SYTRAMA
AUTOMAZIONE FLESSIBILE ROBOTICA

PROGRAMMING MANUAL
FOR
TME KEYBOARD

Release 6.4 L

Serial n.___________

☐ Standard
☐ Special (for M functions and alarms please only consider those pages attached to the present manual)

SY.TRA.MA SRL
Via Lombardia,30
20060 Vignate (MI)
**PRELIMINARY NOTES**

This manual is intended for those workers who were appointed and authorised to carry out programming operations of the robots and who are therefore taking upon themselves the responsibility for any intervention or modification.

**WARNING:** the robot can move anywhere inside the working area therefore pay attention to the setting of the values and of the movements carried out by the robot itself.

For safety reasons and in order to avoid that some unauthorised personnel will modify confidential data, some functions can only be operated by means of an access password.

This manual must be duly kept by a person specifically in charge of it, in a suitable location, so that its consultation is always possible and that it is always in a good state.

Should it be lost or damaged, please ask SY.TRA.MA.SRL-Via Lombardia 30-20060 Vignate (MI) For its replacement.
When doing so, please quote the release number, which appears on the Tme keyboard.
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### 1-ROBOT ACTIVATION

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OK</td>
<td>2</td>
<td>W/ROBOT</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Prgm</td>
<td>5</td>
<td>LINE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAIN MENU</td>
<td></td>
<td>SPEED</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>EDIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>EXCL</td>
</tr>
<tr>
<td>11</td>
<td>AUTO</td>
</tr>
<tr>
<td>12</td>
<td>JOG</td>
</tr>
<tr>
<td>13</td>
<td>DIAGN &gt;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
<td>F2</td>
<td>F3</td>
<td>F4</td>
<td>F5</td>
<td>&gt;</td>
</tr>
</tbody>
</table>

1) It shows the state of the robot, i.e.: STOP or OK or EMER

2) It shows the working mode of the robot, i.e.:
   - W/ROBOT: with robot
   - NO ROBOT: no robot
   - END CYCL: robot at end cycle

3) It shows what working mode has been set, i.e.:
   - AUTO: robot in automatic mode
   - STEP: robot in step to step mode

4) It shows the number of program under execution (from 0 to 9999)

5) Number of line of the program being executed

6) Chosen menu

7) Set speed in percentage

8) ^: use this button to go back to the previous menu

9) F1: The EDIT softkey allows entering the submenus for programming the working cycle.
10) F2. The softkey W/ROBOT-NO ROBOT/END C. allows to choose the working mode of the robot: inserted or excluded or end cycle.

11) F3. The softkey AUTO/STEP allows to choose the working mode of the robot: automatic or step by step.

12) F4. The softkey JOG allows to choose the JOG working mode.

13) F5. The softkey DIAGN allows to enter the diagnosis menu of the robot.

14/15) By pushing this button >, when the relevant symbol is there, it is possible to visualize the other softkeys position (when available) in the same menu.

<table>
<thead>
<tr>
<th>16</th>
<th>10</th>
<th>11</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANGE</td>
<td>END C.</td>
<td>AUTO</td>
<td>SPEED+</td>
<td>SPEED-</td>
</tr>
</tbody>
</table>

| F1 | F2 | F3 | F4 | F5 |

16) F1 CHANGE Selection of the working program.

17) F4 SPEED+ Speed increase

18) F5 SPEED- Speed decrease

Note: if the first cycle is executed in step mode the speed will be automatically reduced at 20%
OPERATIVE MODE JOG AND FORCING

JOG

F4

This softkey allows to choose the JOG working mode.

| EDIT | W/ROBOT | AUTO | JOG | DIAGN |

On the main menu, digit the **F4 JOG** softkey the following page will appear:

<table>
<thead>
<tr>
<th>JOG</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Y AXIS</th>
<th>Z AXIS</th>
<th>X AXIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>000</td>
<td>000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUX(M)</th>
<th>FORCING</th>
<th>SPEED+</th>
<th>SPEED-</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>F3</td>
<td>F4</td>
</tr>
</tbody>
</table>

| F5     |

Short description of the softkey:

- **F1 AUX** Menu for forcing M auxiliaries
- **F2 FORCING** Menu for forcing parameters, flags, escapes
- **F4 SPEED+** Increase of the speed
- **F5 SPEED-** Decrease of the speed

When in JOG mode it is possible to move the chosen axis freely (inside the working field) by pushing the keys on the right side of the keyboard. By means of the **F4 SPEED+** and **F5 SPEED-** softkeys it is possible to increase or decrease the relevant speed.
FORCING M AUXILIARIES

AUX (M)
F1

By “forcing and auxiliary” we mean to be able to control freely the functions of the aux. menu (M).
Note: It is possible to execute the forcing only after having made the search for zero and once the parking procedure has been completed.
In order to get access to the softkey F1 Aux (M), starting from the main menu, press as it follows:

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUX (M)</td>
<td>FORCING</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the main menu, digit the **F1 AUX** softkey and the following page will appear:

AUXILIARY FORCING (M)

(SEE FIRST PAGE AUX)
CHAPT.8 CHART M AUXILIARY FUNCTIONS

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
<th>OFF</th>
<th>OFF</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>F3</td>
<td>F4</td>
<td>F5</td>
</tr>
</tbody>
</table>

- By means of the arrows move the cursor to the M function to be controlled.
- Digit the F1 ON softkey to activate the chosen M auxiliary function.
- Digit the F2 OFF softkey to disactivate the chosen M auxiliary function.
VISUALISATION FOR FORCING MENU

FORCING

F2

By forcing we mean changing the present status of a parameter, Bit F or escape to the opposite state.
Note: it is possible to execute the forcing of the exit only once the search for zero has been made and the robot is in parking position.

EDIT W/ROBOT AUTO JOG DIAGN
AUX (M) FORCING

Digiting the **F2 FORCING** softkeys the following page will appear:

FORCING MENU

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PRESENT VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER 0</td>
<td></td>
</tr>
<tr>
<td>BIT F</td>
<td>0</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>0</td>
</tr>
</tbody>
</table>

Digit the value, press the right arrow >

Forcing a P PARAMETER:
- By means of the arrows move the cursor to the PARAMETER position.
- Set the number of parameter whose value has to be modified.
- Push the key □ the present value of the parameter is visualized.
- Set the new value
- Digit F5 STORE softkey or the button □ to confirm the new value; push the key ^ to escape without storing in memory.

Forcing a Bit F or OUTPUT:
- By means of the arrows move the cursor to the Bit F or OUTPUT.
- Set the number of Bit F or Output whose state has to be modified.
- Push the key □
In the central field the PRESENT VALUE of the Bit F or Output is visualized:

ON =1 (activated)
OFF =0 (disactivated)
- Digit F1 ON or F2 OFF softkeys to activate or disactivate the present state of the signal
HOW TO START IT UP

START UP PROCEDURE

→ give tension to the electric cabinet setting the main switch on “1” position
→ make sure that all the emergency buttons are on consent position “UNBLOCKED”
→ make sure that the selectors “OVERSTROKE” and “GUARDS” are on INS and that all guards are locked
→ give power to the press cabinet and turn on the motor
→ press the START AUX button (the LINE AUX led on the keyboard remains steadily on); “SEARCH FOR ZERO NOT MADE” will appear on the display.

SEARCH FOR REFERENCE POINT

→ press the RESET button till the “EMERGENCY” message goes off (the RESET led will go off)
Note: The search for reference point is only possible when the press is on manual, the guards are locked and the vertical axis in in high position (Z-). Should it not be high:

→ digit the F4 JOG softkey
→ press Z- button till the Z axis reaches its highest position (the robot stops automatically)
→ leave JOG by means of the ^ button
→ press START (the robot will carry out the search for zero; “SEARCH FOR ZERO NOT MADE” will disappear)
During the search for zero, the status appears on the video, for example:

Y AXIS NOT REFERRED
Z AXIS NOT REFERRED
X AXIS NOT REFERRED

Note: the visualization of the above depends on the type of robot (E2-E3).

PLEASE NOTE for the 6.4 L version, after pressing the RESET key, the self-setting takes place and lasts for few seconds. When the operation is over (and the message disappears) it is possible to research the reference point.

→ Wait till the robot has finished the search for 0
→ When all the axes are referred, the main menu appears on the display
→ Make sure the right working program has been selected (top right is the program number Prgm=..........)

PERMIT PRESS SIGNALS

→ Digit STOP softkey
→ Digit START softkey
→ The robot reaches the PARKING position in “EXCLUDED” mode and gives the press all the permits to allow it to go ahead with the cycles (“ROBOT EXCLUDED” appears on the display.
WORKING WITH ROBOT DURING MOULDING CYCLE

STEP MODE
- select the softkey F2 on W/ROBOT mode (check selection on top on the display)
- press Start
Note: if the cycle is carried out on step mode, speed is automatically reduced to 20%.

AUTOMATIC MODE
- Once the moulded part is complete, set the press on automatic mode
- Select Auto mode by means of the F3 (check selection on top on the display)
- press start.

START AFTER A STOP
Pressing STOP, the Step mode is automatically set; select the chosen cycle to reset:

If you want to start with a new cycle, set the press on manual, press START; the robot will move to parking on EXCLUDED mode (note: EXCLUDED mode has been automatically set upon re-start).
Start production of the press on AUTOMATIC mode.

If you want to continue with the same cycle, ignore the message “PRESS NOT ON MANUAL”, press shift + start and the robot will complete the line under execution:
- select AUTO mode by means of the softkey F3
- press START and the robot will continue the cycle on automatic mode.

WARNING: during all operative phases that require access to the protected area or inside the press platens area, a residual risk is there, represented by the vertical axis of the robot that, due to a sudden mechanical or electrical fault, might move vertically. We therefore suggest that the robot is set in a non dangerous zone position.

START AFTER AN EMERGENCY
If, during production cycle, it becomes necessary to press emergency buttons or any device (endstroke, motors, drives etc) that would automatically cause an alarm, act as it follows to reset working:
→ reset the emergency button or look for the reasons of the alarm. For this purpose, use the “Self-diagnosis chart of alarms on Tme keyboard” (Chapter 9); once the cause has been removed, repeat the activation procedure starting from the paragraph “Permit IMM signals”

END OF PRODUCTION
After the robot has started the last pick-up cycle and before it has left the press, press the softkey “END CYCLE”. The robot will pick up the part from the mould, without giving consents to press closing, will unload the part and stop in “PARKING” position.

DE-ACTIVATION
After the “End of production” procedure has been completed:
→ press the “EMERGENCY” button
→ turn the general switch on 0 (zero) position
2-SELF-TEACHING

CYCLE SELF-TEACHING

In order to allow an easy modification of the working values, the self-teaching mode has been created. This menu allows to modify the cycle, palletization and direct position values; the self-teaching modes are here described.

Storing parameters values in memory is only possible if in the program that is being edited the parameters that need modifying are present, otherwise, the error message Parameters assigning will appear.

In order to gain access to the cycle menu starting from the main menu, press as it follows:

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX(M)</td>
</tr>
</tbody>
</table>

Digiting the F2 CYCLE softkey the following page appears:

<table>
<thead>
<tr>
<th>POSITION</th>
<th>Prgm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking</td>
<td>P30</td>
</tr>
<tr>
<td>Wait opening</td>
<td>P31</td>
</tr>
<tr>
<td>Part picking-up</td>
<td>P32</td>
</tr>
<tr>
<td>Part unloading</td>
<td>P33</td>
</tr>
<tr>
<td>Fault part unloading</td>
<td>P34</td>
</tr>
<tr>
<td>Degating position</td>
<td>P35</td>
</tr>
<tr>
<td>On peripheral</td>
<td>P36</td>
</tr>
<tr>
<td>Free</td>
<td>P37</td>
</tr>
<tr>
<td>Carton layer unload</td>
<td>P38</td>
</tr>
<tr>
<td>Carton layer pick-up</td>
<td>P39</td>
</tr>
</tbody>
</table>

Note: in automatic mode it is possible to modify the positions of the axes 1mm at a time.

ATTENTION!

To be sure, run a cycle in STEP mode at a 10% speed, in order to verify the new set quotes.
HOW TO CREATE A PROGRAM

The are two ways of creating a program: either you write a new program (see chapter 3-creation of a new program) or follow the following procedure:

- make a copy of a basic program, bearing in mind that the standard programs you receive are two: pick and place and palletization (see Chapter 3 “Copy of a program”)

- enter the program of the self-teaching menu (Cycle) in order to get the new dimensions; when doing so, consider that :the parking must always be set with the Y axis on unloading side; when in the phase of “Press opening wait” the only value you need is P11 (axis backward after part pick up); usually the mould opening wait coincide on the Y axis with the part pick up and on the Z axis with the parking .

For part release use the “Cycle + part unload” menu if you start from a pick and place program; use the “Pallet” and ” Teach of all the axes first part” if you start from a palletising program.

-if, while getting the values, it is necessary to carry out a pneumatic movement (overturning, tilting, vacuum etc), go back to the self-teaching menu, press “aux” and set the desired function ; go back to the previous menu to move the axes again.

- once the values have been set, decrease the speed (for example 10%) and execute a few cycles in step mode.
SELF-TEACHING PALLETTISING

PALLET F3

The access to the menu of palletization parameters is only allowed when editing a palletization program; otherwise an error of PARAMETERS ASSIGNING will appear. To get access to the palletization menu from the main menu, press in sequence:

F1 EDIT
Move the cursor on the requested program
F1 EDIT
F3 PALLET

The following page will appear:

![Diagram of palletizing setup]

Number of parts X axis = 0000.0
Number of parts Z axis = 0000.0
Number of parts Y axis = 0000.0
Inter-axis A X axis = 0000.0
Inter-axis B Z axis = 0000.0
Inter-axis C Y axis = 0000.0
First part X axis = 0000.0
First part Z axis = 0000.0
First part Y axis = 0000.0
Teach all axis, first part.

Move with the cursor on the data to be modified; press F5 to modify it, set the new value in, including the first decimal digit, press F5 to store.

After having modified the palletizing parameters or selecting a new program in the main menu, the palletization will be automatically set to zero.

Important: after having executed the above procedure, the robot will start palletising from the first position; therefore, parts that should be on the pallet already, would need to be pulled off manually; if on the contrary you want to go ahead from the present condition of the pallet, it is necessary to force to 1 the parameter P0 (zero). See chapter 1 "Operative mode jog and forcing" to know how to force the parameters. Note: in automatic mode it is possible to modify the positions of the axes 1 mm at a time.
SELF-TEACHING DIRECT POSITIONS

DIRECT
F4

The access to the Menu of direct positions is only allowed in case a direct program is being edited; on the contrary, an error of parameter assignation will appear. In order to get to the Direct Programs Menu, we start in the Main Menu setting in sequence:

Digit the softkey F1 EDIT
THEN MOVE THE CURSOR TO THE NUMBERED PROGRAM
Digit the softkey F1 EDIT
Digit the softkey F4 DIRECT
and the following page will appear

<table>
<thead>
<tr>
<th>CYCLE OF 1° POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y AXIS</td>
</tr>
</tbody>
</table>

F1    F2    F3    F4    F5

Pressing Softkey F1 Y Axis or F2 Z Axis or F3 X Axis, the value of the new quote is inserted through the numerical keys (from 0 to 9, +, -) in parameters P40, P41 and P42.

Pressing Softkey F4 Position, it is possible to recall the positions to be modified.

Pressing Softkey F5 Teach, it is possible to move the axis, using the directional keys and then to store the new values pushing the Softkey F5 Storage.

IMPORTANT!
For safety reasons, carry out a cycle on STEP mode at a speed of 10%, in order to check the new orders set in.

Before each direct positionning, the following program lines have to be written, for each position number.

Ex.: P 60 = n. (1°) position  P 60 = n (2°) position
P 40 = .................    P 40 = .................
P 41 = .................    P 41 = .................
P 42 = .................    P 42 = .................
X = P40        Y = P42    X = P40        Y = P42
Z = P41        Z = P41
USING AUX FUNCTIONS DURING SELF-TEACHING

AUX(M)
F5

If, when getting the values, you need to carry out a pneumatic movement (overturning, tilting, vacuum etc) go back to the self-teaching menu, press F5 Aux (M) and set/reset the desired M function.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
</tbody>
</table>

After having executed the desired function, go back to the previous menu to move the axes.
3-DATA INPUT

PASSWORD

PASSW.

F4

In order to gain access to programming, three types of password are needed.

The first password is used to enter and modify programs, speed, waiting times: this password cannot be modified and is only accessible to Sytrama's authorized personnel.

The second password is used to enter and modify the machine datas; this password cannot be modified and is only accessible to Sytrama's authorized personnel.

The third password is used to enter and modify programs, speed, waiting times; this password can be modify.

In order to modify the password, from the main menu, press as it follows:

-digit the softkey >
-digit the softkey F1 CNG prg
-digit the softkey F4 PASSW
-set the old password in
-set the new password in
-digit the softkey F5 STORE
SELECTION OF THE PROGRAM TO EXECUTE

CHANGE
F1

EDIT
W/ROBOT
AUTO
JOG
DIAGN

> 

CHANGE
W/ROBOT
AUTO
SPEED+
SPEED-

- From the main menu digit F1 Edit; the programs menu is then visualized.
- Digit the softkey >
- Digiting the F1 CHANGE softkey it is possible to select a program existing in the programs Menu and execute it. The access to the Programs Menu is only possible if the work program is NOT in execution.

PROGRAMS MENU

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>50</td>
</tr>
<tr>
<td>002</td>
<td>78</td>
</tr>
<tr>
<td>039</td>
<td>86</td>
</tr>
<tr>
<td>129</td>
<td>15</td>
</tr>
<tr>
<td>390</td>
<td>63</td>
</tr>
<tr>
<td>999</td>
<td>58</td>
</tr>
</tbody>
</table>

STORE | SELECT | PASSW |
F1   | F2     | F3    |
F4   | F5     |

The work program can be selected in two different ways:
1) F1 STORE - select the program by means of the arrows
   - digit the F1 STORE softkey. The selected program can then be executed
2) F2 SELECT - digit the softkey F2 SELECT
   - the page MENU PROGRAM CHANGE is visualized

MENU PROGRAM CHANGE

Launch Program No. = 0

- Set the number of desired program by means of the numerical softkeys
- Digit the F5STORE softkey. The selected program is now ready to be executed.
COPY OF A PROGRAM

COPY
F2

Digiting the COPY softkey it is possible to copy a program.

- From the main menu, digit the F1 EDIT softkey and the programs menu is visualized.
- Digit the F2 COPY softkey and the following message appears:
  Copy program No. = ...........

- Set the number of the source program.
- Digit the F5 STORE softkey and the following message appears:
  In the program number = .............

- Set the number of the new program.
- Digit the F5 STORE softkey and the page of the programs menu appears; the program that has just been stored is positioned at the bottom of the programs already stored.

CREATION OF A NEW PROGRAM

NEW
F3

- From the main menu, digit the F1 EDIT softkey and the programs menu appears.
- Digit the F3 NEW softkey and the following message appears: Number to be jointed?
- Set the number of the new program (from 0 to 9999)
- Digit the F5 STORE softkey and the page of edit of the program that has just been created appears, which contains 20 empty lines; when leaving this page, the unused final lines will be deleted.
DELETING A PROGRAM

DELET
F4

- From the main menu digit the F1 EDIT softkey and the program menu appears.
- Select with the arrows the program to be deleted
- Digit the F4 DELETE softkey and the menu of program deleting appears as well as the message: CONFIRM DELETE PROGRAM No…

You then have two chances:
1) You want to delete the program:
   Digit F1 softkey YES
   The message DELETING ON appears; this message will disappear automatically after a few seconds.
   The system will move back to the programs menu. The cursor sets itself on the program that was in execution.

2) With the F2 ESCAPE softkey, you go back to the programs menu.
   Note: It is not possible to delete the program in execution.
CREATION OF A SUB-ROUTINE

The sub-routine program has to include function M38 (written in the first line) and function M39 (written in the last line), while in the Main Menu it is necessary to recall the subroutine to the involved line.

Example. 25 Jump subroutine N°…….(number of program in the subroutine); see also Chapter Parameter Edit Menu paragraph “Conditional and Absolute Jump of program (CMF+JMP).

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
</tbody>
</table>

-The Menu program is visualized
-Digit the NEW F3 Softkey
-The message “Number to join?” is visualized
-Set the number of the new Program (from 0 to 9999)
-Digit Softkey F5 STORE
-The Edit page of the just created program automatically appears and it contains 20 empty lines; leaving this page, the final lines that were not used, are deleted.
MEMORY INFORMATION

INFOMEM
F1

EDIT         W/ROBOT   AUTO   JOG   DIAGN
            EDIT         COPY   NEW   DELETE   PRINT >
            EDIT         CYCLE   PALLET   DIRECT   AUX(M)
>            INFOMEM     DAT I/O

- From the main menu digit the F1 EDIT softkey and the programs menu appears.
- Digit the button >.
- Digit the F1 INFOMEM softkey.

MACHINE DATAS

MAC.DAT
F5

EDIT         W/ROBOT   AUTO   JOG   DIAGN
            >
            INFOMEM     DAT I/O
Press any key to continue

Digiting the softkey F5 MAC.DAT, you enter the page of machine datas; after digiting the password the modification (and its storing) of the data only takes place after switching off and on the main switch of the electric cabinet except for the software limit switched, whose acquiring is immediate.
4-PROGRAM MODIFICATION

VISUALIZATION OF PROGRAM LIST

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
</table>

Digiting the **F1 EDIT** softkey, in the main menu, the programs menu is visualized.
- **Number**: it shows the program number.
- **Length**: it shows the number of lines used in each program.

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>50</td>
</tr>
<tr>
<td>002</td>
<td>78</td>
</tr>
<tr>
<td>039</td>
<td>86</td>
</tr>
<tr>
<td>129</td>
<td>15</td>
</tr>
<tr>
<td>390</td>
<td>63</td>
</tr>
<tr>
<td>999</td>
<td>58</td>
</tr>
</tbody>
</table>

VISUALIZATION OF A PROGRAM

- From the main menu digit the **F1 EDIT** softkey and the programs menu appears.
- With the arrows move the cursor to the program number to be visualized.
- Digiting the softkey **F1 EDIT** the list of the instructions of the chosen program appears.

**WARNING**: when leaving this menu, the number of the highlighted program becomes the present one.
INSERTING A LINE OF A PROGRAM

**INSERT**

**F1**

This function is used to insert a new line inside a program. All the lines following to the one that has been chosen will move downward of one line consequently changing its number (ex. line 10 becomes line 11); the destination of program jumps is also modified.

To get to the softkey **F1 INSERT**, starting from the main menu, press the following:

Note: before digiting the softkey **F1 INSERT**, select the program line to be modified.

- Digit the softkey **F1 INSERT**
- A new empty line will be automatically inserted.

DELETING A LINE OF PROGRAM

**DELETE**

**F2**

This function is used to delete a line of program.

- Select the required line by means of the cursor.
- Digit the softkey >
- Digit the softkey **F2 DELETE**
- The following message appears: DO YOU CONFIRM DELETING THE LINE?
- Digit the F2 ESCAPE softkey if you do not want to cancel it
- Digit the F1 YES softkey to cancel the line.
PARTIAL DELETING A LINE OF PROGRAM

CLEAR
F4

This function is used to set to zero the value of an axis or a function in a certain line of the program.

- Select by means of the arrows keys the chosen line.
- Digit the softkey >
- Digit the softkey **F4 CLEAR**.
- Select the axis or function that you want to delete from the line by means of the softkeys.

- Digiting the chosen softkey, the parameter of the axis or the function will be cancelled from the chosen line.
SETTING AXES SPEED/ACCELERATION

In this menu the special functions on the axis of speed, acceleration.
If not programmed, speed and acceleration will show the maximum value set in the machine-datas.
Digit the softkey F5 F.AXIS

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX(M)</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
</tbody>
</table>

AXIS FUNCTIONS EDIT MENU

<table>
<thead>
<tr>
<th>AXIS</th>
<th>Speed</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>Z</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>X</td>
<td>=</td>
<td>=</td>
</tr>
</tbody>
</table>

Select requested axis

SPEED | ACCEL | ADVANCE | D.R.P. | DISABLE

F1 | F2 | F3 | F4 | F5

Short description of the softkeys:

F1 SPEED Setting axis speed, expressed in dm/s
F2 ACCEL Setting axis acceleration expressed in dm/s²
SETTING AXES SPEED

SPEED
F1

Selecting the softkey **F1 SPEED** it is possible to set the speed of the axis.
The speed can be modified in the program every time it is necessary and is valid for each single axis. Anyway the programmed speed can be changed in percentage by means of the softkeys SPEED+ and SPEED- from 0 % to 100 %.
The position 100% corresponds to the programmed speed.
-To get to **F1 SPEED** softkey, from the main menu, press as it follows.
Note: before digiting the softkey F1SPEED, select the program line to be modified.

```
<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>SPEED</td>
<td>ACCEL</td>
<td>ADVANCE</td>
<td>D.R.P.</td>
<td>DISABLE</td>
</tr>
</tbody>
</table>
```

- By means of the arrows keys, select the axis in which it is requested to program the speed.
- Digit the softkey **F1 SPEED**; on the right the maximum value is shown.
- Set the requested speed in dm/s by means of the numerical keys.
- Digit the softkey F5 STORE
**SETTING AXES ACCELERATION**

**ACCEL F2**

The function F2 ACCEL determines the acceleration of the axis. The acceleration can be modified in the program only when the axis is stopped.

-To get to **F2 ACCEL** softkey, from the main menu, press as it follows.

Note: before digitig the softkey F2ACCEL, select the program line to be modified.

-By means of the arrows select the axis in which it is necessary to program the acceleration value.
-Digit the softkey **F2 ACCEL**; on the right the maximum value is shown.
-Set the required acceleration value in dm/s² by means of the numerical keys.
-Digit the softkey F5 STORE.

Note: in automatic mode, it is possible to modify the axes speed and acceleration.
SETTING A PARAMETER

Specific parameters can be set in the program so that the operations of program modifications are quick and easy (see “P” PARAMETERS"LIST) :
The P Parameter is composed of the letter P plus a number of two digits maximum (ex.P31).60 parameters maximum can be used; a numeric value is assigned to each parameter. The parameters can be used by the user for any operation that might be necessary when executing a work cycle (palletizing, rejects counting, daily cycles counting etc).
To get to the F2 PARAM softkey, from the main menu, press as it follows:

- digit the F2PARAM softkey the parameters edit menu is visualized
- digit the softkey F1 LOAD
  (this function is used to load either a value or another P parameter in a P parameter)
- with the numerical softkeys set the number of the parameter
- digit the softkey F5STORE and the following window will appear:

Note : loading a negative number in a parameter occupies both auxiliaries available for each line.

Parameters edit menu

<table>
<thead>
<tr>
<th>VALUE</th>
<th>PARAMET</th>
<th></th>
</tr>
</thead>
</table>

F1    F2    F3    F4    F5

Now execute the desired function by means of the procedures in the following pages
LOADING A VALUE IN A PARAMETER

In P parameter a constant is loaded

<table>
<thead>
<tr>
<th>EDIT</th>
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<tr>
<td>EDIT</td>
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<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>LOAD</td>
<td>ADD</td>
<td>INC</td>
<td>DEC</td>
<td>CMP+JMP</td>
</tr>
<tr>
<td>VALUE</td>
<td>PARAMET</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-Digit **F1 VALUE**
-Set the value of the constant
-Digit the F5 STORE softkey.
-The parameter and the value of the constant in the line of program that has been previously selected will be stored in memory

**EXAMPLE:**
Loading the constant of a parameter:

P31=K150

The constant (K150) is written in parameter P31 (K= constant, 150= value of the constant). K150 can be a number to be used to execute a mathematical operation or the value of an axis.

**NOTE:** it is not possible to visualize the loading of a parameter with a negative value; the subtraction between two values is used (P31=K-150 P31=K0-K150) but this occupies both auxiliary functions available for each line. It is advisable to store one parameter only for each line, even if it is a positive one.
LOADING THE CONTENT OF A PARAMETER IN ANOTHER PARAMETER

PARAMET
F2

- Digit the **F2 PARAMET**
- Set the number of parameter from which the value to be stored in the first parameter will be taken.
- Digit the F5 STORE softkey

Example  
P31=P35 The content of the parameter P31 takes the value of the content of the parameter P35.
SETTING A PARAMETERED AXIS

Specific parameters can be inserted in the program so that the operations of program modifications are quick and easy (see "P" PARAMETERS LIST).
The P parameter is composed of the letter P plus a number of two digits maximum (ex. P31).
60 parameters maximum can be utilized.
To each parameter a numeric value is assigned.
To get to the F2 PARAM softkey, from the main menu, press as it follows.
Note: before pressing the F2 PARAM softkey, the axis to be modified must be selected.

<table>
<thead>
<tr>
<th>EDIT</th>
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<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
<tr>
<td></td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>TEACH</td>
<td>PARAMET</td>
<td>DISA.AX</td>
<td>VALUE</td>
<td></td>
</tr>
</tbody>
</table>

-Digit the F2 PARAMET, in the field "PROGRAMMED POS." the following will appear: "PARAMETER : 0".

-By means of the numeric keys assign chosen parameter number (from 0 to 60).
-In case of a mistake in digitising the number of parameter, delete the wrong number by means of the cursor.
-Digit the F5 STORE softkey if the parameter has been correctly set.

If that particular line of program already contains a value or a parameter related to the chosen axis, the following message will appear:

PROGRAMMING ALREADY EXISTING, DO YOU WANT TO DELETE IT?

<table>
<thead>
<tr>
<th>YES</th>
<th>ESCAPE</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>F3</td>
<td>F4</td>
<td>F5</td>
</tr>
</tbody>
</table>

Digit the F1 YES softkey if the old content must be replaced with the new one.
Digit the F2 ESCAPE softkey if you do not want to store it in memory.

Note: in automatic mode it is possible to modify the positions of the axis 1 mm at a time.
SETTING AN AXIS WITH DIRECT VALUE

This softkey allows to set the dimension value of an axis.

NOTE: after pushing the AXIS softkey and before pushing the VALUE softkey the axis to be modified must be selected
- By means of the arrows keys select the axis whose value has to be modified.
- Digit the F4 VALUE softkey.
- Set the new value by means of the numeric keyboard
- Digit the F5 STORE softkey.
- The value of the parameter will be automatically stored.

Should the line of program already contain a value or a parameter, the following message will appear:

PROGRAMMING ALREADY EXISTING, DO YOU WANT TO DELETE IT?

Digit the F1 YES softkey if the old content must be replaced with the new one.
Digit the F2 ESCAPE softkey if you do not want to store it in memory.

Note: in automatic mode it is possible to modify the positions of the axis 1 mm at a time.
SETTING AUXILIARY FUNCTIONS

AUX
F3

In this menu all the auxiliary functions used by the program are visualized. In one line two auxiliary functions can be programmed and their execution takes place during the axis movement (if programmed in the same line).

To get to the F3 AUX softkey, from the main menu, press as it follows.
Note: before digiting the F3 AUX softkey, select the line of program to be modified.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
</tbody>
</table>

Digiting the softkey **F3 AUX**, the AUXILIARIES EDIT MENU is shown with the two standard pages available.
- The AUXILIARIES EDIT MENU appears (first page)

<table>
<thead>
<tr>
<th>Auxiliaries Edit Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE FIRST PAGE AUXILIARIES CHAPTER 8</td>
</tr>
<tr>
<td>CHART AUXILIARY FUNCTIONS</td>
</tr>
<tr>
<td>OTHERS (M)</td>
</tr>
<tr>
<td>F1</td>
</tr>
</tbody>
</table>

- Digit **F1 OTHERS** to select the second page Auxiliaries
- The AUXILIARIES EDIT MENU appears (second page)

<table>
<thead>
<tr>
<th>Auxiliaries Edit Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEE SECOND PAGE AUXILIARIES CHAPTER 8</td>
</tr>
<tr>
<td>CHART AUXILIARY FUNCTIONS</td>
</tr>
<tr>
<td>OTHERS (M)</td>
</tr>
<tr>
<td>F1</td>
</tr>
</tbody>
</table>

- By means of the arrows keys, select the requested function.
- Digit the F5 STORE softkey.
NOTE: two functions can be programmed on the same line. If you try and input a third function, a submenu appears giving the chance to eliminate one of the two functions previous programmed (F1 F2) or both (F3).
SETTING ROBOT CONTROLS AND PERMITS FUNCTIONS

PERMITS
F2

All the functions regarding the controls and the consents necessary for the Manipulator to work safely will appear.
To get to the F2 PERMITS softkey, from the main menu, press as it follows.
Note: before digiting the F2 PERMITS softkey, select the line to be modified.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>OTHERS</td>
<td>PERMITS</td>
<td>WAIT</td>
<td>DELETE</td>
<td>STORE</td>
</tr>
</tbody>
</table>

- By means of the arrows keys, position the cursor on the requested function.
- Digit the softkey F5 STORE

MENU EDIT PERMITS

SEE PAGE CONTROLS/PERMITS CHAPTER 8
CHART M AUXILIARY FUNCTIONS

F1   F2   F3   F4   F5
SETTING WAITING TIME ON AN INPUT OR DELAY TIME

To get to the F3 WAITING softkey, from the main menu, press as it follows.
Note: before digiting the F3 WAITING softkey, select the line to be modified.

Digiting the **F3 WAITING** softkey, the Waiting Edit Menu appears.
In this menu, it is possible to select two types of waiting:
1-Waiting for entry ON (1) or OFF (0)
2-Waiting for delay time.

**Waiting Edit Menu**

- **WAIT IF INPUT ?......**
- **WAIT FOR TENTHS ?......**

**WAITING INPUT**

This function allows to wait for an entry to be ON or OFF before going ahead with the program.
- Select the function **WAIT IF INPUT?** by means of the arrows.
- Set the number of entry
- Select the state of the entry (ON or OFF)
- Digit the softkey F5 STORE

**WAITING FOR TENTHS OF SECOND**

This type of waiting allows to delay the execution of the program line following to the one in which the waiting has been set. The program cycle has been delayed for the number of tenths that has been set.
- Select **WAITING FOR TENTHS** by means of the arrows
- Set the number of tenths of second (from 0 to 999).
- Digit the softkey F5 STORE.

Note: in automatic mode it is possible to modify the waiting times.
SETTING OUTPUT CONTROL

OUTPUT F1

To get to the F1 OUTPUT softkey, from the main menu, press as it follows. This menu allows to control a selected output (On activated, OFF disactivated). Note: before digiting the F1OUTPUT softkey, select the line ot be modified.

- Digit the softkey F1 OUTPUT and the Outputs Control Menu will appear.

Outputs Forcing Menu

FORCING OUTPUT NUMBER =...... ON
OFF

- Set the number of output
- Digit the F5 STORE softkey.
- Select ON to activate the output or OFF to disactivate the output.
- Digit the F5 STORE softkey.
SETTING PERIPHERALS

PERIPHER

F2

The functions regarding controls and start of the peripherals are shown here. To get to the F2 PERIPHER softkey, from the main menu, press as it follows. Note: before digiting the F2 PERIPHER softkey, select the program line to be modified.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
</tbody>
</table>

Digiting the softkey F2 PERIPHER the peripherals edit menu will appear:

Peripherals Edit Menu

SEE PAGE PERIPHERALS CHAPTER 8
CHART M AUXILIARY FUNCTIONS

<table>
<thead>
<tr>
<th></th>
<th>DELETE</th>
<th>STORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>F2</td>
<td>F3</td>
</tr>
</tbody>
</table>

- Select the chosen function by means of the arrows keys.
- Digit the F5 STORE softkey.
- The value will be automatically stored in the pre-selected program line.

NOTE: for the function M49 also set the length of advancing of the belt.
5-PROGRAM MODIFICATION (SPECIAL FUNCTIONS)

SETTING ADVANCES SIGNAL AXIS IN POSITION

ADVANCE F3

To get to the F3 ADVANCE softkey, from the main menu, press as it follows.
Note: before digitizing the F3ADVANCE softkey, select the program line to be modified.

```
<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>SPEED</td>
<td>ACCEL</td>
<td>ADVANCE</td>
<td>D.R.P.</td>
<td>DISABLE</td>
</tr>
</tbody>
</table>
```

Digiting the **F3 ADVANCE** softkey, the Axis Functions Edit menu is visualized.
The advance is the distance from the arrival point of the axis. When all programmed axis in a line enter the window determined by the active advance, the control executes then the following line; the axis reach their destination anyhow.

```
Axis Functions Edit Menu

ADVANCE SELECTION

<table>
<thead>
<tr>
<th>MODAL 1</th>
<th>MODAL 2</th>
<th>FREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>=300</td>
<td>=100</td>
<td>=......</td>
</tr>
<tr>
<td>1/10 mm</td>
<td>1/10 mm</td>
<td>1/10 mm</td>
</tr>
</tbody>
</table>

All the advances are active from the line following the control one except for off.
Select desired advance

<table>
<thead>
<tr>
<th>OFF</th>
<th>MODAL 1</th>
<th>MODAL 2</th>
<th>FREE</th>
<th>DELETE</th>
</tr>
</thead>
</table>

F1 F2 F3 F4 F5

OFF: Disables the advance previously set; it is active from the line on which it has been programmed

MODAL 1: This type of advance is active from the line following to the one in which it is programmed; its value is determined in the machine-datas.

MODAL 2: Like modal 1 but with a different value.

FREE: The free advance can be changed every time it is programmed with the limit established by the machine-datas.

DELETE: Delete the setting that has already been stored.
- Digit the softkey **F3 ADVANCE**
- Select the requested type of advance.
- If a Modal 1 or 2 or OFF advance is set (digiting the softkey F2 OR F2 or F1), the function will be automatically stored in the pre-selected line.
- If the F4 FREE advance is selected, set the advance value of the axis expressed in tenths of millimeter and digit the F5 STORE softkey.

### DELETING RESIDUAL PATH

#### D.R.P.

F4

Delete the Residual Path.

This function is used not to finish the path when the specified entry is high or low and it is executed on all the axis.

Example: the axis must move from A to B.

```
A_________C_________B
```

If during the movement of the axis from A to B, the C entry changes its status (high or low), the axis stops its run and executes the following program line without finishing the established path (from C to B). To get to the **F4 D.R.P.** from the main menu, press as it follows. Note: before digiting the **F4 D.R.P.** softkey, select the program line to modify.

```
EDIT W/ROBOT AUTO JOG DIAGN
EDIT COPY NEW DELETE PRINT >
EDIT CYCLE PALLET DIRECT AUX (M)
AXIS PARAM AUX CMP+JMP F.AXIS
SPEED ACCEL ADVANCE D.R.P. DISABLE
```

- Digit the softkey **F4 D.R.P.**
- The following page appears:

### Axis Functions Edit Menu

Choosing to cancel the residual path

Input Number: 0

- Set the requested number of entry
- Digit the F5 STORE softkey.
- Set by means of the softkey F1 ON or F2 OFF the status of the pre-selected entry that will delete the residual path.
- The chosen setting will be automatically stored in memory.
ADD PARAMETERS AND/OR CONSTANTS

ADD
F2

This function is used to add up two parameters or two constants or one constant + one parameter. This operation occupies both auxiliaries available for each line.
To get to the **F2 ADD** softkey, from the main menu, press as it follows.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT &gt;</td>
</tr>
<tr>
<td>EDIT</td>
<td>CYCLE</td>
<td>PALLET</td>
<td>DIRECT</td>
<td>AUX (M)</td>
</tr>
<tr>
<td>AXIS</td>
<td>PARAM</td>
<td>AUX</td>
<td>CMP+JMP</td>
<td>F.AXIS</td>
</tr>
<tr>
<td>LOAD</td>
<td>ADD</td>
<td>INC</td>
<td>DEC</td>
<td>CMP+JMP</td>
</tr>
</tbody>
</table>

-Digit the softkey **F2 ADD**, and the page in which to set the addition to be executed will be shown and the cursor will be positioned on the first operandum.

<table>
<thead>
<tr>
<th>Parameters Edit Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sum</strong></td>
</tr>
<tr>
<td>(ex.1)</td>
</tr>
<tr>
<td>FIRST OPERATING</td>
</tr>
<tr>
<td>:P10</td>
</tr>
<tr>
<td>SECOND OPERATING</td>
</tr>
<tr>
<td>:P11</td>
</tr>
<tr>
<td>RESULT</td>
</tr>
<tr>
<td>:P31</td>
</tr>
<tr>
<td>STORE ?</td>
</tr>
<tr>
<td>CONST</td>
</tr>
<tr>
<td>F1</td>
</tr>
<tr>
<td>F2</td>
</tr>
<tr>
<td>F3</td>
</tr>
<tr>
<td>F4</td>
</tr>
<tr>
<td>F5</td>
</tr>
</tbody>
</table>

Example 1 $P31 = P10 + P11$: add up two parameters $P10$ and $P11$ with result on the parameter $P31$.
Example 2: $P10 = P10 + K325$ :add up the constant 325 with the parameter $P10$ with result on the parameter $P10$.

-The softkey F1 CONST has a double function. Alternatively digiting it ,it allows the selection of K constant or P parameter.
-Set the number of P parameter or K constant by means of the numerical keys
-Position the cursor on the second operandum and set it.
-Position the cursor on Result and set the parameter on which the result must be written
-By means of the arrows, position the cursor on **store?**
-Digit the F5 STORE softkey.
# INCREASE AND DECREASE OF A PARAMETER

<table>
<thead>
<tr>
<th>INCREASE</th>
<th>DECREASE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F3</strong></td>
<td><strong>F4</strong></td>
</tr>
</tbody>
</table>

This function is used to increase or decrease of one unit the value contained in a parameter.

To get to the F3/F4 INCREASE/DECREASE softkeys, from main menu, press as it follows.

```
EDIT  W/ROBOT  AUTO  JOG  DIAGN
EDIT  COPY     NEW       DELETE  PRINT  >
EDIT  CYCLE    PALLET   DIRECT  AUX (M)  
AXIS  PARAM    AUX     CMP+JMP  F.AXIS
LOAD  ADD      INC      DEC     CMP+JMP
```

- Digit the softkey **F3 INCREASE** or **F4 DECREASE**
- By means of the numerical keys, set the number of P parameter (from 0 to 60), whose value must be increased or decreased.
- Digit the F5 STORE softkey.
COMPARISON AND JUMP BETWEEN PARAMETERS

CMP - This function is used to compare two parameter and on the ground of the result, execute the program jump backward or forward.

JMP - The jump in program can either be absolute or conditional.

The function of comparison between parameters occupies both auxiliaries available for each line.

To get to the F5 CMP+JMP softkey, from the main menu, press as it follows.

- Digit the softkey F5 CMP+JMP and the page of comparison and jump in program is visualized.

Compare / Jump

Absolute jump to line....... Subr.......  
If P....... > P....... JUMP to line......  
  >=  
  <  
  <=  
  <>  
If input ON JUMP to line.....  
  OFF

STORE

F1 F2 F3 F4 F5

- Set the value of parameters and the line of destination of the jump by means of the numerical keys. Move the cursor on the required function by means of the cursor arrows.
- Digit the F1 STORE softkey.
SUBTRACTION OF PARAMETERS AND/OR CONSTANTS

SUB
F2

This function is used to execute a subtraction between two parameters or two constants or between a constant and a parameter. This operation occupies both auxiliaries available for each line.

- Digit the softkey F2 SUBTR
- A page appears where it is possible to set the subtraction by means of the cursor, which must be positioned on the first operandum.

Example 1: P31 = P10(P11 : subtraction between the parameters P10 and P11 with result on the parameter P31.
Example 2: P10 = P10 - K325 : subtraction of the constant 325 from the parameter P10 with result on the parameter P10.

- The softkey F1 CONST has a double function. Alternatively digiting it, it is possible to select the K constant or the P parameter.
- By means of the numerical keys, set the number of P parameter or of K constant.
- By means of the arrows keys, position the cursor on the second operandum and set it.
- By means of the arrows, position the cursor on Result and set the number of parameter on which the result has to be loaded
- Position the cursor on STORE?
- Digit the F5 STORE softkey.
6-DIAGNOS VISUALIZATION

VISUALIZATION OF THE MACHINE PARAMETERS VALUES

- Digit the F5 DIAGN softkey
- Digit the F1 VALU P. softkey.
- The pages of the P parameters from number 0 to number 60, divided in 4 pages that can be selected on rotation will appear.
- To visualize the next page digit the F5 DIAGN softkey and then once again the F1 VALU P. softkey.

MAIN MENU
Parameters values

| P0= 0000 | P8= 0000 |
| P1= 0000 | P9= 0000 |
| P2= 0000 | P10= 0000 |
| P3= 0000 | P11= 0000 |
| P4= 0000 | P12= 0000 |
| P5= 0000 | P13= 0000 |
| P6= 0000 | P14= 0000 |
| P7= 0000 | P15= 0000 |

EDIT  W/ROBOT  AUTO  JOG  DIAGN

VALU P.  PLC PRO  ACT LIN.  AXIS  MESSAGES
VISUALIZATION OF SOME ELEMENTS OF THE PLC AND ROBOT CYCLE TIMES

This softkeys has three functions: digiting it once, the menu showing the status of inputs/outputs of the Plc appears. Digiting it once more, the status of execution of the CN and the cycle times appear. Digiting it for the third time, the execution status of the interface robot/imm interface will appear.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALU P.</td>
<td>PLC PRO</td>
<td>ACT LIN.</td>
<td>AXIS</td>
<td>MESSAGES</td>
</tr>
</tbody>
</table>

STATUS PLC INPUTS AND OUTPUTS
- Digit the **F2 PLC PRO** softkey.
- The menu inputs and outputs of the PLC appears; it is then possible to check on their present status. (0=OFF ;1=ON).

**I** = INPUTS  
**O** = OUTPUTS

<table>
<thead>
<tr>
<th>MAIN MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS PLC</td>
</tr>
<tr>
<td>I64</td>
</tr>
<tr>
<td>01234567</td>
</tr>
<tr>
<td>01100111</td>
</tr>
<tr>
<td>O 128</td>
</tr>
<tr>
<td>01234567</td>
</tr>
<tr>
<td>00000011</td>
</tr>
</tbody>
</table>

Example: In order to verify the input I 65, please examine byte I 64 and the upper number “1”.

\[(I64)\]  
\[(I65)\]  
\[(I66)\]  
\[(I67)\]

0 1 2 3
0 1 1 0

The bit going from 0 to 7 are the corresponding in- and outputs. The numbers below indicate the corresponding status.

Note: In case the I/O expansion module is present, pressing once more the F2 PLC PRO, the state of the new input/output is visualized.
NC EXECUTION STATUS

Digiting the **F2 PLC PRO** twice, the status of execution of the Numerical Control appears; it is then possible to check if a value or a function have been executed in the present line of program. It is also visualized the logical status of the BYTE selected in the FORCING menu.

### MAIN MENU

<table>
<thead>
<tr>
<th>Status of execution</th>
<th>Waiting start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y axis =0</td>
<td>(1=executed)</td>
</tr>
<tr>
<td>Z axis =0</td>
<td></td>
</tr>
<tr>
<td>X axis =0</td>
<td></td>
</tr>
<tr>
<td>Funct.1 =0</td>
<td></td>
</tr>
<tr>
<td>Funct.2 =0</td>
<td></td>
</tr>
<tr>
<td>Time out =0</td>
<td></td>
</tr>
</tbody>
</table>

**Byte xx =00000000**

### VISUALIZATION OF THE ROBOT CYCLE TIME

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PLC PRO</td>
<td>ACT. LINE</td>
<td>AXIS</td>
<td>MESSAGES</td>
</tr>
</tbody>
</table>

- Digit the soft-key F5 **DIAGNOSIS**
- Digiting twice the softkey **F2 PLC PRO** the following will be visualised:

**Total time:** in order to verify the total cycle time both of the robot and of the IMM

**Robot time:** in order to verify the cycle regarding the robot only (waiting time of the open IMM excluded)

**Picking-up time:** in order to verify the cycle regarding the in- and output of the robot.

The time starts from the opening of the IMM up to when the allowance for the closing of the IMM is given.

### MAIN MENU

<table>
<thead>
<tr>
<th></th>
<th>00:00:0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total time</td>
<td></td>
</tr>
<tr>
<td>Robot time</td>
<td></td>
</tr>
<tr>
<td>Picking-up time</td>
<td></td>
</tr>
</tbody>
</table>
Digitizing for the third time the F2 PLC PRO Softkey, the execution status of the signals between IMM and robot appears; where it is possible to check the present status of the same (0 = OFF; 1 = ON)

<table>
<thead>
<tr>
<th>MAIN MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Status</td>
</tr>
<tr>
<td>AUTOMATIC.</td>
</tr>
<tr>
<td>GATE</td>
</tr>
<tr>
<td>OPEN IMM</td>
</tr>
<tr>
<td>CLOSED IMM</td>
</tr>
<tr>
<td>FORWARD EJECT.</td>
</tr>
<tr>
<td>BACKWARD EJECT.</td>
</tr>
<tr>
<td>QUALITY CONTROL</td>
</tr>
</tbody>
</table>
**VISUALIZATION OF PRESENT BLOCK**

**PR. LINE**

F3

Digiting the F3 PR.BLOCK softkey, the block that is under execution is shown.

```
<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALU P.</td>
<td>PLC PRO</td>
<td>PR. LINE</td>
<td>AXIS</td>
<td>MESSAGES</td>
</tr>
</tbody>
</table>
```

**VISUALIZATION OF AXIS POSITION**

**AXIS**

F4

Digiting the softkey F4 AXIS, the page showing the position of the axis appears; it shows both the present position of the axis and their programmed position.

```
<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALU P.</td>
<td>PLC PRO</td>
<td>PR. LINE</td>
<td>AXIS</td>
<td>MESSAGES</td>
</tr>
</tbody>
</table>
```

**MAIN MENU**

**AXIS POSITION**

<table>
<thead>
<tr>
<th>Present</th>
<th>Programmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>Y 0.0</td>
</tr>
<tr>
<td>0.0</td>
<td>Z 0.0</td>
</tr>
<tr>
<td>0.0</td>
<td>X 0.0</td>
</tr>
</tbody>
</table>

Present position

Programmed pos.

In this field, the present position of each axis appears.

In this field, the programmed position appears.
VISUALIZATION OF A LINE OF THE PROGRAM IN COMPLETE MODE

**ZOOM F3**

The display allows to visualize max 40 characters per line so that those exceeding this number will not be shown.

Digiting the F3 ZOOM softkey, the selected line will be displayed in complete mode.
7-DATA TRANSFER

PC, BACK UP, PRINTER

DATA I/O

F2

In order to get access to the data transfer menu starting from the main menu, press in sequence:

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFOME</td>
<td>I/O DAT.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROGRAMS</th>
<th>MACHINE DATAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELETE</td>
<td></td>
</tr>
<tr>
<td>CN &gt; PC</td>
<td>PC &gt; CN</td>
</tr>
<tr>
<td>CN &gt; PC</td>
<td>PC &gt; CN</td>
</tr>
</tbody>
</table>

PROGRAMS:

DELETE= Use this instruction to delete a program on a floppy disk (PC)
- Push F1 DELETE, the message DELETE PROGRAM N..... appears
- Set the program number to be deleted
- Push F5 STORE to confirm the selected program deleting

CN > PC= Use this instruction to transfer the program shown from TME keyboard (CN) to the floppy disk (PC)
- Select the program number to be transferred
- Push F2 CN > PC to activate the transfer

PC > CN= Use this instruction to transfer a program from the floppy disk (PC) to the TME keyboard (CN).
- Push F3 PC > CN, the message LOAD PROGRAM N.... appears
- Set the program number to be transferred
- Push F5 STORE to confirm the loading

MACHINE DATAS

CN > PC= Use this instruction to transfer the machine datas from the TME keyboard (CN) to the floppy disk (PC)
- Push F4 CN > PC to activate the transfer.

PC > CN= Use this instruction to transfer the machine datas from a floppy disk (PC) to the TME keyboard (CN).
- Push F5 PC > CN to activate the transfer
WARNING: with this instruction the datas contained in the CN are overwritten.
After having given this instruction it is necessary to switch off and re-start the CN.
In order to get access to the print menu starting from the main menu, press in sequence:

<table>
<thead>
<tr>
<th>EDIT</th>
<th>INSERT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDIT</td>
<td>COPY</td>
<td>NEW</td>
<td>DELETE</td>
<td>PRINT</td>
</tr>
</tbody>
</table>

Select the data to be printed by means of the softkeys:

F1  SHOWN PROGRAM
F2  ALL PROGRAMS IN MEMORY
F3  MACHINE DATAS
F4  VALUE CONTAINED IN THE PARAMETERS.
F5  TIMER

Prepare the PRINTER and push a button.
Pushing the button F5 it is possible to modify the wait timer for the printer carriage return in order to adapt the TME keyboard to any other printer.
The timer value is quantified in tenths of seconds.
E.g.: Print timer: 12= 1.2 secs
Set the new value by means of the numerical buttons, push again the button F5 to store or ^ to escape without modification of the Timer value.

**CONNECTION PC/ BACK-UP MODULE / PRINTER**

Cable for the connection of the PC/BACK-UP MODULE / PRINTER to the electrical cabinet.
connector
9 poles
female

<table>
<thead>
<tr>
<th>ELECTRIC CABINET</th>
<th>3</th>
<th>(RX)------------- (TX)</th>
<th>PRINTER OR BACK-UP UNIT OR PC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>(TX)------------- (RX)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>(GND)---------- (GND)</td>
<td></td>
</tr>
</tbody>
</table>

**PRINTER CONFIGURATION**

It is possible to print the data contained in the memory by means of a printer equipped with a serial outgoing RS-232.

Configuration of the printer:

<table>
<thead>
<tr>
<th>SERIAL OUTGOING</th>
<th>RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAUD RATE</td>
<td>9600</td>
</tr>
<tr>
<td>WORD LENGTH</td>
<td>8 (Data bit)</td>
</tr>
<tr>
<td>PARITY</td>
<td>NO</td>
</tr>
<tr>
<td>STOP BIT</td>
<td>1</td>
</tr>
</tbody>
</table>
8-GENERAL NOTES, EXAMPLES, CHARTS

REMARKS ON HOW TO PROGRAM THE T.M.E. KEYBOARD

The elements of the PLC are organized in a matrix composed of lines to be executed and operations to be carried out.
- The lines to be executed are 900 (500 for the 5 axis version) and they can be divided in a maximum number of 40 programs of variable length
- The operations that can be carried out for each program line are divided in two groups:
  1. axis control
  2. functions execution (mathematical, wait, jumps, controls.)

1. AXIS CONTROL

Each line can handle 3 axis (or 5 for the 5 axis version) and for each axis it is possible to choose the operation to be executed (destination, speed, acceleration) and with which value.

The destination can be loaded with a direct value or through a supporting parameter.

WARNING: loading the accelerations must only be done when the axis is stopped.
On each axis an ADVANCE can be executed so that the following line of the program can be executed while the axis are approaching their destination (they will reach it anyhow).
This advance of position is adjustable on 3 levels, that are previously set in the machine-datas.

2. SPEEDING UP THE PRESS CYCLE

In order to speed up the press cycle, it is possible to write on the same line of the ascent M46 and M40. The IMM closes if the manipulator is out of mould and the part is on the gripper.

3. FUNCTIONS EXECUTION

Each line can handle two auxiliary functions which are carried out at the same time.
The functions that can be executed are of two different types: simple (they occupy 1 auxiliary) or complex (they occupy both auxiliaries).

The double functions can be operations of ADDITION and SUBTRACTION, operations of COMPARISON between parameters with jump of operations of loading a negative value in one Parameter.
The functions available are:

**Single:**
- Load the parameter 0 - 60 with:
  - a direct value
  - another parameter
- Increase the parameter
- Decrease the parameter
- Absolute jump.
- If I 0 ON jump to line C
- If I 1 ON jump to line C.
- If I 2 ON jump to line C
- If I 3 ON jump to line C
- If I 4 ON jump to line C
- If I 5 ON jump to line C
- If I 6 ON jump to line C
- If I 7 ON jump to line C
- If I 0 OFF jump to line C
- If I 1 OFF jump to line C
- If I 2 OFF jump to line C
- If I 3 OFF jump to line C
- If I 4 OFF jump to line C
- If I 5 OFF jump to line C
- If I 6 OFF jump to line C
- If I 7 OFF jump to line C
- Wait if input I ON
- Wait if input I OFF
- Force output 0 ON
- Force output 0 OFF
- Delete the residual path if entry I ON
- Delete the residual path if entry I OFF
- Set the advance OFF
- Set the Modal 1 (ADV. M1) advance
- Set the Modal 2 (ADV. M2) advance
- Set the Free advance (ADV. FREE)
- Stop for XX tenths.
- Auxiliary functions from M10 to M59

**Double:**
- If Parameter A > Parameter B jump to line C
- If Parameter A >=Parameter B jump to line C
- If Parameter A < Parameter B jump to line C
- If Parameter A <= Parameter B jump to line C
- If Parameter A = Parameter B jump to line C
- If Parameter A <> Parameter B jump to line C
- Addition between parameters or constants
- Subtraction between parameters or constants.
### EXAMPLES OF PROGRAMMING

**Standard Program RSV101 E3**

00
01 \( VY=4 \ VZ=4 \ VX=4 \) \( \) Y/Z/X axis speed in \( \text{dm/s} \)
02 \( AY=15 \ AZ=150 \ AX=20 \) \( \) Y/Z/X axis acceleration in \( \text{dm/s}^2 \)
03 \( P10=K0.0 \) \( \) write in \( P10 \) X axis parking value
04 \( P11=K0.0 \) \( \) write in \( P11 \) X axis IMM waiting open. value
05 \( P12=K0.0 \) \( \) write in \( P12 \) the X axis pick-up value
06 \( P13=K0.0 \) \( \) write in \( P13 \) the X axis part unloading value
07 \( P20=K0.0 \) \( \) write in \( P20 \) the Z axis parking value
08 \( P21=K0.0 \) \( \) write in \( P21 \) the Z axis IMM wait. open. value
09 \( P22=K0.0 \) \( \) write in \( P22 \) the Z axis part picking-up value
10 \( P23=K0.0 \) \( \) write in \( P23 \) the Z axis part unload. value
11 \( P30=K0.0 \) \( \) write in \( P30 \) the Y axis parking value
12 \( P31=K0.0 \) \( \) write in \( P31 \) the Y axis IMM wait. open. value
13 \( P32=K0.0 \) \( \) write in \( P32 \) the Y axis part picking-up value
14 \( P33=K0.0 \) \( \) write in \( P33 \) the Y axis part unload. value
15 \( M43 \) \( \) vertical axis up check
16 \( Z=P20 \) \( \) Z axis in parking
17 \( X=P10 \) \( \) X axis in parking
18 \( Y=P30 \) \( \) Y axis in parking
19 \( M15 \) \( \) wrist reset
20 \( VY=25 \ VZ=50 \ VX=10 \) Anti M1 \( \) Y/Z/X speed change in \( \text{dm/s} \) + Mod.1 advance
21 \( M42 \) \( \) start cycle
22 \( Y=P32 \ AZ=150 \ X=P11 \) \( \) Y axis in part pick-up on IMM + Z axis accel. in \( \text{dm/s}^2 \) + X axis on waiting opening
23 \( M45 \) \( \) wait for IMM opening
24 \( Z=P22 \ M10 \) \( \) Z axis in part pick-up + vacuum set
25 \( X=P12 \ M20 \) \( \) X axis in part pick-up + ejector forward
26 \( X=P11 \ M21 \) \( \) X axis + ejector backwards
27 \( Z=P20 \) \( \) Z axis upwards
28 \( M40 \) \( \) verify picked-up part
29 \( Y=P33 \ X=P13 \ M46 \) \( \) Y and X parts unloading + permit IMM closing
30 \( VZ=5 \ M14 \) \( \) Z axis speed change in \( \text{dm/s} \) + wrist set
31 \( AZ=5 \) \( \) Z axis acceleration change in \( \text{dm/s}^2 \)
32 \( Z=P23 \) Anti OFF \( \) Z axis part unloading + advance off
33 \( M11 \ Stop \) \( \) vacuum reset +stop for 0,5 sec.
34 \( VZ=10 \) Anti M2 \( \) Z axis speed change in \( \text{dm/s} \) + Modal 2 advance
35 \( Z=P20 \) \( \) Z axis upwards
36 \( \) Jump19 \( \) jump to line 19
Palletization standard program RSV 101 E3

01  VY=4  VZ=4  VX=4  Y/Z/X axis speed in dm/s in dm/s
02  AY=15  AZ=150  AX=20  P48=K0.0  Y/Z/X axis acceleration in dm/s² +*
03  P10=K0.0  write in P10 the X axis parking value
04  P11=K0.0  write in P11 the X axis IMM waiting opening value
05  P12=K0.0  write in P12 the X axis part picking-up value
06  P20=K0.0  write in P20 the Z axis parking value
07  P21=K0.0  write in P21 Z axis IMM waiting opening value
08  P22=K0.0  write in P22 the Z axis part pick-up value
09  P30=K0.0  write in P30 the Y axis parking value
10  P31=K0.0  write in P31 the Y axis IMM waiting opening value
11  P32=K0.0  write in P32 the Y axis part picking-up value
12  M43  vertical axis up check
13  If P0 <>P48 Jump 27  if the value of P0 differs from the value of P48
    jump to line 27
14  P1=K0.0  write in P1 the N. of parts to be pallet. on the X axis
15  P2=K0.0  write in P2 the N. of parts to be pallet. on the Z axis
16  P3=K0.0  write in P3 the N. of parts to be pallet. on the Y axis
17  P4=K0.0  write in P4 the interaxis of the part to be palletized on the X axis
18  P5=K0.0  write in P5 the interaxis of the part to be palletized on the Z axis
19  P6=K0.0  write in P6 the interaxis of the part to be palletized on the Y axis
20  P7=K0.0  write in P7 the value of the 1st part to be palletized on the X axis
21  P8=K0.0  write in P8 the value of the 1st part to be palletized on the Z axis
22  P9=K0.0  write in P9 the value of the 1st part to be palletized on the Y axis
23  P50=P7  P53=K0.0  * + *  * + *  P51=P8  P54=K0.0  P52=P9  P55=K0.0
24  P0=K1.0  M50  *+ start conveyor belt
25  Z=P20  Z axis in parking position
26  X=P10  X axis in parking position
27  Y=P30  Y axis in parking position
28  M15  wrist reset
29  VY=25  VZ=50  VX=10  Anti M1  speed change Y/Z/X in dm/s Modal 1 advance
30  M15  M42  wrist reset + start cycle
31  Y=P32  AZ=150  Y-axis in part pick-up + Z-axis acceleration in dm/s²
32  M15  X=P11  X-axis on waiting opening
33  M44  waiting time for IMM opening
34  Z=P22  M10  Z axis in part pick-up + vacuum set
35  X=P12  M20  X-axis in part pick-up + ejector forward
36  X=P11  M21  X-axis and ejector backwards
37  Z=P20  Z axis upwards
38  M40  verify picked-up part
39  Y=P52  X=P50  M46  Y- and X-axis over the pallet + permit IMM closing
41 \text{VZ=5 M14} \quad \text{Z-axis speed change in dm/s + wrist reset}
42 \text{AZ=5} \quad \text{Z-axis acceleration in dm/s²}
43 \text{P41=P51-K100.0 * + *}
44 \text{Z=P41} \quad \text{support for intermediate position of the vertical axis}
45 \text{VZ=1 Anti OFF} \quad \text{Z-axis speed change in dm/s + off advance}
46 \text{Z=P51} \quad \text{down stroke onto the pallet}
47 \text{M11 Stop 5 ten} \quad \text{vacuum reset + pause for 0.5 seconds}
48 \text{VZ=10 Anti M2} \quad \text{vertical speed change in dm/s + Modal 2 advance}
49 \text{Z=P20} \quad \text{Z axis upwards (if the pallet is complete)}
50 \text{Inc P53} \quad \text{*}
51 \text{P50=P50+P4} \quad \text{*}
52 \text{If P53 < P1 Jump 30} \quad \text{*}
53 \text{P50=P7 P53=K0.0} \quad \text{*}
54 \text{Inc P55} \quad \text{*}
55 \text{P52=P52-P6} \quad \text{*}
56 \text{If P55 < P3 Jump 30} \quad \text{*}
57 \text{P52=P9 P55=K0.0} \quad \text{*}
58 \text{Inc P54} \quad \text{*}
59 \text{P51=P51-P5} \quad \text{*}
60 \text{If P54 < P2 Jump 30} \quad \text{*}
61 \text{P51=P9 P54=K0.0} \quad \text{*}
62 \text{M50} \quad \text{start conveyor belt}
63 \text{Jump 30} \quad \text{jump to line 30}

*= algorithm not to be modified in a standard program.

Special Palletization program RSV 101 E3 with carton layer

0
01 \text{VY=4 VZ=4 VX=4} \quad \text{X/Y/Z/ axis speed in dm/s}
02 \text{AY=30 AZ=100 AX=40 P48=K0.0} \quad \text{Y/Z/X axis acceleration in dm/s² + *}
03 \text{P10=K0.0} \quad \text{write in P10 X axis parking value}
04 \text{P11=K0.0} \quad \text{write in P11 X axis in IMM wait. open. value}
05 \text{P12=K0.0} \quad \text{write in P12 X axis part picking-up value}
06 \text{P18=K0.0} \quad \text{write in P18 Z axis carton layer unloading value}
07 \text{P19=K0.0} \quad \text{write in P19 Z axis value of carton layer pick up value}
08 \text{P20=K0.0} \quad \text{write in P20 Z axis parking value}
09 \text{P21=K0.0} \quad \text{write in P21 Z axis IMM wait. open. value}
10 \text{P22=K0.0} \quad \text{write in P22 Z axis part picking-up value}
11 \text{P28=K0.0} \quad \text{write in P28 Z axis cart. layer unload value}
12 \text{P29=K0.0} \quad \text{write in P29 Z axis cart. layer pick-up value}
13 \text{P30=K0.0} \quad \text{write in P30 Y axis parking value}
14 \text{P31=K0.0} \quad \text{write in P31 Y axis IMM wait. Open. value}
15 \text{P32=K0.0} \quad \text{write in P32 Y axis part picking-up value}
16 \text{P38=K0.0} \quad \text{write in P38 Y axis cart. layer unload value}
17 \text{P39=K0.0} \quad \text{write in P39 Y axis cart. layer pick-up value}
18 \text{P49=K500.0} \quad \text{support for special program}
19 \text{M43} \quad \text{vertical axis up check}
20 \text{If P0 <>P48 Jump 34} \quad \text{if the value of P0 is different from the value P48}
21 \text{Jump 30} \quad \text{jump to line 30}
21 P1=K0.0 write in P1 the N. of parts to be pallet. on X axis
22 P2=K0.0 write in P2 the N. of parts to be pallet. on Z axis
23 P3=K0.0 write in P3 the N. of parts to be pallet on Y axis
24 P4=K0.0 write in P4 the inter. of the part to be palletized on the X axis
25 P5=K0.0 write in P5 the inter. of the part to be palletized on the Z axis
26 P6=K0.0 write in P6 the inter. of the part to be palletized on the Y axis
27 P7=K0.0 write in P7 the value of the 1st part to be palletized on the X axis
28 P8=K0.0 write in P8 the value of the 1st part to be palletized on the Z axis
29 P9=K0.0 write in P9 the value of the 1st part to be palletized on the Y axis
30 P50=P7 P53=K0.0 * + *
31 P51=P8 P54=K0.0 * + *
32 P52=P9 P55=K0.0 * + *
33 P0=K1.0 M50 * + conveyor on til input
34 Z=P20 Z axis in parking
35 X=P10 X axis in parking
36 Y=P30 Y axis in parking
37 M15 wrist reset
38 VY=21 VZ=41 VX =11 Anti M1 Y/Z/X speed change in dm/s + modal 1 advance
39 M42 start cycle
40 Y=P32 AZ=80 X=P11 Y axis in part pick-up + Z axis accel. in dm/s² + X axis on waiting opening
41 M45 wait for IMM opening
42 Z=P22 M10 Z axis in part pick-up + vacuum set
43 X=P12 M20 X axis in part pick-up + ejector forward
44 X=P11 M21 X axis and ejector backwards
45 Z=P20 Z axis upwards
46 M40= verify picked-up part
47 Y=P52 X=P50 M46 Y and X axis on the pallet + permit for IMM closing
48 VZ=5 M14 Z axis speed change in dm/s + wrist set
49 AZ=5 P41=P51-K100.0 Z axis acceleration change in dm/s² +*
50 Z=P41 support for interim. position of Z axis
51 VZ=1 Anti Off Z axis speed change in dm/s + modal off
52 Z=P51 down stroke on pallet
53 M11 Stop 5 tenths vacuum reset + stop 0.5 sec.
54 VZ=10 Anti M2 Z axis speed change in dm/s + Modal 2 advance
55 Z=P20 Z axis upwards (if the pallet is complete)
56 Inc P53 *+*
57 If P50 = P50 + P4 *+*
58 If P53 < P1 Jumps 37 *+*
59 P50 = P7 P53 =K0.0 *+*
60 Inc P55 *
61 P52=P52 - P6 *+*
62 If P55 < P3 Jump 37 *+*
63 P52 =P9 + P55=K0.0 *+*
64 Inc P54 *
65 P51 = P51 – P5 *
66 If P54 < P2 Jump 70
67 P51= P8 P54=K0.0
68 M50 conveyor on til input
69 Jump 37 jump to line 37
70 Jump to sub109 jump to sub-routine program n 109
71 Jump 37 jump to line 37 (if the pallet is complete)

* = Algorithm not to be modified
P49 = minimum carton layer level

Subroutine N. 109

0
01 M38 start of subroutine
02 Y=P39 X=P19 Y and X axis on carton layer pick-up
03 Z=P29 M14 Z axis on carton layer pick-up + wrist set
04 VZ=1 M10 Z axis change of speed + vacuum set
05 Z=700.0 CPR if ON I115 Z axis on carton layer pick-up
06 VZ=5 Z axis change of speed
07 Z=P29 Z axis climb to carton layer pick-up
08 If I 0 OFF jump to 3 if I ZERO is off, it jumps to line 3
09 VZ=10 Z axis change of speed
10 Z=P20 Z axis upwards
11 Y=P38 X=P19 Y and X axis on carton layer unload
12 Z=P51 downstroke on pallet
13 M11 Stop for 5 tenths vacuum reset + stop for 0,5 sec
14 Z=P20 Z axis upwards
15 M39 end of subroutine

Special Palletization program RSV 101 E3 with direct single positions

00
01 VY=4 VZ=4 VX=4 X/Y/Z/ axis speed in dm/s
02 AY=5 AZ=40 AX=5 P48=K0.0 Y/Z/X axis acceleration in dm/s² + *
03 P10=K0.0 write in P10 the X axis parking value
04 P11=K0.0 write in P11 the X axis IMM waiting opening value
05 P12=K43.0 write in P12 the X axis part picking-up value
06 P20=K0.0 write in P20 the Z axis parking value
07 P21=K0.0 write in P21 the Z axis IMM waiting opening value
08 P22=K0.0 write in P22 the Z axis part picking-up value
09 P30=K0.0 write in P30 the Y axis parking value
10 P31=K0.0 write in P31 the Y axis IMM waiting opening value
11 P32=K1914.3 write in P 32 the Y axis part picking-up value
12 M43 vertical axis up check
13 If P0 <> P48 Jump 28 if the value of P0 is different from the value P48 jump to line 28
14 P1=K0.0 write in P1 the n° of parts to palletize on X axis
15 P2=K7.0 write in P2 the n° of parts to palletize on Z axis
16 P3=K0.0 write in P3 the n° of parts to palletize on Y axis
17 P4=K0.0 write in P4 the interaxis of the part to palletize on X axis
18  P5=K0.0 write in P5 the interaxis of the part to palletize on Z axis
19  P6=K0.0 write in P6 the interaxis of the part to palletize on Y axis
20  P7=K378.9 write in P7 the value of the 1st part to palletize on X axis
21  P8=K1831.6 write in P8 the value of the 1st part to palletize on Z axis
22  P9=K806.1 write in P9 the value of the 1st part to palletize on Y axis
23  P50=P7 P53=K0.0 * + *
24  P51=P8 P54=K0.0 * + *
25  P52=P9 P55=K0.0 * + *
26  P60=K0.0 M50 support for special program + belt start
27  PO = K1.0 *
28  Z = P20 Z axis in parking
29  X = P10 X axis in parking
30  Y = P30 Y axis in parking
31  M14 P46=K0.0 wrist set + support for special program
32  VY =10 VZ =18 VX=10 Anti M1 Y/Z/X speed change + modal 1 advance
33  M42 start cycle
34  Y = P32 AZ = 40 X = P11 Y axis in part pick-up + accel. on Z axis + X axis on wait. op.
35  M45 wait for IMM opening
36  Z = P22 M10 Z axis in part pick-up + vacuum set
37  X=P12 M20 X axis in part pick-up + ejector forwards
38  X = P11 M21 X axis + ejector backwards
39  Z = P20 Z axis upwards
40  M40 verify picked-up part
41  If P46 <> P60 Jump 48 if the value of P46 differs from the value of P60 jump to line 48
42  P60 = K1.0 first position on pallet
43  P40 = K378.9 support for position of X axis
44  P41 = K1835.7 support for position of Z axis
45  P42 = K916.6 support for position of Y axis
46  Jump to sub106 jump to sub-routine nr 106
47  Jump 31 jump to line 31
48  Inc P46 *
49  If P46 <> P60 Jump 56 if the value of P46 differs from the value of P60 jump to line 56
50  P60 = K2.0 second position on pallet
51  P40 = K378.9 support for position of X axis
52  P41 = K1826.6 support for position of Z axis
53  P42 = K753.7 support for position of Y axis
54  Jump to sub 106 jump to sub-routine 106
55  Jump 31 jump to line 31
56  Inc P46 *
57  If P46 <> P60 Jump 65 If P46 value differs from the one of P60 jump to line 65
58  P60 = K3.0 third position on pallet
59  P40= K378.9 support for position of X axis
60  P41=K1826.6 support for position of Z axis
61. \( P42 = k594.8 \)  
62. Jump to sub106  
63. \( P47 = K0.0 \)  
64. Jump 31  
65. Inc P46  
66. If P46 \( <> \) P60 jump 73  
67. \( P60 = K4.0 \)  
68. \( P4 = k666.1 \)  
69. \( P41 = K1799.3 \)  
70. \( P42 = k150.2 \)  
71. Jump to sub 106  
72. Jump 31  
73. Inc P46  
74. If P46 \( <> \) p60 jump 81  
75. \( P60 = K5.0 \)  
76. \( P40 = K482.7 \)  
77. \( P41 = K1817.1 \)  
78. \( P42 = K161.5 \)  
79. Jump to sub106  
80. Jump 31  
81. Inc P46  
82. Se P46 \( <> \) P60 Jump 89  
83. \( P60 = K6.0 \)  
84. \( P40 = K0.0 \)  
85. \( P41 = K1806.0 \)  
86. \( P42 = K667.8 \)  
87. Jump to sub106  
88. Jump 31  
89. Inc P46  
90. If P46 \( <> \) P60 jump 187  
91. \( P60 = K18.0 \)  
92. \( P40 = K0.0 \)  
93. \( P41 = K0.0 \)  
94. \( P42 = K0.0 \)  
95. Jump to sub106  
96. Jump 31  
97. Inc P46  
98. If P46 \( <> \) P60 jump 195  
99. \( P60 = K19.0 \)  
100. \( P40 = K0.0 \)  
101. \( P41 = K0.0 \)  
102. \( P42 = K0.0 \)  
103. Jump to sub106  
104. Jump 31  
105. P60 = K20.0  
106. \( P40 = K0.0 \)  
107. \( P41 = K0.0 \)  
108. support for position of Y axis  
109. Jump to sub-routine 106  
110. jump to line 31  
111. If P46 value differs from the one of P60  
112. jump to line 73  
113. fourth position on pallet  
114. support of position of X axis  
115. support of position of Z axis  
116. support of position of Y axis  
117. jump to sub-routine 106  
118. jump to line 31  
119. if the value of P46 differs from the one of P60  
120. it jumps to line 81  
121. fifth position on pallet  
122. support for position of X axis  
123. support for position of Z axis  
124. support for position of Y axis  
125. jump to sub-routine 106  
126. jump to line 31  
127. if the value of P46 differs from the one of P60  
128. it jumps to line 89  
129. sixth position on pallet  
130. support for position of X axis  
131. support for position of Z axis  
132. support for position of Y axis  
133. jump to sub-routine 106  
134. jump to line 31  
135. if the value of P46 differs from the one of P60  
136. it jumps to line 187  
137. eighteenth position on the pallet  
138. support for position of X axis  
139. support for position of Z axis  
140. support for position of Y axis  
141. jump to sub-routine 106  
142. jump to line 31  
143. if the value of P46 differs from the one of P60  
144. jump to line 195  
145. nineteenth position on the pallet  
146. support for position of X axis  
147. support for position of Z axis  
148. support for position of Y axis  
149. jump to subroutine 106  
150. jump to line 31  
151. twentieth position on the pallet  
152. support for position of X axis  
153. support for position of Z axis  
154. support for position of Y axis
198 \( P42 = K0.0 \) support for position of Y axis
199 Jump to sub 106 jump to sub-routine 106
200 \( P46 = K0.0 \) \( P60 = K0.0 \) supports for special program
201 Inc P54 *
202 \( P51 = P51 - P5 \) \(* + *\)
203 If \( P54 < P2 \) jump 31 \(* + *\)
204 \( P51 = P8 \) \( P54 = K0.0 \) \(* + *\)
205 M50 conveyor on til input
206 Jump 31 jump to line 31

\* = algorithms not to be modified

SUBROUTINE N. 106

0
01 M38 Start of subroutine
02 \( P50 = P40 - K30.0 \) \(* + *\)
03 \( P51 = P41 - K20.0 \) \(* + *\)
04 \( P52 = P42 - K30.0 \) \(* + *\)
05 \( Y = P52 \) \( X = P50 \) Y and X axis on pallet
06 \( Z = P51 \) downstroke on pallet
07 \( VY = 1 \) \( VZ = 1 \) \( VX = 1 \) Y/Z/X change of speed
08 \( Y = P42 \) \( X = P40 \) Y and X axis on pallet
09 \( Z = P41 \) Inc P46 downstroke on pallet + *
10 M11 Sto for 5 tenths vacuum reset + stop for 0.5 sec
11 \( VY = 11 \) \( VZ = 11 \) \( VX = 11 \) Y/Z/X axis change of speed
12 \( Z = P20 \) Z axis upwards
13 \( X = P12 \) X axis in part pick-up
14 M39 end subroutine

Special program RSV 101 E3 with 2 vacuums and relevant exhaust

0
01 \( VY = 4 \) \( VZ = 4 \) \( VX = 4 \) Z/Y/X axis speed
02 \( AY = 15 \) \( AZ = 150 \) \( AX = 20 \) Z/Y/X axis acceleration
03 \( P10 = K0.0 \) write in P10 the X axis parking value
04 \( P11 = K0.0 \) write in P11 the X axis IMM wait. open. value
05 \( P12 = K0.0 \) write in P12 the X axis part picking-up value
06 \( P13 = K0.0 \) write in P13 the X axis part unloading value
07 \( P20 = K0.0 \) write in P20 the Z axis parking value
08 \( P21 = K0.0 \) write in P21 the Z axis IMM waiting opening value
09 \( P22 = K0.0 \) write in P22 the Z axis part picking-up value
10 \( P23 = K0.0 \) write in P23 the Z axis part unloading value
11 \( P30 = K0.0 \) write in P30 the Y axis parking value
12 \( P31 = K0.0 \) write in P31 the Y axis IMM waiting opening value
13 \( P32 = K0.0 \) write in P32 the Y axis part picking-up value
14 \( P33 = K0.0 \) write in P33 the Y axis part unloading value
15 \( P47 = K500.0 \) write in P47 the interaxis value between the 2 exhausts
16 M43 vertical axis up check
17 \( Z = P20 \) Z axis in parking
18 \( X = P10 \) X axis in parking
19 \( X = P30 \) Y axis in parking
20  M15  wrist reset
21  VY=25 VZ=50 VX=10 AntiM1  Y/Z/X change of speed + modal 1 advance
22  M42  start cycle
23  Y=P32 AZ=150 X=P11  Y-axis in part pick-up + Z-axis accel. + X axis on wait. open
24  M45  wait for IMM opening
25  Z=P22 M10 M12  Z axis in part pick-up + vacuum set 1 and 2
26  X=P12 M20  X axis in part pick-up + ejector forwards
27  X=P11 M21  X axis and ejector backwards
28  Z=P20  Z axis upwards
29  M40 M41  verify the picked-up parts
30  Y = P33  X = P13  M46  Y and X axis in unloading 1st part + IMM closing permit
31  VZ=5 M14  Z-axis speed + wrist set
32  AZ=5 P41=P23-K100.0  Z axis acceleration +* + *
33  Z=P41  support for position of Z axis
34  VZ=1 Anti OFF  Z-axis speed change + Modal off
35  Z=P23  Z axis in unloading 1st part
36  M11 Stop 5 tenths  vacuum 1 reset + stop for 0.5 sec
37  Z=P41 P42=P33 + P47  support for position of Z-axis + * + interaxis
38  M44  trav safety off
39  Y=P42  Y axis in unloading 2nd part
40  Z = P23  Z axis in unloading 2nd part
41  M13 Stop for 5 tenths  vacuum reset 2 + stop for 0.5 sec
42  VZ=10 Anti M2  Z axis speed + modal 2 advance
43  Z = P20  Z axis upwards
44  Jump 20  Jump to line 20

Special program RSV 101 E3 with sprue storage before unloading the part

01  VV=4  VZ=4 VX=4  Y/Z/ X axis speed
02  AY=30 AZ=100 AX=40  Y/Z/X axis acceleration
03  P10=K0.0  write in P10 the X axis parking value
04  P11=K0.0  write in P11 the X axis in IMM wait. open. value
05  P12=K0.0  write in P12 the X axis part picking-up value
06  P13=K0.0  write in P13 the X axis part unloading value
07  P14=K0.0  write in P14 the Z axis fault part unloading value
08  P20=K0.0  write in P20 the Z axis parking value
09  P21=K0.0  write in P21 the Z axis IMM waiting opening value
10  P22=K0.0  write in P22 the Z axis part picking-up value
11  P23=K0.0  write in P23 the Z axis part unloading value
12  P24=K0.0  write in P24 the Z axis fault part unloading value
13  P30=K0.0  write in P30 the Y axis parking value
14  P31=K0.0  write in P31 the Y axis IMM waiting opening value
15  P32=K0.0  write in P32 the Y axis part picking-up value
16  P33=K0.0  write in P33 the Y axis unloading value
17  P34=K0.0  write in P34 the Y axis fault part unloading value
18  M43  Vertical axis up check
19  Z=P20  Z axis in parking
20  X=P10  X axis in parking
21  Y=P30  Y axis in parking
22  M15  wrist reset
23 VY=21 VZ=41 VX=11 Anti M1
24 M42
25 Y=P32 AZ=80 X=P11
26 M45
27 Z=P22 M10
28 X=P12 M20
29 M26
30 X = P11 M21
31 Z=P20
32 M40
33 Y=P34 X=P14 M46
34 VZ= 5 M14
35 AZ=5
36 Z=P24 Anti OFF
37 M27 stop for 5 tenths
38 VZ= 10 Anti M1
39 Z=P20
40 Y = P33 X = P13
41 Z=P23 Anti OFF
42 M11 Stop for 5 tenth
43 VZ = 10 Anti M2
44 Z = P20
45 Jump22

Special Palletization program RSV 101 E3 QUINCE QUONCE
0
01 VY=4 VZ=4 VX=4 X/Y/Z/ axis speed in dm/s
02 P48=K0.0 AY=20 AZ=100 AX=20 Y/Z/X axis acceleration in dm/s +*
03 P10=K0.0 write in P10 the X axis parking value
04 P11=K0.0 write in P11 the X axis IMM waiting opening value
05 P12=K0.0 write in P12 the X axis part picking-up value
06 P20=K0.0 write in P20 the Z axis parking value
07 P21=K0.0 write in P21 the Z axis IMM waiting opening value
08 P22=K0.0 write in P22 the Z axis part picking-up value
09 P30=K0.0 write in P30 the Y axis parking value
10 P31=K0.0 write in P31 the Z axis IMM waiting opening value
11 P32=K0.0 write in P 32 the Y axis part picking-up value
12 M43 vertical axis up check
13 If P0 <>P48 Jump 29 if the value of P0 is different than the
14 P1=K0.0 write in P1 the N. of parts to pallettize on X axis
15 P2=K0.0 write in P2 the N. of parts to pallettize on Z axis
16 P3=K0.0 write in P3 the N. of parts to pallettize on Y axis
17 P4=K0.0 write in P4 the interaxis of the part to pallettize
on X axis
18 P5=K0.0 write in P5 the interaxis of the part to pallettize
on Z axis
19 P6=K0.0 write in P6 the interaxis of the part to pallettize
on Y axis
20 P7=K0.0 write in P7 the value of the 1st part to palletize on X axis
21 P8=K0.0 write in P8 the value of the 1st part to palletize on Z axis
22 P9=K0.0 write in P9 the value of the 1st part to palletize on Y axis
23 P50=P7 P53=K0.0 *
24 P51=P8 P54=K0.0 *
25 P52=P9 P55=K0.0 *
26 P49=K0.0 file support even/odd
27 P47=K70.0 moving to second line
28 P0=K10.0 M50 *
29 Z=P20 Z axis in parking
30 X=P10 X axis in parking
31 Y=P30 Y axis in parking
32 M15 wrist reset
33 VV=21 VZ=41 VX=11 Anti M1 Y/Z/X speed change + modal 1 advance
34 AY = 20 M42 Y axis acceleration – start cycle
35 Y=P32 AZ=120 X=P11 Y axis on part + accel. on Z axis + X axis on IMM
36 M45 wait for IMM opening
37 Z=P22 M10 Z axis in part pick-up + vacuum set
38 X=P12 M20 X axis in part pick-up + ejector forwards
39 5 tenth stop stop for 0.5 sec
40 X=P11 X Axis backwards
41 M21 ejector backwards
42 Z=P20 Z axis upwards
43 M40 verify the picked-up part
44 M46 permit IMM closing
45 P42=P52 + K20.0 *
46 Y=P42 P41=P51 – K10.0 *
47 X=P50 M14 Anti OFF X axis on pallet + wrist set + advance off
48 Z=P41 support for intermed. position vertical axis
49 VY = 2 VZ = 2 M44 axis Y/Z speed + trav safety off
50 AY = 5 AZ = 5 change of Y/Z axis acceleration
51 Y= P52 present position of Y axis on pallet
52 Z = P51 down stroke on pallet
53 M11 Stop 15 tenths vacuum reset + stop for 0.5 sec.
54 VZ = 10 Anti M2 change of speed Z axis + modal 2 advance
55 Z = P20 Z axis upwards
56 Inc P53 *
57 Se P50 = P50 + P4 *
58 Se P53 < P1 Jumps 32 *
59 Se P49 = P48 Jumps 63 *
60 P49=KO.0 P53=KO.0 Support for even/odd lines + part loaded on X axis pallet *
61 P50=P7 *
62 Jump 65 Jump to line 65
63 P50 = P7 + P47 *
64 P49=K1.0 P53=K1.0 Support for even/odd line + part loaded on X axis pallet *
65 Inc P55 *
66 P52=P52+P6
67 If P55<P3 Jump 32
68 P52=P9 P55=K0.0
69 Inc P54
70 P51=P51 –P5
71 P50=P7 P53=K0.0
72 P49=K0.0 Support for even/odd lines
73 If P54 <P52 Jump 32
74 P51=P8 P54=K0.0
75 M50 Conveyor on til input
76 Jump 32 Jump to line 32

* = Algorithm not to be modified

P47 = move second line
P49 = support for even/odd lines
Line 64 – P53 = 0(second line same as first one)
Line 64 - P53= 1(1 part less than second row compared to the first one)

Special palletization program RSV 101 E3 for unloading on 2 pallets

0
01 VY=4 VZ=4 VX=4 Y/Z/ X axis speed in dm/s
02 AY=15 AZ=150 AX=20 Y/Z/ X axis acceleration in dm/s
03 P10=K0.0 write in P10 the X axis parking value
04 P11=K0.0 write in P11 the X axis in IMM waiting opening value
05 P12=K0.0 write in P12 the X axis part picking-up value
06 P20=K0.0 write in P20 the X axis parking value
07 P21=K0.0 write in P21 the Z axis IMM waiting opening value
08 P22=K0.0 write in P22 the Z axis part picking-up value
09 P30=K0.0 write in P30 the Y axis parking value
10 P31=K0.0 write in P31 the Y axis IMM waiting opening value
11 P32=K0.0 write in P32 the Y axis part picking-up value
12 M43 vertical axis up check
13 If P <> P48 Jump 32 if P0 value is different than P48, jump to line 32
14 P1=K0.0 write in P1 the n° of parts to palletize on X axis
15 P2=K0.0 write in P2 the n° of parts to palletize on Z axis
16 P3=K0.0 write in P3 the n° of parts to palletize on Y axis
17 P4=K0.0 write in P4 the interaxis of part to palletize on X axis
18 P5=K0.0 write in P5 the interaxis of part to palletize on Z axis
19 P6=K0.0 write in P6 the interaxis of part to palletize on Y axis
20 P7=K0.0 write in P7 value of 1st part to pallet. on X axis 1st pallet
21 P8=K0.0 write in P8 value of 1st part to pallet. on Z axis 1st pallet
22 P9=K0.0 write in P9 value of 1st part to pallet. on Y axis 1st pallet
23 P16=K0.0 write in P16 value of 1st part to pallet. on X axis 2nd pallet
24 P26=K0.0 write in P26 value of 1st part to pallet. on Z axis 2nd pallet
25 P36=K0.0  write in P36 value of 1st part to pallet on Y axis
26 P50=P7 P53=K0.0  2nd pallet
27 P51=P8 P54=K0.0  *
28 P52=P9 P55=K0.0  +
29 P49=K0.0  support to working pallet
30 M54 M56  special functions for change of pallet 1 and 2
31 P0=K1.0  *
32 Z=P20  Z axis in parking
33 X=P10  X axis in parking
34 Y=P30  Y axis in parking
35 M15  wrist reset
36 VY=25 VZ=50 VX=10  Y/Z/X speed change
37 M42  + modal 1 advance
38 Y=P32 AZ=150 X=P11  Y axis in part pick-up + accel. of Z axis +
X axis on wait. open
39 M45  wait for IMM opening
40 Z=P22 M10  Z axis in part pick-up + vacuum set
41 X=P12 M20  X axis in part pick-up + ejector forward
42 X=P11 M21  X axis + ejector backwards
43 Z=P20  Z axis upward
44 M40  verify picked-up part
45 M46  permit to IMM closing
46 If P49 >P48 Jump 72  *
47 Y=P52 X=P50  Y and X axis on pallet 1
48 VZ=5 M14 M55  Z axis change of speed + wrist set + control of pallet 1 in position
49 AZ=5 P41=P51 – K100.0  change of acceleration Z axis + *
50 Z=P41  support for intermediate position of vertical axis
51 VZ=1 Anti OFF  change of speed Z axis + off modal
52 Z=P51  down stroke to pallet 1
53 M11 stop for 5 tenths  vacuum reset + stop for 0.5 sec
54 VZ=AntiM2  change of speed Z axis + modal 2 advance
55 Z=P20  Z axis upward
56 Inc P53  *
57 P50=+P50 +P4  *
58 If P53 < P1 jumps 35  *
59 P50=P7 P53=K0.0  *
60 Inc P55  *
61 P52=P52 – P6  *
62 If P55 < P3 Jump 35  *
63 P52=P9 P55=K0.0  *
64 Inc P54  *
65 P51=P51 - P5  *
66 If P54 < P2 Jump 35  *
67 P50=P16 P53=K0.0  *
68 P51=P26 P54=K0.0  *
69 P52=P36 P55=K0.0  *
70 M54 P49=K1.0  Special change pallet 1 function + support for working pallet
Jump 35

Y=P52 X=P50

VZ=5 M14 M57

AZ=5 P41 = K100.0

Z=P41 - P51 K100.0

VZ=1 Anti OFF

Z=P51

M11 Stop for 5 tenths

VZ=10 anti M2

Z=P50

Inc P53

P50=P50 + P4

If P53 < P1 Jump 35

P50=P16 P53=K0.0

Inc P55

P52=P52 - P6

If P55 < P3 Jump 35

P52=P36 P55=K0.0

Inc P54

P51=P51 - P5

If P54 < P2 Jump 35

P50=P7 P53=K0.0

P51=P8 P54=K0.0

P52=P9 P55=K0.0

M56 P49=K0.0

Jump 35

P7 = Position of 1st part 1st pallet X axis
P8 = Position of 1st part 1st pallet Z axis
P9 = Position of 1st part 1st pallet Y axis
P16= Position of 1st part 2nd pallet X axis
P26= Position of 1st part 2nd pallet Z axis
P36= Position of 1st part 2nd pallet Y axis
P49= Support for working pallet = pallet 1, 1 = pallet 2
M54 = Change of pallet 1
M55 = Control of pallet 1 in position
M56 = Change of pallet 2
M57 = Control of pallet 2 in position

* = Algorithms not to be modified
## CHART FOR PARAMETERS UPDATING

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<tr>
<th>Description</th>
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<th>Z axis</th>
<th>Y axis</th>
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<td>P Value</td>
<td>P Value</td>
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### PARAMETERS LIST “P” AND RELEVANT DESCRIPTION

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<td>part inter-axis on X axis</td>
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<td>part inter-axis on Z axis</td>
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<td>part inter-axis on Y axis</td>
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<td>position of the first part on X axis</td>
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<td>P08</td>
<td>position of the first part on Z axis</td>
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<td>position of the first part on Y axis</td>
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<td>parking position of X axis</td>
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<td>X axis position waiting for the IMM opening</td>
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<td>X axis position for part unloading</td>
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<td>P14</td>
<td>X axis position for fault part unloading</td>
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<td>P15</td>
<td>X axis position for degating</td>
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<td>P16</td>
<td>X axis position on peripheral</td>
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<td>X axis position for carton layer unloading</td>
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<td>X axis position for carton layer pick-up</td>
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<td>parking position of Z axis</td>
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<td>Z axis position waiting for the IMM opening</td>
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<td>Z axis position for part pick-up</td>
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<td>Z axis position for carton layer unloading</td>
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<td>Y axis position for fault part unloading</td>
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<td>Y axis position for degating</td>
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<td>Y axis position on peripheral</td>
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<td>Y axis position for carton layer unloading</td>
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<td>Z axis actual position on pallet</td>
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<td>M28 M29 Blow 1</td>
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<td>M40 Verify part 1</td>
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<td>M41 Verify part 2</td>
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<td>M50 Conv.on til input</td>
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<td>M57</td>
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9-MESSAGES AND ALARMS

VISUALIZATION OF MESSAGES

The diagnostic is composed of a group of messages and alarms constantly active; they can quickly detect the irregularities of the Numerical Control and of the Manipulator, so that restarting operations are easier and so that damages to personnel or to the Manipulator itself are avoided.

FROM THE MAIN MENU:

<table>
<thead>
<tr>
<th>DIAGNOS.</th>
<th>F5</th>
</tr>
</thead>
</table>

Digiting the **F5 DIAGNOS** softkey, the page of diagnostic is visualized. It remains on for five seconds. After this lapse of time, the page of the main menu will be automatically on again.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>INSER</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
</table>

Digit the softkey **F5 DIAGNOS** and the number of alarm along with its relevant description is visualized.

VISUALIZATION OF MESSAGES AND ALARMS

<table>
<thead>
<tr>
<th>MESSAGES</th>
<th>F5</th>
</tr>
</thead>
</table>

Digiting the **F5 MSGS** softkey, the page showing messages will appear.

<table>
<thead>
<tr>
<th>EDIT</th>
<th>W/ROBOT</th>
<th>AUTO</th>
<th>JOG</th>
<th>DIAGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>VALU P.</td>
<td>PLC PRO</td>
<td>ACT. LINE</td>
<td>AXIS</td>
<td>MESSAGES</td>
</tr>
</tbody>
</table>

See causes and remedies in the following chart.
<table>
<thead>
<tr>
<th>No.</th>
<th>CAUSE</th>
<th>REMEDY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>THERMAL PROTECTION</td>
<td>one of the thermal protection relays has opened check that the motor's current absorption is not greater than that for which the relay is set</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>KA2/KA5 FAULTY</td>
<td>relay KA2 and/or KA5 damaged substitute relay</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>MOTOR DRIVE FAULTY (SEE ALSO CHAPTER 4.2 TROUBLE SHOOTING DRIVE DIAGNOSIS OF THE USER AND MAINTENANCE MANUAL)</td>
<td>power supply not correct or no current to the drives drive damaged Motor damaged Motor cable, dynamo or Encoder damaged Motor connection or Encoder damaged Mechanical obstruction Adjust power supply Replace drive-warning-remember to keep original trimmer card Replace motor replace cable check connections remove obstruction</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>AIR MISSING</td>
<td>no compressed air in the system pressure switch not set properly pressure switch broken open compressed air tap set pressure switch to correct pressure (400 kPa) replace pressure switch</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>PROGRAM ERROR AT LINE</td>
<td>unacceptable speed or acceleration values have been set or invalid axis destination or program jumps destination set new, correct values</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>BATTERY LOW, DO NOT TURN OFF (SEE ALSO CHAPTER 5.2 CHANGING THE BATTERY OF THE USER AND MAINTENANCE MANUAL)</td>
<td>the battery is flat the equipment has been left off for a long period save the machine data and the work programs, replace battery, re load the machine data and work programs reset the alarm if no new battery is available DO NOT switch off.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>NO HABILITATED AXIS</td>
<td>a hardware error has occurred on a circuit board of an axis and/or a switchboard I/O incorrect machine data replace the defective circuit board input correct machine data switch off the panel and then switch on again</td>
<td></td>
</tr>
</tbody>
</table>
| No. 08 | MESSAGE: | WAIT SELF-SETTING IN PROGRESS (MESSAGE PRESENT ONLY ON THE 6.4 L VERSION)  
|        |          | the robot is carrying out the setting automatically. When it will be over, the message will disappear. |
| No. 09 | CAUSE:   | ERROR IN SUBROUTINE EXECUTION  
|        |          | a subprogram has been executed as main program  
|        |          | the auxiliary functions M38 and/or M39 have not been correctly programmed  
|        | REMEDY:  | select the correct main program  
|        |          | check the program and/or the subprogram |
| No. 10 | CAUSE:   | BARS SAFETY ON  
|        | REMEDY:  | the robot is outside the permitted working area  
|        |          | position the robot inside the correct area using the relevant procedure depending on the situation  
|        |          | A: during search for zero:  
|        |          | *press softkey F4 Jog  
|        |          | *press reset  
|        |          | *move the Y axis on the unloading position or on press centre  
|        |          | B: during a Jog movement:  
|        |          | *turn the selector on overstroke safety off  
|        |          | *press reset  
|        |          | *move the robot inside the permitted area  
|        |          | *turn the selector on overstroke safety on  
|        |          | C: during a movement in cycle  
|        |          | *turn the selector on overstroke safety off  
|        |          | *press the F4 jog softkey  
|        |          | *press any arrow key  
|        |          | *press reset  
|        |          | *move the robot inside the permitted area  
|        |          | *turn the selector on overstroke safety on  
|        |          | *go back to main menu  
| No. 14 | CAUSE:   | SOFTWARE END STROKE REACHED  
|        | REMEDY:  | the axis has been moved over the software limit switch; machine datas not correct  
|        |          | using the direction buttons on the keyboard move the axis in the correct position  
|        |          | set the new machine datas |
| No. 15 | CAUSE:   | OVERSTROKE  
|        | REMEDY:  | the manipulator has been moved to an OVERSTROKE position  
|        |          | a limit switch of overstroke has been pushed  
|        |          | move the key selector “OVERSTROKE” on EXCL  
|        |          | push the button START AUX  
|        |          | select the JOG mode  
|        |          | press any arrow key  
|        |          | press the RESET button  
|        |          | free the limit switch moving, by means of the direction buttons, the manipulator in the direction opposite to the one of the overstroke  
|        |          | reposition the key selector “OVERSTROKE” on INS  
<p>|        |          | exit from JOG |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| 16    | IMM OPEN SIGNAL MISSING              | the robot is in the moulding machine and the mould open signal has not been received     | limit switch "Y axis out of machine" and/or "Z axis out of mould" damaged or not set properly  
check that the "Machine open" signal is working  
replace or adjust limit switches                                      |
| 17    | WRIST OUT OF POSITION                | the operation has not been terminated in the time allowed (persistent message) due to:    | - defective cylinder  
-sack limit switch  
-flow regulator closed and/or broken  
-mechanical obstruction  
replace cylinder  
set the limit switch  
adjust or change flow regulator  
remove obstruction                                                 |
| 18    | WRIST ROTATION OUT OF POSITION       | the operation has not been terminated in the time allowed (persistent message) due to:    | - defective cylinder  
-sack limit switch  
-flow regulator closed and/or broken  
-mechanical obstruction  
replace cylinder  
set the limit switch  
adjust or change flow regulator  
remove obstruction                                                 |
| 19    | PART GRIPPER OUT OF POSITION         | the operation has not been terminated in the time allowed (persistent message) due to:    | - defective cylinder  
-sack limit switch  
-flow regulator closed and/or broken  
-mechanical obstruction  
replace cylinder  
set the limit switch  
adjust or change flow regulator  
remove obstruction                                                 |
| 20    | PART NOT RELEASED                    | part not removed  
vacuum switch or control device (photoelectric cell, limit switch, etc.) not set properly  
vacuum switch or control device (photoelectric cell, limit switch, etc.) broken  
check working sequence program  
set vacuum switch or control device (photoelectric cell, limit switch, etc.) correctly  
replace vacuum switch or control device (photoelectric cell, limit switch, etc.)  
remove obstruction                                                  |
<table>
<thead>
<tr>
<th>No.</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| 21   | PART MISSING               | no part attached to gripper
suction cups or control device (photoelectric cell, limit switch, etc) on gripper broken
vacuum tube broken or folded
vacuum switch or control device (photoelectric cell, limit switch, etc) not set properly
vacuum switch or control device (photoelectric cell, limit switch, etc) broken
vacuum pump or Venturi or pinch defective
check moulding cycle
replace suction cups and/or pinch
adjust vacuum tube
set vacuum switch and/or control device (photoelectric cell, limit switch, etc)
replace vacuum switch and/or control device (photoelectric cell, limit switch, etc)
check the functioning of the vacuum pump or Venturi or pinch |
| 22   | GATE OPEN                  | the moulding machine gate is open
close the gate
check that the signal of gate closed arrives |
| 23   | EJECTOR NOT FORWARD        | the operation has not been terminated in the time allowed (persistent message) due to:
defective cylinder
slack limit switch
mechanical obstruction
replace cylinder
re position the limit switch
remove obstruction
 |
| 24   | EJECTOR NOT BACKWARD       | the operation has not been terminated in the time allowed (persistent message) due to:
defective cylinder
slack limit switch
mechanical obstruction
replace cylinder
re position the limit switch
remove obstruction |
| 25   | Y AXIS NOT IN POSITION     | Y axis not in its correct position
Y axis limit switch outside the mould not set properly or broken
check cycle program
adjust or replace limit switch |
| 26   | Z-AXIS NOT DOWN            | The function M20 ejector forward with the Z axis too high
Z axis limit switch outside the mould out of order
check the program in use
replace the limit switch |
<table>
<thead>
<tr>
<th>No.</th>
<th>Cause</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Z AXIS NOT UP</td>
<td>the &quot;zero position&quot; limit switch on the vertical axis does not read</td>
</tr>
<tr>
<td></td>
<td></td>
<td>press the <strong>directional buttons</strong> on the control box to send the vertical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>axis to the top of its stroke</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check the working cycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace the limit switch</td>
</tr>
<tr>
<td>28</td>
<td>CORE SET NOT IN POSITION</td>
<td>the operation has not been terminated in the time allowed (persistent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>message) due to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>defective cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>slack limit switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>flow regulator closed and/or broken</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mechanical obstruction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>re position the limit switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>adjust or change flow regulator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>remove obstruction</td>
</tr>
<tr>
<td>29</td>
<td>CORE PULL NOT IN POSITION</td>
<td>the operation has not been terminated in the time allowed (persistent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>message) due to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>defective cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>slack limit switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mechanical obstruction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>re position the limit switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>remove obstruction</td>
</tr>
<tr>
<td>30</td>
<td>IMM CYCLE NOT COMPLETED</td>
<td>the sequence of signals moulding machine open and moulding machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed, has not been correctly executed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check moulding machine cycle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check that the signals moulding machine open and moulding machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>closed arrive</td>
</tr>
<tr>
<td>31</td>
<td>IMM NOT OPEN</td>
<td>the mould has not opened in the time allowed (persistent message)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check for any alarms on the moulding machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check that the signals of moulding machine open and/or closed arrive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>check the vertical axis cam outside the mould</td>
</tr>
<tr>
<td>32</td>
<td>IMM NOT IN AUTOMATIC</td>
<td>the robot has been switched to &quot;<strong>automatic</strong>&quot; with the moulding machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in <strong>manual</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>switch selector to <strong>manual</strong>;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>switch the moulding machine to <strong>automatic</strong></td>
</tr>
<tr>
<td>33</td>
<td>IMM NOT IN MANUAL</td>
<td>the moulding machine has not been set to <strong>manual</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>set moulding machine to manual operating mode</td>
</tr>
<tr>
<td>34</td>
<td>OPERATION WITHOUT ROBOT</td>
<td>the “excluded” mode of the robot has been set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>select the desired functioning mode</td>
</tr>
<tr>
<td>35</td>
<td>ROBOT IN END CYCLE</td>
<td>the “and cycle” mode of the robot has been set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>select the desired functioning mode</td>
</tr>
<tr>
<td>No.</td>
<td>CAUSE Evaluation</td>
<td>REMEDY Evaluation</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>No.36</td>
<td>CONVEYOR NOT READY&lt;br&gt;the downstream conveyor belt is full&lt;br&gt;the photoelectric cell has lost its setting</td>
<td>free the conveyor&lt;br&gt;adjust the photoelectric cell</td>
</tr>
<tr>
<td>No.37</td>
<td>PERIPHERAL NOT READY&lt;br&gt;the equipment with which the robot has to work is not in the correct position</td>
<td>check and adjust the equipment</td>
</tr>
<tr>
<td>No.38</td>
<td>OUT 1 (PNEUMATIC X) NOT IN POSITION&lt;br&gt;the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder&lt;br&gt;slack limit switch&lt;br&gt;flow regulator closed and/or broken&lt;br&gt;mechanical obstruction</td>
<td>replace cylinder&lt;br&gt;re position the limit switch&lt;br&gt;adjust or change flow regulator&lt;br&gt;remove obstruction</td>
</tr>
<tr>
<td>No.39</td>
<td>OUT 2 (PNEUMATIC Z) NOT IN POSITION&lt;br&gt;the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder&lt;br&gt;slack limit switch&lt;br&gt;flow regulator closed and/or broken&lt;br&gt;mechanical obstruction</td>
<td>replace cylinder&lt;br&gt;re position the limit switch&lt;br&gt;adjust or change flow regulator&lt;br&gt;remove obstruction</td>
</tr>
<tr>
<td>No.45</td>
<td>GUARD SAFETY DEVICES OPEN&lt;br&gt;a guard has been opened;&lt;br&gt;a limit switch of a guard has been damaged</td>
<td>close the guard&lt;br&gt;replace the limit switch of the guard</td>
</tr>
<tr>
<td>No.46</td>
<td>OVERSTROKE SAFETY DEVICES OVERRIDDEN&lt;br&gt;the key selector “OVERSTROKE” has been turned on “EXCL”</td>
<td>reposition on “INS” the key selector “OVERSTROKE”</td>
</tr>
<tr>
<td>No.47</td>
<td>GUARD SAFETY DEVICES OVERRIDDEN&lt;br&gt;the key selector “GUARDS” has been turned on “EXCL”</td>
<td>reposition on “INS” the key selector “GUARDS”</td>
</tr>
<tr>
<td>No.48</td>
<td>EMERGENCY&lt;br&gt;an emergency button has been pressed</td>
<td>unlock the emergency button; press start auxiliaries button on the moulding machine, then start auxiliaries on TME</td>
</tr>
<tr>
<td>No.49</td>
<td>END CYCLE SECURITIES&lt;br&gt;the M42 requirement is not satisfied</td>
<td>check the vacuum switches, the limit switches on Y/Z axis outside the mould</td>
</tr>
</tbody>
</table>
# Chart of Fault Tracing Diagnosis and Alarm Signals for the TME Keyboard Without Number

<table>
<thead>
<tr>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Error of Input/Output on PCD2 Bus</strong></td>
<td>axis or I/O card missing or wrong card position</td>
</tr>
<tr>
<td></td>
<td>hardware error</td>
</tr>
<tr>
<td></td>
<td>wrong machine data axis no.</td>
</tr>
<tr>
<td></td>
<td>I/O card faulty</td>
</tr>
<tr>
<td></td>
<td>axis card faulty</td>
</tr>
<tr>
<td></td>
<td>BUS faulty</td>
</tr>
<tr>
<td><strong>Alteration on datas: Do you want to delete completely the CPU?</strong></td>
<td>discharged or faulty batteries</td>
</tr>
<tr>
<td></td>
<td>check the placing contacts of the batteries</td>
</tr>
<tr>
<td></td>
<td>replace batteries (see chapter 5.2 Changing the batteries)</td>
</tr>
<tr>
<td></td>
<td>delete completely the CPU (pressing F1)</td>
</tr>
<tr>
<td></td>
<td>restore the machine datas and the programs manually or using the backup unit or PC</td>
</tr>
<tr>
<td><strong>Command error on axis card/s</strong></td>
<td>the axis card has not answered to the PLC in the time necessary due to a system overload or command error</td>
</tr>
<tr>
<td></td>
<td>hardware error</td>
</tr>
<tr>
<td></td>
<td>wrong machine datas</td>
</tr>
<tr>
<td></td>
<td>cut voltage from the electrical panel and switch on again</td>
</tr>
<tr>
<td></td>
<td>axis card faulty</td>
</tr>
<tr>
<td></td>
<td>check machine datas</td>
</tr>
<tr>
<td><strong>Error position on the Y/X/Z axis</strong></td>
<td>axis obstruction and/or mechanically strong</td>
</tr>
<tr>
<td></td>
<td>motor/encoder connection on the motor side or drive card faulty</td>
</tr>
<tr>
<td></td>
<td>wrong machine datas, position error, motion control, acc., speed</td>
</tr>
<tr>
<td></td>
<td>check the obstruction, if any</td>
</tr>
<tr>
<td></td>
<td>check the motor/encoder connection on the motor side and/or drive card</td>
</tr>
<tr>
<td></td>
<td>check the machine datas</td>
</tr>
<tr>
<td></td>
<td>drive card faulty</td>
</tr>
<tr>
<td></td>
<td>motor faulty</td>
</tr>
<tr>
<td><strong>Calculation error on line…of the program and/or of the function…</strong></td>
<td>writing error in the CN program</td>
</tr>
<tr>
<td></td>
<td>two equal functions have been written on the same line</td>
</tr>
<tr>
<td></td>
<td>check the CN program</td>
</tr>
<tr>
<td></td>
<td>separate the two functions</td>
</tr>
<tr>
<td><strong>Sytrama terminal board V:B3</strong></td>
<td>no transmission between the PLC and the keyboard is present</td>
</tr>
<tr>
<td></td>
<td>hardware error</td>
</tr>
<tr>
<td></td>
<td>check the cable and/or the connections between the keyboard and the CPU</td>
</tr>
<tr>
<td></td>
<td>check the CPU status</td>
</tr>
<tr>
<td></td>
<td>check the interface card keyboard/CPU</td>
</tr>
<tr>
<td></td>
<td>check the TME keyboard</td>
</tr>
</tbody>
</table>