SY.TRA.MA S.r.l.

CODE: ATME 6.4L

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)

SY.TRA.MA S.r.l.

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.

INDEX

SY.TRA.MA S.r.l.

1-ROBOT ACTIVATION

1 OK	2 W/ROBOT	3 STEP	4 Prgm	5 LINE
	MAIN MENU 6		**SPEED** 7	
9 EDIT	10 EXCL	11 AUTO	12 JOG	13 14 **DIAGN >**

8					15
^ || F1	F2	F3	F4	F5	>

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-NO ROBOT-END CYCL
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 - STEP
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.

SY.TRA.MA S.r.l.

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.

16	10	11	17	18
CHANGE	END C.	AUTO	SPEED+	SPEED-

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 %

SY.TRA.MA S.r.l.

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 :

```
         JOG                        SPEED
                                     35%


   Y  AXIS  =          000
   Z  AXIS  =          000
   X  AXIS  =          000


AUX(M)    FORCING              SPEED+    SPEED-
```

F1	F2	F3	F4	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.

SY.TRA.MA S.r.l.

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:

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

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

ON	OFF			

F1	F2	F3	F4	F5

-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.

SY.TRA.MA S.r.l.

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

TYPE              PRESENT VALUE

PARAMETER 0
BIT F             0
OUTPUT            0

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 the 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

SY.TRA.MA S.r.l.

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.

SY.TRA.MA S.r.l.

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

| CYCLE
F2 |
| --- |

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:

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	**CYCLE**	PALLET	DIRECT	AUX(M)

Digiting the F2 CYCLE softkey the following page appears:

		Prgm		
POSITION	= Y	Z	X	
Parking	=P30	P20	P10	
Wait opening	=P31	P21	P11	
Part picking-up	=P32	P22	P12	
Part unloading	=P33	P23	P13	
Fault part unloading	=P34	P24	P14	
Degating position	=P35	P25	P15	
On peripheral	=P36	P26	P16	
Free	=P37	P27	P17	
Carton layer unload	=P38	P28	P18	
Carton layer pick-up	=P39	P29	P19	

Y AXIS	Z AXIS	X AXIS		TEACH

F1	F2	F3	F4	F5

Not all of the positions appear on the displayed page; in order to visualize those not shown on the display and/or in order to select the position that needs modifying, use the following keys ☐ and ☐

Pressing the softkeys F1 Y AXIS or F2 Z AXIS or F3 X AXIS and by means of the numerical keys (1:9 +,-), the value of the new position can be set in.

Pushing the F5 TEACH softkey, it is possible to move the axis using the arrows keys and the store the new values by means of the F5 STORE softkey.

Note: in automatic mode it is possible to modify the positions of the axis 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.

SY.TRA.MA S.r.l.

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.

SY.TRA.MA S.r.l.

SELF-TEACHING PALLETISING

**PALLET
F3**

The access to the menu of palletization parameters is <u>only</u> allowed when editing a palletization program; otherwise an error of PARAMETERS ASSIGNING will appear. To get access to the pallettization 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:
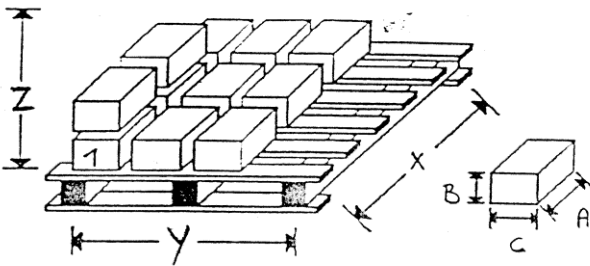
Number of parts X axis	=	0000.0
Number of parts Z axis	=	0000.0
Number of parts Y axis	=	0000.0
Inter-axis A X axis	=	0000.0
Inter-axis B Z axis	=	0000.0
Inter-axis C Y axis	=	0000.0
First part X axis	=	0000.0
First part Z axis	=	0000.0
First part Y axis	=	0000.0
Teach all axis, first part.		
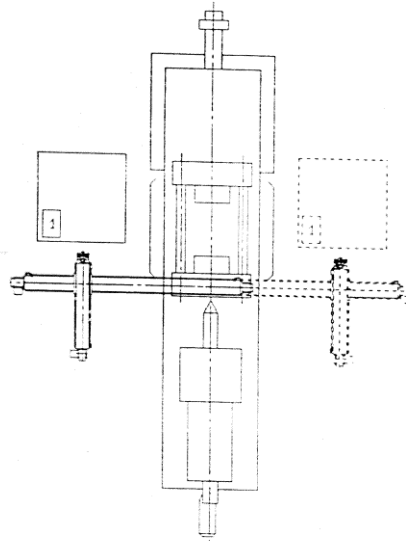
Move with the cursor on the data to be modified; press F5 to modify it, set the new value in, **including** the first decimal digit, press F5 to store.

After having modified the pallettizing parameters or selecting a new program in the main menu, the pallettization 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.

SY.TRA.MA S.r.l.

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

CYCLE OF 1° POSITION				
Y AXIS	Z AXIS	X AXIS	POSITION	TEACH

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

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	**AUX (M)**

After having executed the desired function, go back to the previous menu to move the axes.

SY.TRA.MA S.r.l.

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

SY.TRA.MA S.r.l.

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

NUMBER	LENGTH
001	50
002	78
039	86
129	15
390	63
999	58

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.

SY.TRA.MA S.r.l.

COPY OF A PROGRAM

```
  COPY
   F2
```

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

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	**COPY**	NEW	DELETE	PRINT >

-From the main menu, digit the F1EDIT softkey and the programs menu is visualized.
-Digit the **F2COPY** 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
```

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	**NEW**	DELETE	PRINT >

-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 **F5STORE** 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.

SY.TRA.MA S.r.l.

DELETING A PROGRAM

```
DELETE
  F4
```

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	**DELETE**	PRINT >

-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.

SY.TRA.MA S.r.l.

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).

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	**NEW**	DELETE	PRINT >

-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.

SY.TRA.MA S.r.l.

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			MAC.DAT

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.

SY.TRA.MA S.r.l.

4-PROGRAM MODIFICATION

VISUALIZATION OF PROGRAM LIST

	EDIT	W/ROBOT	AUTO	JOG	DIAGN	

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.

MENU PROGRAMS

NUMBER	LENGTH
001	50
002	78
039	86
129	15
390	63
999	58

VISUALIZATION OF A PROGRAM

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

-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.
-Digit the **F1 EDIT** softkey and the self-teaching menu appears.
-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.

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
>				
INSERT	DELETE	ZOOM	CLEAR	

-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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
>				
INSERT	**DELETE**	ZOOM	CLEAR	

-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.

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DIRECT	AUX (M)

>

INSERT	DELETE	ZOOM	**CLEAR**	

-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.

Y AXIS	Z AXIS	X AXIS	FUNCTION	
F1	F2	F3	F4	F5

-Digiting the chosen softkey, the parameter of the axis or the function will be cancelled from the chosen line.

SY.TRA.MA S.r.l.

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**

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DIRECT	AUX (M)

AXIS	PARAM	AUX(M)	CMP+JMP	**F.AXIS**

AXIS FUNCTIONS EDIT MENU				
AXIS	Speed		Acceleration	
Y	=		=	
Z	=		=	
X	=		=	
	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

SY.TRA.MA S.r.l.

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.

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

-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

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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 digiting the softkey F2ACCEL , select the program line to be modified.

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

-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/s^2 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.

SY.TRA.MA S.r.l.

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:

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DIRECT	AUX (M)

AXIS	**PARAM**	AUX	CMP+JMP	F.AXIS

-digiting 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				
Load in Parameter P0				
VALUE	PARAMET			

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

```
VALUE
  F1
```

In P parameter a constant is loaded

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

VALUE	PARAMET

-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.

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LOADING THE CONTENT OF A PARAMETER IN ANOTHER PARAMETER

PARAMET F2

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
VALUE	**PARAMET**			

-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.

SY.TRA.MA S.r.l.

SETTING A PARAMETERED AXIS

```
PARAMET
   F2
```

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
AXIS	PARAM	AUX	CMP+JMP	F.AXIS
TEACH	**PARAMET**	DISA.AX	VALUE	

-Digiting **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 digiting 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 ?

YES F1	ESCAPE F2	F3	F4	F5

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.

SY.TRA.MA S.r.l.

SETTING AN AXIS WITH DIRECT VALUE

VALUE
F4

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

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
AXIS	PARAM	AUX	CMP+JMP	F.AXIS
TEACH	PARAMET	DISA.AX	**VALUE**	

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?

YES F1	ESCAPE F2	F3	F4	F5

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 memor

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

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

AXIS	PARAM	**AUX**	CMP+JMP	F.AXIS

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

Auxiliaries Edit Menu				
SEE FIRST PAGE AUXILIARIES CHAPTER 8 CHART AUXILIARY FUNCTIONS				
OTHERS (M)	**PERMITS**	**WAIT**	**DELETE**	**STORE**

F1	**F2**	**F3**	**F4**	**F5**

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

Auxiliaries Edit Menu				
SEE SECOND PAGE AUXILIARIES CHAPTER 8 CHART AUXILIARY FUNCTIONS				
OTHERS (M)	**PERMITS**	**WAIT**	**DELETE**	**STORE**

F1	**F2**	**F3**	**F4**	**F5**

-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).

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
AXIS	PARAM	**AUX**	CMP+JMP	F.AXIS
OTHERS	**PERMITS**	WAIT	DELETE	STORE

-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				
			DELETE	**STORE**

F1	**F2**	**F3**	**F4**	**F5**

SY.TRA.MA S.r.l.

SETTING WAITING TIME ON AN INPUT OR DELAY TIME

```
WAITING
   F3
```

To get to the F3 WAITING softkey, from the main menu, press as it follows.
Note: before digiting the F3WAITING softkey, select the line to be modified.

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DIRECT	AUX (M)

AXIS	PARAM	**AUX**	CMP+JMP	F.AXIS

OTHERS	PERMITS	**WAIT**	DELETE	STORE

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.

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DIRECT	AUX (M)

AXIS	PARAM	**AUX**	CMP+JMP	F.AXIS

>

OUTPUT	PERIPHE			

-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.

SY.TRA.MA S.r.l.

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
AXIS	PARAM	**AUX**	CMP+JMP	F.AXIS
>				
OUTPUT	**PERIPHE**			

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

Peripherals Edit Menu				
SEE PAGE PERIPHERALS CHAPTER 8 CHART M AUXILIARY FUNCTIONS				
			DELETE	STORE

F1	F2	F3	F4	F5

-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 digiting the F3ADVANCE softkey, select the program line to be modified.

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

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				
MODAL 1	=300	1/10 mm		
MODAL 2	=100	1/10 mm		
FREE	=........	1/10 mm		
All the advances are active from the line following the control one except for off.				
Select desired advance				
OFF	MODAL 1	MODAL 2	FREE	DELETE

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 **F4D.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.

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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.

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 **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.

Parameters Edit Menu		
Sum		
	(ex.1)	(ex.2)
FIRST OPERATING	:P10	P10
SECOND OPERATING	:P11	K325
RESULT	P31	P10
STORE ?		
CONST		

F1	F2	F2	F4	F5

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.

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INCREASE AND DECREASE OF A PARAMETER

INCREASE F3	DECREASE F4

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

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.

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COMPARISON AND JUMP BETWEEN PARAMETERS

CMP-JMP F5

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.

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 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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN

EDIT	COPY	NEW	DELETE	PRINT >

EDIT	CYCLE	PALLET	DELETE	PRINT
AXIS	PARAM	AUX	CMP+JMP	F.AXIS

>

CLEAR	SUB			

-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.

```
              Parameters Edit Menu
                  Subtraction

                         (ex.1)       (ex.2)
FIRST OPERATING      :   P10          P10
SECOND OPERATING     :   P11          K325
RESULT               :   P31          P10
STORE ?
```

CONST				

F1	F2	F3	F4	F5

Example1: 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 loades
-Position the cursor on STORE?
-Digit the F5 STORE softkey.

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6-DIAGNOS VISUALIZATION

VISUALIZATION OF THE MACHINE PARAMETERS VALUES

| VALU P. |
| F1 |

EDIT	W/ROBOT	AUTO	JOG	DIAGN
VALU P.	PLC PRO	ACT LIN.	AXIS	MESSAGES

-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	INSERT	AUTO	JOG	DIAGN

F1	F2	F3	F4	F5

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PLC PRO F2

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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
VALU P.	**PLC PRO**	ACT LIN.	AXIS	MESSAGES

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

```
                         MAIN MENU

STATUS PLC

I64            I 80           I 96              I 112
01234567       01234567       01234567          01234567
01100111       11000011       00011001          00110100

O 128          O 144          O 160             O 176
01234567       01234567       01234567          01234567
00000111       00010010       11100011          00010001

```

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.

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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

Status of execution                          Waiting start
Y axis     =0    (1=executed)
Z axis     =0
X axis     =0
Funct.1    =0
Funct.2    =0
Time out   =0                 Byte xx    =00000000
```

VISUALIZATION OF THE ROBOT CYCLE TIME

EDIT	W/ROBOT	AUTO	JOG	**DIAGN**

VALU P.	**PLC PRO**	ACT. LINE	AXIS	MESSAGES

- 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

               Total time           00:00:0
               Robot time           00:00:0
               Picking-up time      00:00:0
```

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ROBOT/IMM INTERFACE EXECUTION STATUS

Digiting 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)

```
                              MAIN MENU

     S. Status                    S. Status

      .........AUTOMATIC.          ..........EXCLUDED          KA1
      .........GATE                ..........OUTPUT EJECT.     KA3
      .........OPEN IMM            ..........RE-ENT-EJECT.     KA4
      ........CLOSED IMM           .........CLOSING           KA2
      .........FORWARD EJECT.      ..........OPENING/CLOS.     KA5
      .........BACKWARD EJECT.
      .........QUALITY CONTROL
```

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VISUALIZATION OF PRESENT BLOCK

**PR. LINE
F3**

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

EDIT	W/ROBOT	AUTO	JOG	**DIAGN**
VALU P.	PLC PRO	**PR. LINE**	AXIS	MESSAGES

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.

EDIT	W/ROBOT	AUTO	JOG	**DIAGN**
VALU P.	PLC PRO	PR. LINE	**AXIS**	MESSAGES

MAIN MENU

AXIS POSITION

Present		Programmed
0.0	Y	0.0
0.0	Z	0.0
0.0	X	0.0

Present position	In this field, the present position of each axis appears.
Programmed pos.	In this field, the programmed position appears.

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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.

EDIT	W/ROBOT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	PRINT >
EDIT	CYCLE	PALLET	DIRECT	AUX (M)
>				
INSERT	DELETE	**ZOOM**	CLEAR	

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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:

EDIT	W/ROBOT	AUTO	JOG	DIAGN
>				
INFOME	**I/O DAT.**			

PROGRAMS			MACHINE DATAS	
DELETE	**CN > PC**	**PC > CN**	**CN > PC**	**PC > CN**

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 dats contained in the CN are overwritten.
            After having given this instruction it is necessary to switch off and re-start the CN.

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

EDIT	INSERT	AUTO	JOG	DIAGN
EDIT	COPY	NEW	DELETE	**PRINT**
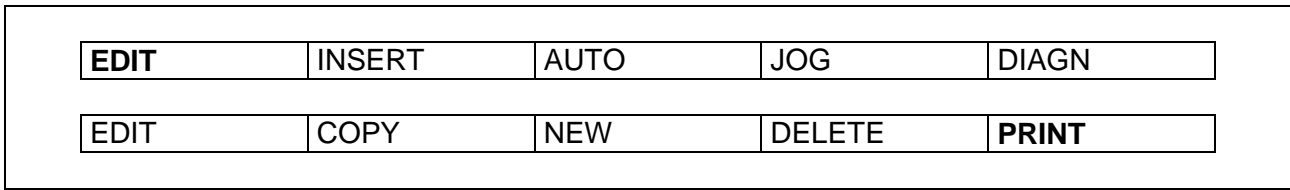
Select the datas to be printed by means of the softkeys:
F1   SHOWN PROGRAM
F2   ALL PROGRAMS IN MEMORY
F3   MACHINE DATAS
F4   VALUE CONTAINED IN THE PARAMETERS.
F5   TIMER

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

ELECTRIC CABINET	3	(RX)-------------- (TX)	PRINTER OR BACK-UP UNIT OR PC
	2	(TX)--------------(RX)	
	5	(GND)----------(GND)	
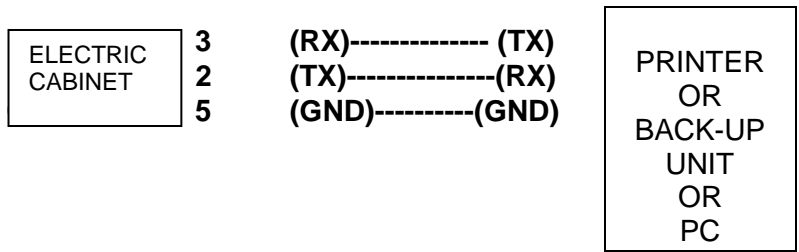
PRINTER CONFIGURATION

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

Configuration of the printer:

SERIAL OUTGOING	RS-232
BAUD RATE	9600
WORD LENGTH	8 (Data bit)
PARITY	NO
STOP BIT	1

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 (mathematicals, 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.

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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
              Substraction between parameters or constants.

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EXAMPLES OF PROGRAMMING

Standard Program RSV101 E3

00		
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/s²
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 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 dm/s² + 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 dm/s + wrist set
31	AZ=5	Z axis acceleration change in dm/s²
32	Z=P23 Anti OFF	Z axis part unloading + advance off
33	M11 Stop 5 dix	vacuum reset +stop for 0,5 sec.
34	VZ=10 Anti M2	Z axis speed change in dm/s + Modal 2 advance
35	Z=P20	Z axis upwards
36	Jump19	jump to line 19

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Paletization 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 P 32 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 pallettized on the X axis
18	P5=K0.0	write in P5 the interaxis of the part to be pallettized on the Z axis
19	P6=K0.0	write in P6 the interaxis of the part to be pallettized on the Y axis
20	P7=K0.0	write in P7 the value of the 1st part to be pallettized on the X axis
21	P8=K0.0	write in P8 the value of the 1st part to be pallettized on the Z axis
22	P9=K0.0	write in P9 the value of the 1st part to be pallettized on the Y axis
23	P50=P7 P53=K0.0	* + *
24	P51=P8 P54=K0.0	* + *
25	P52=P9 P55=K0.0	* + *
26	P0=K1.0 M50	*+ start conveyor belt
27	Z=P20	Z axis in parking position
28	X=P10	X axis in parking position
29	Y=P30	Y axis in parking position
30	M15	wrist reset
31	VY=25 VZ=50 VX=10 Anti M1	speed change Y/Z/X in dm/s Modal 1 advance
32	M15 M42	wrist reset + start cycle
33	Y=P32 AZ=150	Y-axis in part pick-up + Z-axis acceleration in dm/s²
	X=P11	X-axis on waiting opening
34	M45	waiting time for IMM opening
35	Z=P22 M10	Z axis in part pick-up + vacuum set
36	X=P12 M20	X-axis in part pick-up + ejector forward
37	X=P11 M21	X-axis and ejector backwards
38	Z=P20	Z axis upwards
39	M40	verify picked-up part
40	Y=P52 X=P50 M46	Y- and X-axis over the pallet + permit IMM closing

41	VZ=5 M14	Z-axis speed change in dm/s + wrist reset
42	AZ=5	Z-axis acceleration in dm/s²
	P41=P51-K100.0	* + *
43	Z=P41	support for intermediate position of the vertical axis
44	VZ=1 Anti OFF	Z-axis speed change in dm/s + off advance
45	Z=P51	down stroke onto the pallet
46	M11 Stop 5 ten	vacuum reset + pause for 0.5 seconds
47	VZ=10 Anti M2	vertical speed change in dm/s + Modal 2 advance
48	Z=P20	Z axis upwards (if the pallet is complete)
49	Inc P53	*
50	P50=P50+P4	*
51	If P53 < P1 Jump 30	*
52	P50=P7 P53=K0.0	*
53	Inc P55	*
54	P52=P52-P6	*
55	If P55 < P3 Jump 30	*
56	P52=P9 P55=K0.0	*
57	Inc P54	*
58	P51=P51-P5	*
59	If P54 < P2 Jump 30	*
60	P51=P8 P54=K0.0	*
61	M50	start conveyor belt
62	Jump 30	jump to line 30

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

Special Palletization program RSV 101 E3 with carton layer

0		
01	VY=4 VZ=4 VX=4	X/Y/Z/ axis speed in dm/s
02	AY=30 AZ=100 AX=40 P48=K0.0	Y/Z/X axis acceleration in dm/s² +*
03	P10=K0.0	write in P10 X axis parking value
04	P11=K0.0	write in P11 X axis in IMM wait. open. value
05	P12=K0.0	write in P12 X axis part picking-up value
06	P18=K0.0	write in P18 Z axis carton layer unloading value
07	P19=k0.0	write in P19 Z axis value of carton layer pick up value
08	P20=K0.0	write in P20 Z axis parking value
09	P21=K0.0	write in P21 Z axis IMM wait. open. value
10	P22=K0.0	write in P22 Z axis part picking-up value
11	P28=K0.0	write in P28 Z axis cart. layer unload value
12	P29=K0.0	write in P29 Z axis cart. layer pick-up value
13	P30=K0.0	write in P30 Y axis parking value
14	P31=K0.0	write in P31 Y axis IMM wait. Open. value
15	P32=K0.0	write in P32 Y axis part picking-up value
16	P38=K0.0	write in P38 Y axis cart. layer unload value
17	P39=K0.0	write in P39 Y axis cart. layer pick-up value
18	P49=K500.0	support for special program
19	M43	vertical axis up check
20	If P0 <>P48 Jump 34	if the value of P0 is different from the value P48 jump to line 34

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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 interm. 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	*

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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 pallettize on X axis
15	P2=K7.0	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 palettize on Z axis
19	P6=K0.0	write in P6 the interaxis of the part to palettize on Y axis
20	P7=K378.9	write in P7 the value of the 1st part to palettize on X axis
21	P8=K1831.6	write in P8 the value of the 1st part to palettize on Z axis
22	P9=K806.1	write in P9 the value of the 1st part to palettize 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	support for position of Y axis
62	Jump to sub106	jump to sub-routine 106
63	P47 = K0.0	*
64	Jump 31	jump to line 31
65	Inc P46	*
66	If P46 <> P60 jump 73	if P46 value differs from the one of P60 jump to line 73
67	P60=K4,0	fourth position on pallet
68	P40 = k666.1	support of position of X axis
69	P41 = K1799.3	support of position of Z axis
70	P42 = k150.2	support of position of Y axis
71	Jump to sub 106	jump to sub-routine 106
72	Jump 31	jump to line 31
73	Inc P46	*
74	If P46 <>p60 jump 81	if the value of P46 differs from the one of P60 it jumps to line 81
75	P60 = K5,0	fifth position on pallet
76	P40 = K482.7	support for position of X axis
77	P41 = K1817.1	support for position of Z axis
78	P42 = K161.5	support for position of Y axis
79	Jump to sub106	jump to sub-routine 106
80	Jump 31	jump to line 31
81	Inc P46	*
82	Se P46 <>P60 Jump 89	if the value of P46 differs from the one of P60 it jumps to line 89
83	P60 = K6.0	sixth position on pallet
84	P40 0 K0.0 - K74.5	support for position of X axis
85	P41 = K1806.0	support for position of Z axis
86	P42 = K667.8	support for position of Y axis
87	Jump to sub106	jump to sub-routine 106
88	Jump 31	jump to line 31
89	Inc P46	*
180	If P46 <> P60 jump 187	if the value of P46 differs from the one of P60 jump to line 187
181	P60 = K18.0	eighteenth position on the pallet
182	P40 = K0.0	support for position of X axis
183	P41 = K0.0	support for position of Z axis
184	P42 = K0.0	support for position of Y axis
185	Jump to sub106	jump to sub-routine 106
186	Jump 31	jump to line 31
187	Inc P46	*
188	If P46 <> P60 jump 195	if the value of P46 differs from the one of P60 jump to line 195
189	P60 = K19.0	nineteenth position on the pallet
190	P40 = K0.0	support for position of X axis
191	P41 = K0.0	support for position of Z axis
192	P42 = K0.0	support for position of Y axis
193	Jump to sub106	jump to subroutine 106
194	Jump 31	jump to line 31
195	P60 = K20.0	twentieth position on the pallet
196	P40 = K0.0	support for position of X axis
197	P41 = K0.0	support for position of Z 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 – K 30.0	*+*
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

0		
01	VY=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	Y/Z/X axis speed change + modal 1 advance
24	M42	start cycle
25	Y=P32 AZ=80 X=P11	Y axis in part pick-up +Z axis accel. +
		X axis on wait. open
26	M45	wait for IMM opening
27	Z=P22 M10	Z axis in part pick-up + vacuum set
28	X=P12 M20	X axis in part pick up + ejector forwards
29	M26	sprue grip set
30	X = P11 M21	X axis and ejector backwards
31	Z=P20	Z-axis upwards
32	M40	Verify picked-up part
33	Y=P34 X=P14 M46	Y and X axis on unloading + permit IMM closing
34	VZ= 5 M14	Z-axis speed + wrist set
35	AZ=5	Z axis acceleration
36	Z=P24 Anti OFF	Z axis in sprue unloading +advance OFF
37	M27 stop for 5 tenths	sprue grip reset + stop for 0,5 sec.
38	VZ= 10 Anti M1	Z axis speed + modal 1 advance
39	Z=P20	Z axis upwards
40	Y = P33 X = P13	X and Y axis in unloading of part
41	Z=P23 Anti OFF	Z axis in unloading of part
42	M11 Stop for 5 tenth	vacuum reset + stop for 0,5 sec
43	VZ = 10 Anti M2	Z axis speed + modal 2 advance
44	Z = P20	Z axis in parking
45	Jump22	Jump to line 22

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
		value of P48 jump to line 29
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 palettize on Z axis
16	P3=K0.0	write in P3 the N. of parts to palettize on Y axis
17	P4=K0.0	write in P4 the interaxis of the part to palettize
		on X axis
18	P5=K0.0	write in P5 the interaxis of the part to palettize
		on Z axis
19	P6=K0.0	write in P6 the interaxis of the part to palettize
		on Y axis

20	P7=K0.0	write in P7 the value of the 1st part to pallettize on X axis
21	P8=K0.0	write in P8 the value of the 1st part to pallettize on Z axis
22	P9=K0.0	write in P9 the value of the 1st part to pallettize 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=K1 .0 M50	*+ conveyor on til input
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	VY=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 palletze 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 2nd pallet
26	P50=P7 P53=K0.0	*+*
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
	Anti M1	+ modal 1 advance
37	M42	start cycle
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

71	Jump 35	Jump to line 35
72	Y=P52 X=P50	Y/X axis on pallet 2
73	VZ=5 M14 M57	Z axis speed change + tilting set + control of pallet 2 in position
74	AZ=5 P41=P51 - K100.0	change of acceleration Z axis + *
75	Z=P41	support for intermediate position of vertical axis
76	VZ=1 Anti OFF	change of speed of Z axis + anticipation switch off
77	Z=P51	down stroke to pallet 2
78	M11 Stop for 5 tenths	vacuum reset + stop for 0,5 sec
79	VZ=10 anti M2	Z axis change of speed + modal 2 advance
80	Z=P20	Z axis upward
81	Inc P53	*
82	P50=P50 + P4	*+*
83	If P53 < P1 Jump 35	*+*
84	P50=P16 P53=K0.0	*+*
85	Inc P55	*
86	P52=P52 - P6	*+*
87	If P55 < P3 Jump 35	*+*
88	P52=P36 P55=K0.0	*+*
89	Inc P54	*
90	P51=P51 - P5	*+*
91	If P54 < P2 Jump 35	*+*
92	P50=P7 P53=K0.0	*+*
93	P51=P8 P54=K0.0	*+*
94	P52=P9 P55=K0.0	*+*
95	M56 P49=K0.0	special function for change of pallet 2 +*
96	Jump 35	jump to line 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

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CHART FOR PARAMETERS UPDATING

Description		X Axis		Z axis		Y axis
Position	P	Value	P	Value	P	Value
Parts on pallet	1		2		3	
Inter-axis on pallet	4		5		6	
1°position pallet	7		8		9	
Parking	10		20		30	
Waiting opening	11		21		31	
Part pick-up	12		22		32	
Part unloading	13		23		33	
Fault part unloading	14		24		34	
Degating pos.	15		25		35	
On peripheral	16		26		36	
Free	17		27		37	
Carton layer unload	18		28		38	
Carton layer pick-up	19		29		39	

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PARAMETERS LIST "P" AND RELEVANT DESCRIPTION

P00   parameters start
P01   number of parts on axis X
P02   number of parts on Z axis
P03   number of parts on Y axis
P04   part inter-axis on X axis
P05   part inter-axis on Z axis
P06   part inter-axis on Y axis
P07   position of the first part on X axis
P08   position of the first part on Z axis
P09   position of the first part on Y axis
P10   parking position of X axis
P11   X axis position waiting for the IMM opening
P12   X axis position for part pick-up
P13   X axis position for part unloading
P14   X axis position for fault part unloading
P15   X axis position for degating
P16   X axis position on peripheral
P17
P18   X axis position for carton layer unloading
P19   X axis position for carton layer pick-up
P20   parking position of Z axis
P21   Z axis position waiting for the IMM opening
P22   Z axis position for part pick-up
P23   Z axis position for part unloading
P24   Z axis position for fault part unloading
P25   Z axis position for degating
P26   Z axis position on peripheral
P27
P28   Z axis position for carton layer unloading
P29   Z axis position for carton layer pick-up
P30   parking position of Y axis
P31   Y axis position waiting for the IMM opening
P32   Y axis position for part pick-up
P33   Y axis position for part unloading
P34   Y axis position for fault part unloading
P35   Y axis position for degating
P36   Y axis position on peripheral
P37
P38   Y axis position for carton layer unloading
P39   Y axis position for carton layer pick-up
P40   Support for X axis position
P41   Support for Z axis position
P42   Support for Y-axis position
P43
P44
P45
P46
P47
P48   variable for number 0
P49
P50   X axis actual position on pallet

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P51   Z axis actual position on pallet
P52   Y axis actual position on pallet (X axis)
P53   part loaded on pallet (X axis)
P54   layer on pallet (Z axis)
P55   line on pallet (Y axis)
P56
P57
P58
P59
P60   support for special program

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Auxiliary functions "M" and corresponding description, input, output							
First page Aux				ON		OFF	
ON	OFF						
M10	M11	Vacuum 1		U144			
M12	M13	Vacuum 2		U145			
M14	M15	Wrist		U164	I 84	U163	I 83
M16	M17	Wrist rotation		U165	I 85	U166	I 86
M18	M19	Part grip		U167			I 87
M20	M21	Ejector		U180	I100	U181	I101
M22	M23	Out 1 (X pneumatic)		U177	I113	U176	I112
M24	M25	Out 2 (Z pneumatic)	Out 2	U133	I 52	U132	
			Z Pneum	U133	I 52	U132	I114
M26	M27	Sprue grip		U149			
Second page Aux				ON		OFF	
ON	OFF						
M28	M29	Blow 1		U134			
M30	M31	Part grip without sensor		U167			
M32	M33	Degator		U178			
M34	M35	Core Set		U128	I 48	U129	I 49
M36	M37	Core Pull		U130	I 50	U131	I 51
M38	M39	Start/End subroutine					
Page controls / allowances			ON		OFF		
M40	Verify part 1		I 64				
M41	Verify part 2		I 65				
M42	Start cycle		I118, I119		I 64, I 65		
M43	Vert. Axis up check		I 114				
M44	Trav. safety off						
M45	Wait IMM open		I 98, I101		I 99, I100		
M46	Permit IMM close		I118				
M47	Strip release						
M48							
Page of the Peripheral			OUT		IN		
M49	Conv.on for ... (0,1 sec)		U147				
M50	Conv.on til input		U147		I 67		
M51	Check conv. clear				I 67		
M52	Start peripheral		U148				
M53	Peripheral ready				I 68		
M54							
M55							
M56							
M57							

SY.TRA.MA S.r.l.

EDIT	W/ROBOT	AUTO	JOG	DIAGN	>	CHANGE	INSERT	AUTO	SPEED +	SPEED -
						STORE	SELECT		PASS W.	

VALU.P.	PLC PRO	ACT.LINE	AXIS	MESS

AUX (M)	FORCING		SPEED +	SPEED -

EDIT	COPY	NEW	DELETE	PRINT	>	INFOME	DAT. I/O			
						DELETE	CN > PC	PC > CN	CN > PC	PC > CN

EDIT	CYCLE	PALLET	DIRECT	AUX(M)

Push a	button to go	on		DATA MAC

SELECT	ALL	DATA MAC	PARAMET	TIMER

AXIS	PARAM	AUX	CNF+JMP	F.AXIS	>	INSERT	DELETE	ZOOM	CLEAR

AXIS Y	AXIS Z	AXIS X	FUNC.1	FUNC.2

SPEED	ACCEL	ADVANCE	D.R.P.	DISABLE

OFF	MODAL 1	MODAL 2	FREE	CLEAR

OTHERS	PERMITS	WAIT	DELETE	STORE	>	OUTPUT	PERIPHE

LOAD	ADD	INC	DEC	CNF+JMP	>	CLEAR	SUB		

TEACH	PARAMET	DISA.AX	VALUE	

AXSEL	ALLAX			

		STORE	SPEED +	SPEED -

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:

```
DIAGNOS.
   F5
```

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.

EDIT	INSER	AUTO	JOG	**DIAGN**

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

VISUALIZATION OF MESSAGES AND ALARMS

```
MESSAGES
   F5
```

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

EDIT	W/ROBOT	AUTO	JOG	**DIAGN**
VALU P.	PLC PRO	ACT. LINE	AXIS	**MESSAGES**

See causes and remedies in the following chart.

SY.TRA.MA S.r.l.

CHART OF TROUBLE SHOOTING DIAGNOSIS AND ALARM SIGNALS FOR THE TME KEYBOARD

No.01	THERMAL PROTECTION
CAUSE	one of the thermal protection relays has opened
REMEDY	check that the motor's current absorbtion is not greater than that for which the relay is set
No.02	KA2/KA5 FAULTY
CAUSE	relay KA2 and/or KA5 damaged
REMEDY	substitute relay
No.03	MOTOR DRIVE FAULTY (SEE ALSO CHAPTER 4.2 TROUBLE SHOOTING DRIVE DIAGNOSIS OF THE USER AND MAINTENANCE MANUAL)
CAUSE	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
REMEDY	Adjust power supply Replace drive-warning-remember to keep original trimmer card Replace motor replace cable check connections remove obstruction
No.04	AIR MISSING
CAUSE	no compressed air in the system pressure switch not set properly pressure switch broken
REMEDY	open compressed air tap set pressure switch to correct pressure (400 kPa) replace pressure switch
No.05	PROGRAM ERROR AT LINE
CAUSE	unacceptable speed or acceleration values have been set or invalid axis destination or program jumps destination
REMEDY	set new, correct values
No.06	BATTERY LOW, DO NOT TURN OFF (SEE ALSO CHAPTER 5.2 CHANGING THE BATTERY OF THE USER AND MAINTENANCE MANUAL)
CAUSE	the battery is flat the equipment has been left off for a long period
REMEDY	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.
No. 07	NO HABILITATED AXIS
CAUSE	a hardware error has occurred on a circuit board of an axis and/or a switchboard I/O incorrect machine data
REMEDY	replace the defective circuit board input correct machine data switch off the panel and then switch on again

SY.TRA.MA S.r.l.

No. 08	WAIT SELF-SETTING IN PROGRESS (MESSAGE PRESENT ONLY ON THE 6.4 L VERSION)
MESSAGE:	the robot is carrying out the setting automatically. When it will be over, the message will disappear.
No. 09	ERROR IN SUBROUTINE EXECUTION
CAUSE:	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	BARS SAFETY ON
CAUSE:	the robot is outside the permitted working area
REMEDY:	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	SOFTWARE END STROKE REACHED
CAUSE	the axis has been moved over the software limit switch;
	machine datas not correct
REMEDY	using the direction buttons on the keyboard move the axis in the correct position
	set the new machine datas
No. 15	OVERSTROKE
CAUSE:	the manipulator has been moved to an OVERSTROKE position
	a limit switch of overstroke has been pushed
REMEDY:	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
	exit from JOG

SY.TRA.MA S.r.l.

No.16 CAUSE	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
REMEDY	check that the "Machine open" signal is working
	replace or adjust limit switches
No.17 **CAUSE**	WRIST OUT OF POSITION
	the operation has not been terminated in the time allowed (persistent message) due to:
	-defective cylinder
	-slack limit switch
	-flow regulator closed and/or broken
	-mechanical obstruction
REMEDY	replace cylinder
	re position the limit switch
	adjust or change flow regulator
	remove obstruction
No.18 **CAUSE**	WRIST ROTATION OUT OF POSITION
	the operation has not been terminated in the time allowed (persistent message) due to:
	defective cylinder
	slack limit switch
	flow regulator closed and/or broken
	mechanical obstruction
REMEDY	replace cylinder
	re position the limit switch
	adjust or change flow regulator
	remove obstruction
No.19 **CAUSE**	PART GRIPPER OUT OF POSITION
	the operation has not been terminated in the time allowed (persistent message) due to:
	defective cylinder
	slack limit switch
	flow regulator closed and/or broken
	mechanical obstruction
REMEDY	replace cylinder
	re position the limit switch
	adjust or change flow regulator
	remove obstruction
No.20 **CAUSE**	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
REMEDY	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

No.21	PART MISSING
CAUSE	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
REMEDY	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
No.22	GATE OPEN
CAUSE	the moulding machine gate is open
REMEDY	close the gate
	check that the signal of gate closed arrives
No.23	EJECTOR NOT FORWARD
CAUSE	the operation has not been terminated in the time allowed (persistent message) due to:
	defective cylinder
	slack limit switch
	mechanical obstruction
REMEDY	replace cylinder
	re position the limit switch
	remove obstruction
No.24	EJECTOR NOT BACKWARD
CAUSE	the operation has not been terminated in the time allowed (persistent message) due to:
	defective cylinder
	slack limit switch
	mechanical obstruction
REMEDY	replace cylinder
	re position the limit switch
	remove obstruction
No.25	Y AXIS NOT IN POSITION
CAUSE	Y axis not in its correct position
	Y axis limit switch outside the mould not set properly or broken
REMEDY	check cycle program
	adjust or replace limit switch
No.26	Z-AXIS NOT DOWN
CAUSE	The function M20 ejector forward with the Z axis too high
	Z axis limit switch outside the mould out of order
REMEDY	check the program in use
	replace the limit switch

No.27	Z AXIS NOT UP
CAUSE	the "zero position" limit switch on the vertical axis does not read
REMEDY	press the **directional buttons** on the control box to send the vertical axis to the top of its stroke check the working cycle replace the limit switch
No.28	CORE SET NOT IN POSITION
CAUSE	the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder slack limit switch flow regulator closed and/or broken mechanical obstruction
REMEDY	replace cylinder re position the limit switch adjust or change flow regulator remove obstruction
No.29	CORE PULL NOT IN POSITION
CAUSE	the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder slack limit switch mechanical obstruction
REMEDY	replace cylinder re position the limit switch remove obstruction
No.30	IMM CYCLE NOT COMPLETED
CAUSE	the sequence of signals moulding machine open and moulding machine closed, has not been correctly executed
REMEDY	check moulding machine cycle check that the signals moulding machine open and moulding machine closed arrive
No.31	IMM NOT OPEN
CAUSE	the mould has not opened in the time allowed (persistent message)
REMEDY	check for any alarms on the moulding machine check that the signals of moulding machine open and/or closed arrive check the vertical axis cam outside the mould
No.32	IMM NOT IN AUTOMATIC
CAUSE	the robot has been switched to **"automatic"** with the moulding machine in **manual**
REMEDY	switch selector to **manual**; switch the moulding machine to **automatic**
No.33	IMM NOT IN MANUAL
CAUSE	the moulding machine has not been set to **manual**
REMEDY	set moulding machine to manual operating mode
No.34	OPERATION WITHOUT ROBOT
CAUSE	the "excluded" mode of the robot has been set
REMEDY	select the desired functioning mode
No.35	ROBOT IN END CYCLE
CAUSE	the "and cycle" mode of the robot has been set
REMEDY	select the desired functioning mode

SY.TRA.MA S.r.l.

No.36 CAUSE REMEDY	CONVEYOR NOT READY the downstream conveyor belt is full the photoelectric cell has lost its setting free the conveyor adjust the photoelectric cell
No.37 CAUSE REMEDY	PERIPHERAL NOT READY the equipment with which the robot has to work is not in the correct position check and adjust the equipment
No.38 CAUSE REMEDY	OUT 1 (PNEUMATIC X) NOT IN POSITION the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder slack limit switch flow regulator closed and/or broken mechanical obstruction replace cylinder re position the limit switch adjust or change flow regulator remove obstruction
No.39 CAUSE REMEDY	OUT 2 (PNEUMATIC Z) NOT IN POSITION the operation has not been terminated in the time allowed (persistent message) due to: defective cylinder slack limit switch flow regulator closed and/or broken mechanical obstruction replace cylinder re position the limit switch adjust or change flow regulator remove obstruction
No.45 CAUSE: REMEDY:	GUARD SAFETY DEVICES OPEN a guard has been opened; a limit switch of a guard has been damaged close the guard replace the limit switch of the guard
No.46 CAUSE: REMEDY:	OVERSTROKE SAFETY DEVICES OVERRIDDEN the key selector "OVERSTROKE" has bee turned on "EXCL" reposition on "INS" the key selector "OVERSTROKE"
No.47 CAUSE: REMEDY:	GUARD SAFETY DEVICES OVERRIDDEN the key selector "GUARDS" has been turned on "EXCL" reposition on "INS" the key selector "GUARDS"
No.48 CAUSE REMEDY	EMERGENCY an emergency button has been pressed unlock the emergency button; press start auxiliaries button on the moulding machine, then start auxiliaries on TME
No.49 CAUSE REMEDY	END CYCLE SECURITIES the M42 requirement is not satisfied check the vacuum switches, the limit switches on Y/Z axis outside the mould

SY.TRA.MA S.r.l.

CHART OF FAULT TRACING DIAGNOSIS AND ALARM SIGNALS FOR THE TME KEYBOARD WITHOUT NUMBER

CAUSE **REMEDY**	ERROR OF INPUT/OUTPUT ON PCD2 BUS axis or I/O card missing or wrong card position hardware error wrong machine data axis no. I/O card faulty axis card faulty BUS faulty
CAUSE: **REMEDY:**	ALTERATION ON DATAS: DO YOU WANT TO DELETE COMPLETELY THE CPU? discharged or faulty batteries check the placing contacts of the batteries replace batteries (see chapter 5.2 Changing the batteries) delete completely the CPU (pressing F1) restore the machine datas and the programs manually or using the back-up unit or PC
CAUSE: **REMEDY:**	COMMAND ERROR ON AXIS CARD/S the axis card has not answered to the PLC in the time necessary due to a system overload or command error hardware error wrong machine datas cut voltage from the electrical panel and switch on again axis card faulty check machine datas
CAUSE: **REMEDY:**	ERROR POSITION ON THE Y/X/Z AXIS axis obstruction and/or mechanically strong motor/encoder connection on the motor side or drive card faulty wrong machine datas, position error, motion control, acc., speed check the obstruction, if any check the motor/encoder connection on the motor side and/or drive card check the machine datas drive card faulty motor faulty
CAUSE: **REMEDY:**	CALCULATION ERROR ON LINE…..OF THE PROGRAM AND/OR OF THE FUNCTION….. writing error in the CN program two equal functions have been written on the same line check the CN program separate the two functions
CAUSE: **REMEDY:**	SYTRAMA TERMINAL BOARD V:B3 no transmission between the PLC and the keyboard is present hardware error check the cable and/or the connections between the keyboard and the CPU check the CPU status check the interface card keyboard/CPU check the TME keyboard