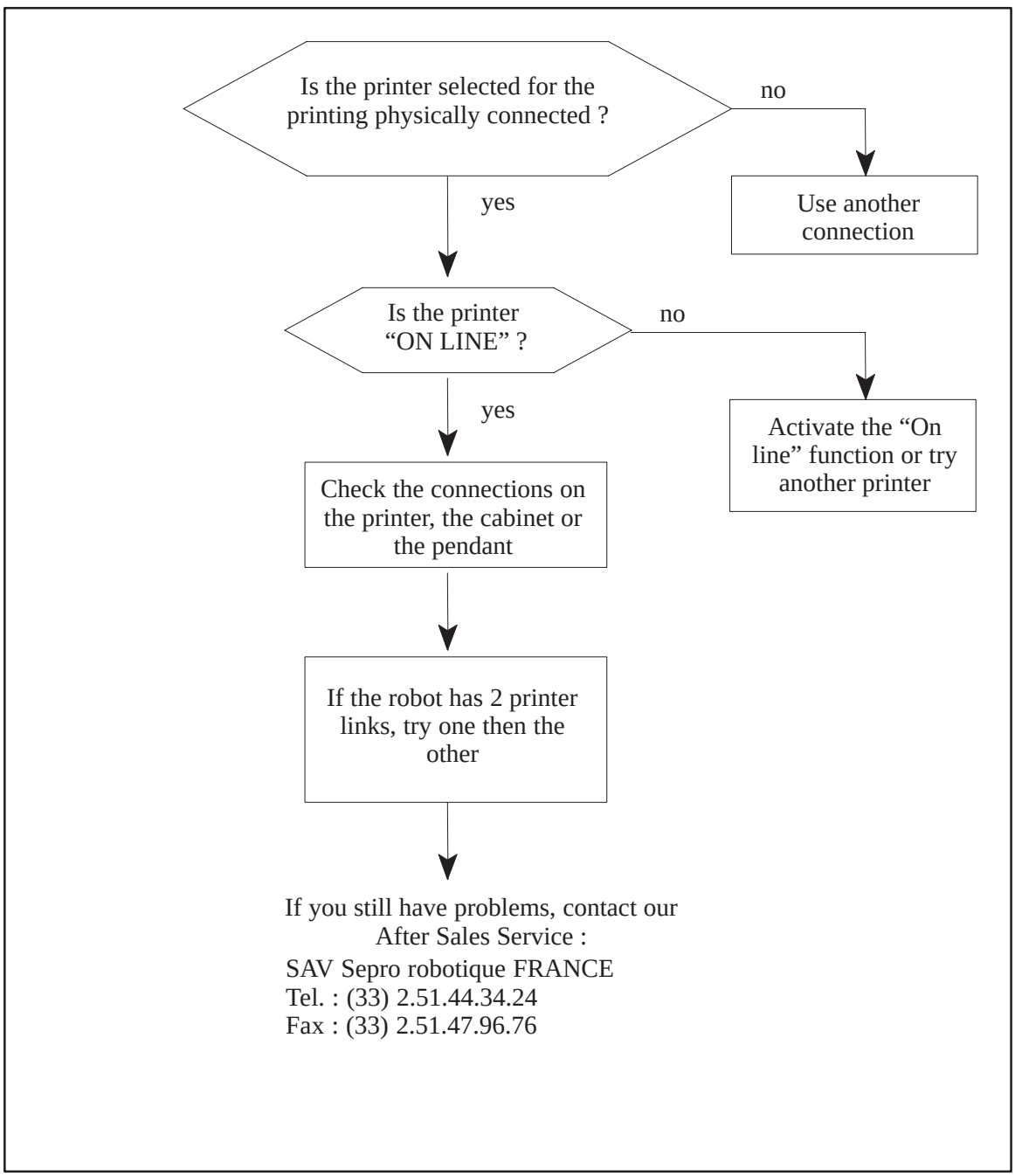
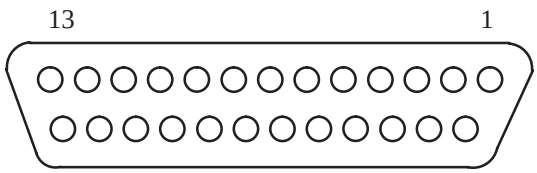


Figure 36 : Printer faults diagnosis

Parallel inteface connector :

Use a **PC Compatible** SubD 25 Pin standard cable – **Centronics**.



Front view of the female SubD 25 Pin plug
(or rear view of the mobile male plug to be used)

PIN	SIGNAL	I/O	DESCRIPTION
1	STROBE	O	– Strobe
2	PD0	O	+ data 0
3	PD1	O	+ data 1
4	PD2	O	+ data 2
5	PD3	O	+ data 3
6	PD4	O	+ data 4
7	PD5	O	+ data 5
8	PD6	O	+ data 6
9	PD7	O	+ data 7
10	ACK	I	– Acknowledgement
11	BUSY	I	+ Busy
18–25	GND		Mass (0V)

Figure 37 : Centronics printer signals

– FIGURES –

We're Here to Help

Conair has made the largest investment in customer support in the plastics industry. Our service experts are available to help with any problem you might have installing and operating your equipment. Your Conair sales representative also can help analyze the nature of your problem, assuring that it did not result from misapplication or improper use.

How to Contact Customer Service

To contact Customer Service personnel, call:

From outside the United States, call: 814-437-6861

You can commission Conair service personnel to provide on-site service by contacting the Customer Service Department. Standard rates include an on-site hourly rate, with a one-day minimum plus expenses.

Before You Call ...

If you do have a problem, please complete the following checklist before calling Conair:

- ❒ Make sure you have all model, serial and parts list numbers for your particular equipment. Service personnel will need this information to assist you.
- ❒ Make sure power is supplied to the equipment.
- ❒ Make sure that all connectors and wires within and between loading control and related components have been installed correctly.
- ❒ Check the troubleshooting guide of this manual for a solution.
- ❒ Thoroughly examine the instruction manual(s) for associated equipment, especially controls. Each manual may have its own troubleshooting guide to help you.
- ❒ Check that the equipment has been operated as described in this manual.
- ❒ Check accompanying schematic drawings for information on special considerations.

Additional manuals and prints for your Conair equipment may be ordered through the Customer Service or Parts Departments for a nominal fee.

EQUIPMENT GUARANTEE

Conair guarantees the machinery and equipment on this order, for a period as defined in the quotation from date of shipment, against defects in material and workmanship under the normal use and service for which it was recommended (except for parts that are typically replaced after normal usage, such as filters, liner plates, etc.). Conair's guarantee is limited to replacing, at our option, the part or parts determined by us to be defective after examination. The customer assumes the cost of transportation of the part or parts to and from the factory.

PERFORMANCE WARRANTY

Conair warrants that this equipment will perform at or above the ratings stated in specific quotations covering the equipment or as detailed in engineering specifications, provided the equipment is applied, installed, operated and maintained in the recommended manner as outlined in our quotation or specifications.

Should performance not meet warranted levels, Conair at its discretion will exercise one of the following options:

- Inspect the equipment and perform alterations or adjustments to satisfy performance claims. (Charges for such inspections and corrections will be waived unless failure to meet warranty is due to misapplication, improper installation, poor maintenance practices or improper operation.)
- Replace the original equipment with other Conair equipment that will meet original performance claims at no extra cost to the customer.
- Refund the invoiced cost to the customer. Credit is subject to prior notice by the customer at which time a Return Goods Authorization Number (RGA) will be issued by Conair's Service Department. Returned equipment must be well crated and in proper operating condition, including all parts. Returns must be prepaid.

Purchaser must notify Conair in writing of any claim and provide a customer receipt and other evidence that a claim is being made.

WARRANTY LIMITATIONS

Except for the Equipment Guarantee and Performance Warranty stated above, Conair disclaims all other warranties with respect to the equipment, express or implied, arising by operation of law, course of dealing, usage of trade or otherwise, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

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