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USERGUIDE

CNS900++ Operating Manual

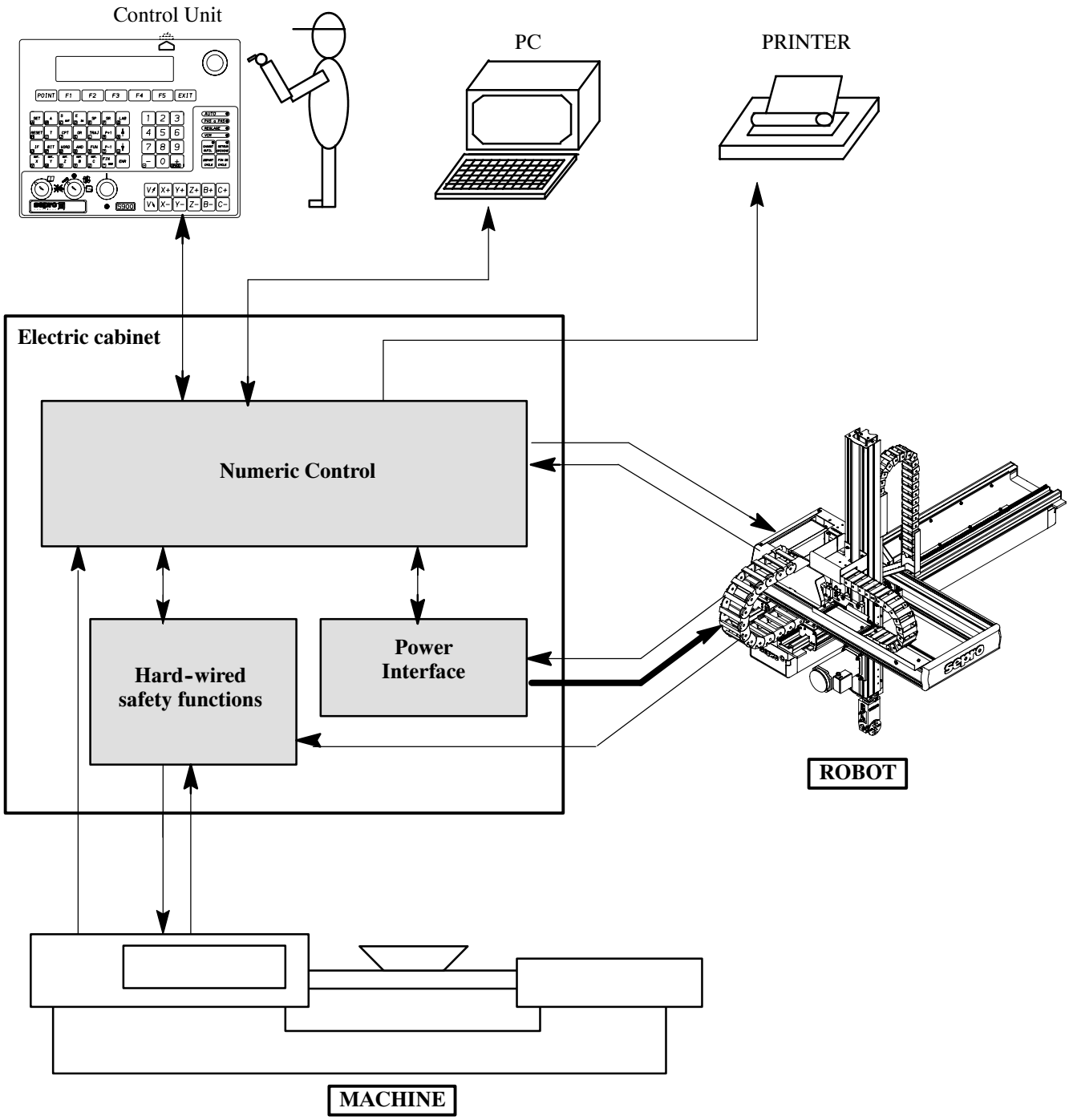
Version 0.6

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

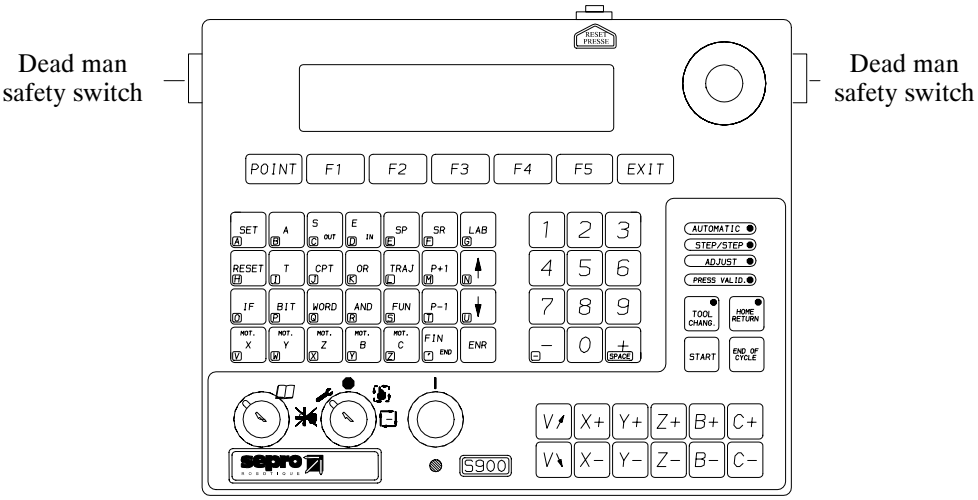
This manual is out-of-date and is provided only for its technical information, data and capacities. Portions of this manual detailing procedures or precautions in the operation, inspection, maintenance and repair of the product forming the subject matter of this manual may be inadequate, inaccurate,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containing warnings, information, precautions, and procedures that may be more adequate than those contained in this out-of-date manual.

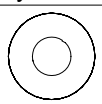
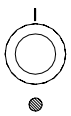
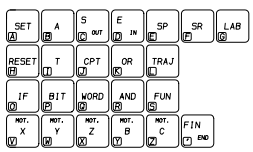
- CONTENTS -

I - PLC Architectures



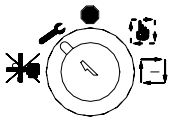
II - The Control Unit



Symbols	Functions	Symbols	Functions
	Emergency Stop button (Key *No. 455)*	POINT	Page access key: robot position and total speed value.
	Mode key : NO ROBOT / ADJUST / STOP / STEP BY STEP / AUTOMATIC *(Key No. 455)*	F1 ... F5	Keys to select functions displayed on the menus.
	Programming Key : used for programming *(Key No. 421)*	EXIT	Key used to cancel a function or return to a higher menu.
	Power button. The green indicator light must be lit to authorize robot movements.	V/ V\	Overall robot speed adjustment keys.
AUTOMATIC	Robot in Auto mode indicator light.	X+ Y+ Z+ B+ C+ / X- Y- Z- B- C-	Axis control keys in Adjust or Step by Step mode for training.
STEP/STEP	Robot in Step by Step mode indicator light.		
ADJUST	Robot in Adjust mode indicator light.		Programming keys
PRESS VALID.	Light indicating that the robot has validated the Machine cycle.		
TOOL CHANG.	Key used to set to tool change position. *.Light indicating that positioning is in progress.*	P+1 / P-1	Program step change.
HOME RETURN	Key used to set to safety position: - Before cycle start, - To restart cycle after a robot error. *.Light indicating that positioning is in progress.*		Change of line in a program Step.
		ENR	Validation of code or function.
START	Auto or Step by Step cycle start command or Home Return set cycle start command or auxiliary output command or Action command through Test function	1 2 3 / 4 5 6 / 7 8 9 / 0	Numeric keyboard.
END OF CYCLE	End of cycle Stop command	RESET PRESSE	Restart IMM push-button

DEAD MAN button: Automatic operation of the robot is only possible if the terminal is on its stationary support and its position checked. Note that in all valid modes, if the terminal is not on its stationary support, robot movements are subject to actuation both of a "DEAD MAN" contact and the "Cycle start" command or an axis control.

III - Operation Modes

* Accessible using the MODES key: 

AUTO mode: Execution of cycle in Automatic mode.

STEP BY STEP Mode: Execution of cycle in Step by Step mode, or execution of a Home Return sequence, or execution of the return to Tool Change Position sequence.

STOP Mode : Robot stops with access to programming mode.

ADJUST Mode: Manual movement of numeric axes.

NO ROBOT mode: Enables the machine to operate without the robot. The robot is in emergency stop mode but access to programming remains possible.

* Accessible from Keyboard :

TEST Function: Accessible in ADJUST mode. Used to execute a manual pneumatic movement using the corresponding Action code. Can also be used to activate an output and to check the status of an input or a bit.

DISP MONITOR Function: Accessible in STOP, STEP BY STEP and AUTO modes. Used to display all the variables.

CHECK Function: Accessible in STEP BY STEP and AUTO modes. Used to display the variable required by the system to continue the cycle.

HISTORIC Function : Accessible in STEP BY STEP, STOP and AUTO modes. Used to display the last 22 faults with the error occurrence time and the restart time.

PRODUCTION Function: Accessible in STEP BY STEP, STOP and AUTO modes. Used to access production times and counters.

MAINTENANCE Function: Accessible in STEP BY STEP, STOP and AUTO modes. Used to access maintenance times and robot configuration.

IV - Cycle Start Procedures

Robot Cycle Start Procedure

1. Select the program to be executed

   -> See **"Selecting a program to be executed"** Page 5.

   This operation indicates to the command the number of the program to be executed from those stored in the memory.

2. Home Return

   This operation moves the robot to a safety position in order to start the Auto cycle without trouble.

   * If the application includes stacking [FIL]:

     - either, the cycle is restarted and the stacking is restarted from the beginning

       -> See **"Total Home Return Request"** Page 6

     - or, the cycle is restarted and the stacking in progress is resumed

       -> See **"Simple Home Return Request"** Page 6

   * If the application does not include stacking:

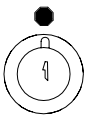
     -> See **"Simple Home Return Request"** Page 6

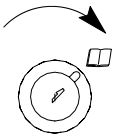
3. Start the Robot/Machine cycle

   -> See **"Execution of Robot/Machine cycle in Auto mode"** Page 7.

V 0.6 ⚠ This operation starts the robot cycle in automatic mode. A safety function "DELAYED START" may be activated, see Page 8.

Selecting a Program to be Executed

1. Select STOP mode  . . . . . .

2. Turn the program key  . . . . . .

3. Press [EXEC] F5 . . . . . .

4. Do you know the number of the MP to be executed ?

YES

Enter the number of the MP (example : No 01)

Validate by pressing ENR . . . . . .

NO

Press [?] F5 . . . . . .

Use keys: [<-] F4, [->] F5

to display the program to be executed (example : MP01).

Once you have made your choice:

Press [Selec] F1 . . . . . .

The program is now selected for execution . . . . . .

Example: MP 01.

5. If the machine in use is only in Manual mode :

Enter [YES] F1 if you want to start an "off load" cycle.

Enter [NO] F2 if you want to start production.

MP . . [ ]
[STOP]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

[Prog]

[PROG] [PARAM] [G_MEMO] [LIST] [EXEC]

[Prog]

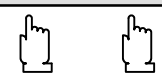
Type the MP number, ENR or -> [?]

Program to be executed found in: EEPROM

-> the robot indicates the memory in which the program to be executed has been found:
RAM or EEPROM or MODULE

MP 01 [ ]
Checksum . . . . Longr . . . . Bytes

[Selec] [<-] [->]



Program to be executed found in :

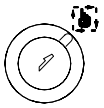
-> the robot indicates the memory in which the program to be executed has been found:
RAM or EEPROM or MODULE

MP 01 [ ]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

Execution with IMM cycle simulation ?
[YES] [NO]

Simple Home Return Request

1. Select Step by Step mode 

2. Press HOME RETURN . . . . . .

   The green HOME RETURN light flashes. . . . . .

   The simple Home Return is selected by default.

3. Press START .

4. Hold START until the green HOME RETURN light goes out and the message to wait for the program execution is displayed on the readout. . . .

MP 01 [ ]

[SIMPL] [TOTAL] Home return

MP 01 [ ]

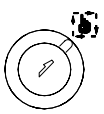
Simple H.R. in progress [RUN]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

[WaitSTART]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

Total Home Return Request

1. Select Step by Step mode 

2. Press HOME RETURN . . . . . .

   The green HOME RETURN light flashes. . . . . .

3. Press F3 [TOTAL]

4. Press START

5. Hold START until the green HOME RETURN light goes out and the message to wait for the program execution is displayed on the readout.

MP 01 [ ]

H.R. Request

[SIMPL] [TOTAL] Home return

F2 F3

Total H.R. in progress [RUN]

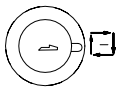
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

[WaitSTART]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

Automatic Cycle Execution

1. The machine (i.e. the press) is in Auto mode (door closed).

2. Select mode 

3. Press START

   -> The AUTOMATIC light lights up . . . . . .

   (The PRESS VALID. light lights up if the robot is working with an injection press).

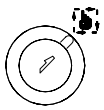
4. Start the machine (press) cycle.

MP -- [ ]
[AUTO]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

Step by Step Cycle Execution

1. The machine (press) is in Auto mode (door closed).

2. Select mode 

3. Press START

   -> The STEP/STEP light lights up.

4. Hold START until the message [WaitSTART] is displayed. . . . .

[WaitSTART]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

5. Repeat operations 3 and 4 until the PRESS VALID. light lights up.

6. Start the machine (press) cycle.

7. Repeat operations 3 and 4 until the cycle is completed.

N.B. : Operations 5 and 6 are only necessary for applications with injection presses.

Stopping an Automatic Cycle

MP 01 [FRONT BUMPER XR57 . .]
[RUN]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

1. The robot is operating in Automatic mode.. . . . . .

2. Press [END OF CYCLE]

-> The [AUTOMATIC] light flashes and the robot continues to operate until the part currently being produced is unloaded.

The press cycle is not restarted by the robot; it remains open.

-> The robot stops its cycle at the point where it restarts the press cycle.

The [AUTOMATIC] light goes out.. . . . . .

MP 01 [FRONT BUMPER XR57 . .]
[WaitSTART]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

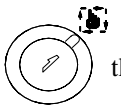
N.B. : Pressing [START] again restarts the production cycle.

Delayed start

Function non activated by default.
Invoked in Auto or in Step by Step.

. When starting the robot, pressing [START] produces a **RINGING ALARM** (not installed as standard) the duration of which can be parametered.

. The robot will only START after a safety DELAY, the duration of which can be parametered.

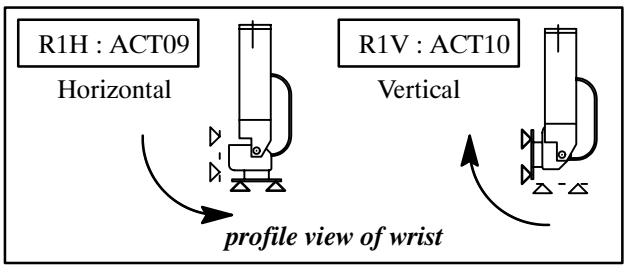
<u>Note</u> In mode  the START will be delayed only if the robot has been stopped for more than 20 seconds.

V - Pneumatic Movements

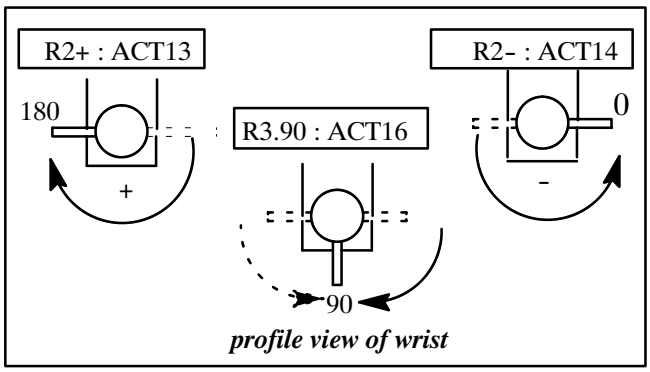
V - 1. Description

The following are possible:

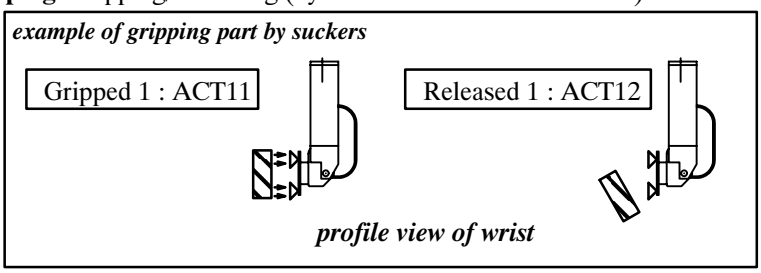
Rotation R1 Horizontal/Vertical



Rotations R2+ / R2- and R390



Part gripping Gripping/Releasing (by suction or mechanical action).



V - 2. Movement Monitoring

These movements are all driven by a bistable control valve and are monitored either by an inductive sensor, a magnetic sensor, or a vacuum sensor (for part gripping).

Activation and monitoring of a movement can be performed automatically through the ACT programming code (Action).

So, programming an **ACTION** , involves the following operations:

activation of the output corresponding to the movement.

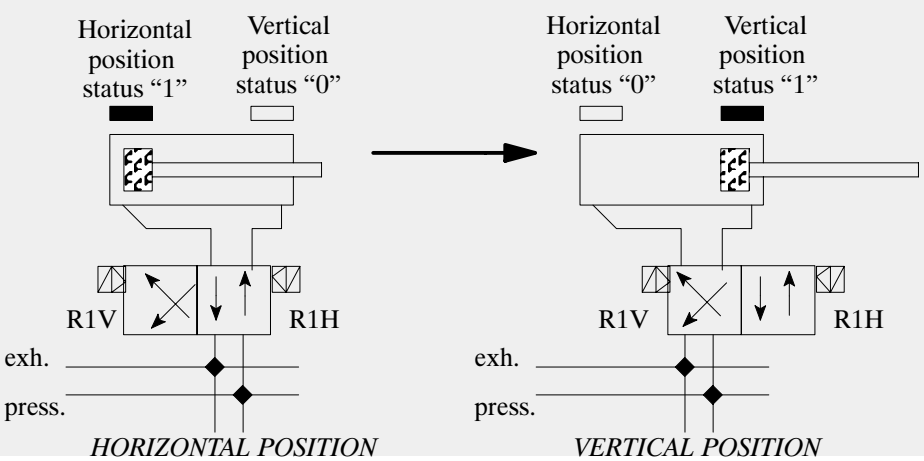
Check that the input corresponding to the movement is at “1”.

Check that the input corresponding to the opposite movement is at “0”.

Example of an action :

ACT 10 : Switching from horizontal to vertical gripping

- *Activation of R1V vertical rotary unit solenoid valve*
- *Vertical position sensor check at 1.*
- *Horizontal position sensor check at 0.*

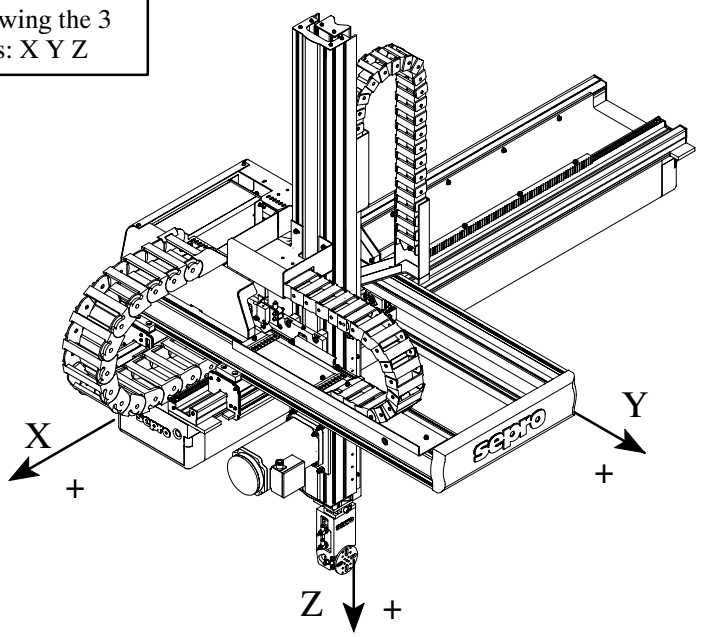


VI - Numeric Axes

VI - 1. Description

- Max. 5 axes: X, Y, Z, B, C.
- Drive: Brushless or asynchronous motor on horizontal axes
  Brushless motor on vertical axes.

Diagram showing the 3 standard axes: X Y Z



VI - 2. Initialisation

VI - 2. 1.Principle

INITIALISATION means applying to the axis a known position from those stored in the memory. This position is obtained:

- either when the encoder initialisation pulse and Init. sensor signal occur in conjunction,
- or by the leading edge of the Init. sensor signal.

The axis must be initialised if the "NO INIT " message is displayed.

Example: Y and Z axes must be initialised

```
ADJUST
X = 3458,7    Y = No Init       Z = No Init
B =                C =              Ks =
[Cont.]  [ j=0.1]   [ j=1 ]   [Offset]
```

The initialisation procedure is described on the next page.

Calibration Principle

CALIBRATING the axis means accurately measuring the position of the axis relative to a fixed point on the robot.

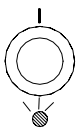
The calibration procedures are known as ***Machine original values*** *(POM) procedures and are described in the exceptional procedures of the robot instruction manual (File I).*

Calibration procedures should only be carried out after replacement of the motor or after major modification of the robot. They are to be considered as EXCEPTIONAL MEASURES..

VI - 2. 2.Procedure

Initialisation Procedure

1. Select mode 

2. Press the Power button 

   -> *The green indicator light lights up.*

3. Move axis up to initialisation cam.

4. Initialisation is complete when the "No Init" message is replaced by a numeric value.

   (Example : Initialisation completed for X-axis) . . . . . .

   The axis stops automatically at the cam.

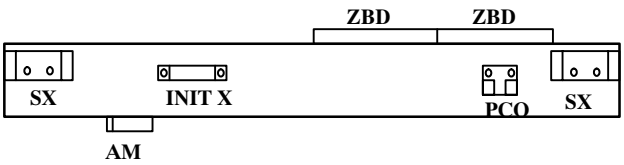
```
ADJUST
X = 3458,7    Y = No Init       Z = No Init
B =                C =               Ks =
[Cont.]  [ j=0.1]  [ j=1 ]   [Offset]
```

VII - Safety Devices

VII - 1. Cams and sensors

X-AXIS

Installation of cams on the section



Definition of cams:

AM : lowering into machine authorized

ZBD : Arm free area

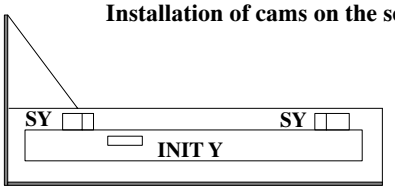
INIT X : X-axis initialisation

SX : Overtravel X

PCO : Tool change position

Y-AXIS

Installation of cams on the section



Definition of cams :

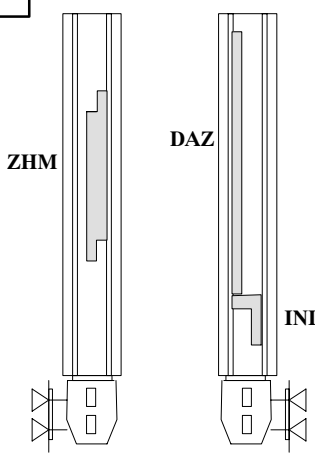
INIT Y :Y-axis initialisation

SY : Overtravel Y

Z-AXIS

. Arm with SECU94 board

Direct arm and telescopic arm



DAZ : Cam defining Z stroke

INIT Z : Z-axis initialisation

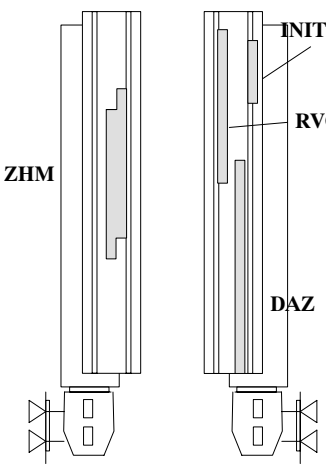
BH : Arm up

ZHM : Out of mould area

.Fixed sensors

. Cams on mobile arm.

Compact arm



INIT Z : Z-axis initialisation

DAZ : Cam defining Z stroke

BH : Arm up

ZHM : Out of mould area

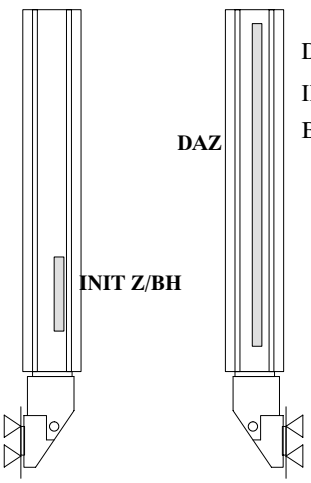
RVO : Necessary vertical rotation

. Fixed cams

. Sensor on mobile carriage

. Arm with SECU89 board

Direct arm and telescopic arm



DAZ : Cam defining Z stroke

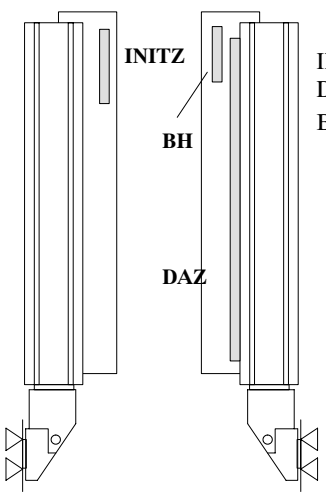
INIT Z : Z-axis initialisation

BH : Arm up

. Fixed sensors

. Cams on mobile arm

Compact arm



INIT Z : Z-axis initialisation

DAZ : Cam defining Z stroke

BH : Arm up

. Fixed cams

. Sensors on mobile carriage

VII - 2. Work areas

Located on all three axes, cams and sensors delimit the work area in which the manipulator can move safely in the automatic mode.

. 3000 RANGE:

There are 4 different areas:

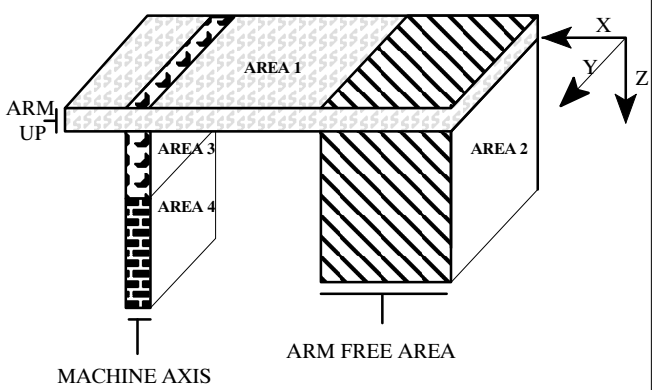
AREA 1 : Robot Arm Up area in which the robot can move during a machine movement.

AREA 2 : Robot Arm Free area in which the robot can move downwards while the machine is in motion.

AREA 3 : Robot in Machine Axis area into which the robot can lower without the MO (Machine Open) information being present.

The out of mould area cam defines the approach stroke that the robot can make in the machine axis area while waiting for the mould to open. Once the part has been grabbed in the mould, the press can close as soon as the arm re-enters the "out of mould area" (ZHM).

AREA 4 : Robot on Machine Axis area in which the robot can only lower if it has received the "Machine Open" (MO) information. A safety stop is invoked in the case of loss of the message "Machine Open" (MO) before entering ZHM or BH. (Refer to "anticipated restart" in the Programming Manual Level I)..



☞ **CAUTION ! In ADJUST mode:**

. the robot no longer acknowledges these areas,

. only the safety stop devices remain active (emergency stop, machine access door closed -PF-).

Adjust the position of the cam according to the muold height and the gripper in order to prevent the machine closing on the robot.

When changing a mould, gripper or modifying the arm level (see Chapter I4 of instruction manual), **ADJUST** the position of this cam.

To avoid having to adjust the cam every time the mould or gripper is changed, you are advised to place the cam in its optimum position.

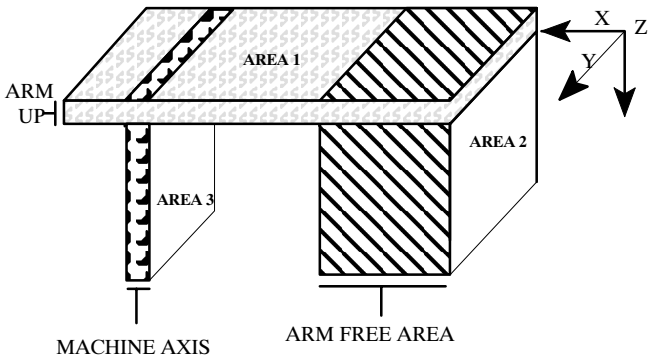
. OTHERS:

There are 3 different areas :

AREA 1 : Robot Arm Up area in which the robot can move during a machine movement.

AREA 2 : Robot Arm Free area in which the robot can move downwards while the machine is in motion.

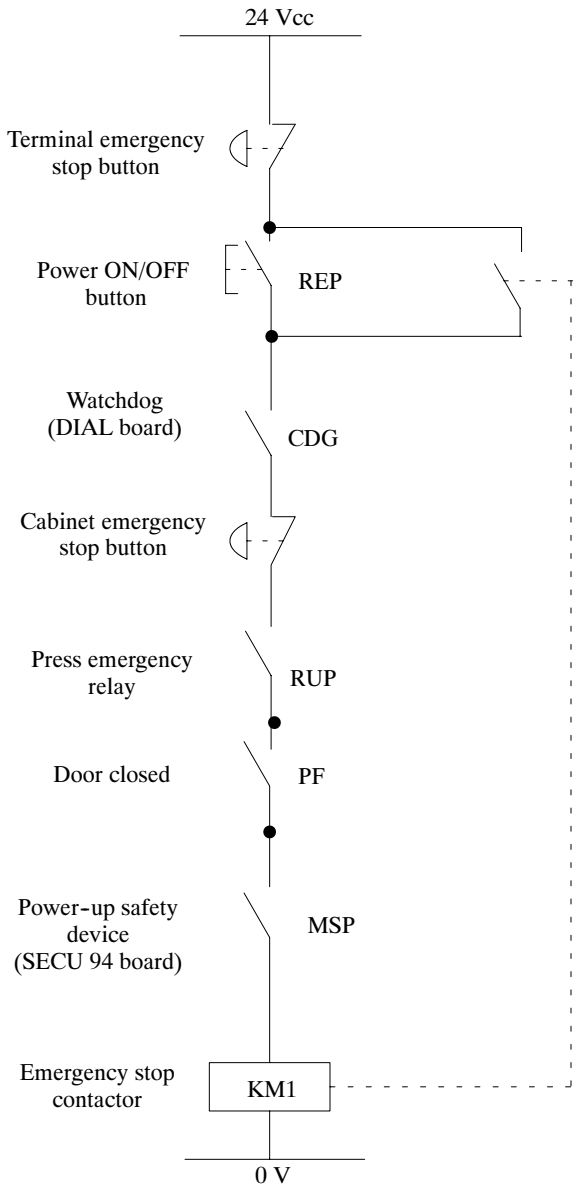
AREA 3 : Robot on Machine Axis area in which the robot can only lower if it has received the "Machine Open" (MO) and "door closed" (PF) information. In this area, the robot prevents any machine movement.



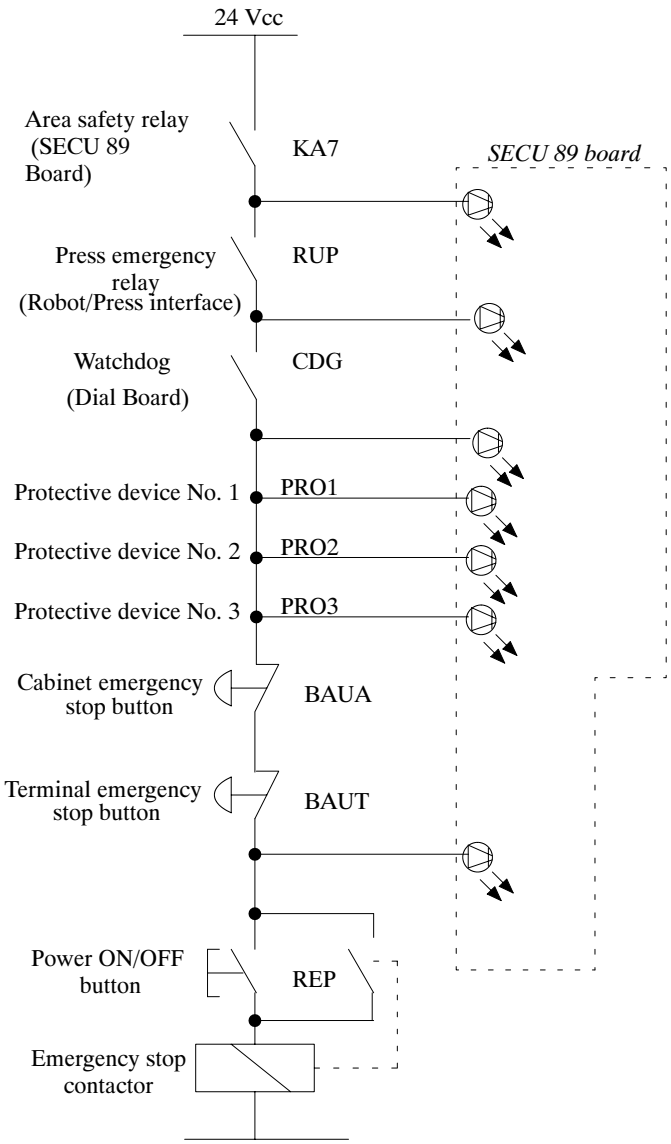
☞ **CAUTION ! In ADJUST mode**, the robot no longer acknowledges these areas.

VII - 3. Emergency Stop Line

. Robot with SECU94 board



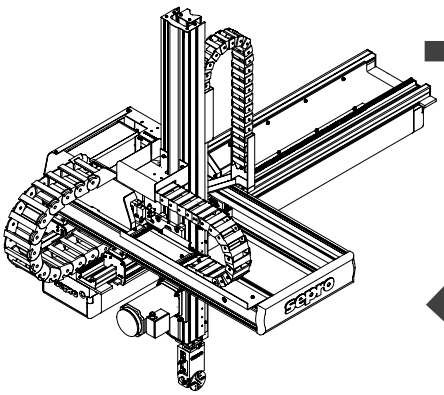
. Robot with SECU89 board



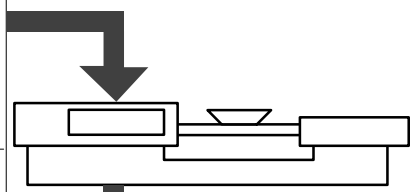
VIII - Robot / machine interface

INTERFACE

ROBOT



MACHINE



Mould area free *(Arm free safety device)*
Enable mould closure *(Machine cycle validation)*
Enable ejector back
Enable ejectors forward
Enable movement of core pullers to position 1
Enable movement of core pullers to position 2
Enable full mould opening
Emergency stop of handling device
Operation with handling device *(Without robot)*

Mould open position *(Machine open)*
Safety devices of machine *(Door closed)*
Automatic
Mould closed *(Part made)*
Ejectors back position
Ejectors forward position
Emergency stop of machine
Intermediate mould opening position
Reject *(Bad part)*

- General handling work or work with machines:

The robot only understands the "MO" safety signal whilst moving.

- Work with injection press:

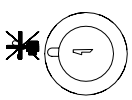
The interface must be wired according to a EUROMAP 12 or SEPRO protocol.

In addition to "MO" signal, the robot also understands the "PFAB (fabricated part)" and "MA/SA (Machine in Auto / Semi-Auto mode)" signals and carries out a consistency check.

- Work without the robot :

1 - The numerical command sends the signal "NO ROBOT" to the machine.

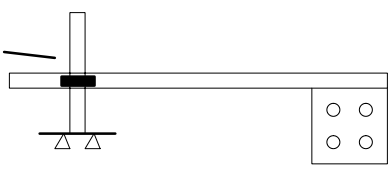
Position of mode selector :



2 - Two robot positions define two power supply modes for the cabinet.

. The robot is in tool change position (PCO) after a *"tool change position request"* procedure given on the following page.

PCO cam



=> The robot control cabinet can be powered off.

. The robot sends SBD to the machine (the robot arm is free of the machine on the arm high position cam -BH-).

=> The robot control cabinet cannot be powered off.

Tool Change Position (PCO) Request

1. Select mode 

2. Press TOOL CHANG. . . . . .

   -> *The green* TOOL CHANG. *light lights up.*

3. Press START . . . . . .

   -> *The green* TOOL CHANG. *light goes out, the* HOME RETURN *light lights up since a Home Return is automatically executed before any PCO request.*

4. Hold START . . . . . .

   -> *The* TOOL CHANG. *light lights up and the* HOME RETURN *light goes out.*

5. Hold START until the message [WaitSTART] is displayed **AND** the robot stops. . . . . .

Note : At the end of the PCO (tool change position) subroutine, a home return is automatically selected: a home return must be made before Step by Step or Automatic sequence is started up.

```
                    T.C. Request        [STOP]
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MR01 /000 / -SP 00/ 000/ -PLC  - - SPP  /  /
          Simple H.R. in progress      [RUN]
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MR01 /000 / -SP 99/ 000/ -PLC  - - SPP  /  /
                                     [RUN]
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MR01 / 000 / -SP    /     / -PLC  - - SPP  /  /
                               [WaitSTART]
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

IX - List of actions, inputs and outputs

IX - 1. List of actions

ACT = Action				
		Definition	associated OUTPUT	associated INPUT
ACT	00	Machine cycle wait		MO, PFAB IN15, IN14
	01	Not used	Depending on type of machine	
	02	Rise 1 (pneumatic)		
	03	Rise 2 (pneumatic)		
	04	Lowering 1 (pneumatic)		
	05	Lowering 2 (pneumatic)		
	06	Slow approach Y (pneumatic)		
	07	Normal approach Y (pneumatic)		
	08	Reverse Y (pneumatic)		
	09	Rotation 1 horizontally	OUT 6	IN 22
	10	Rotation 1 vertically	OUT 7	IN 23
	11	Grip part 1	OUT 5	IN 21
	12	Release part 1	OUT 4	IN 21
	13	Rotation 2 + direction	OUT 8	IN 24
	14	Rotation 2 - direction	OUT 9	IN 25
	15	Slow speed lowering 1 (Z pneumatic)		FAL, IN 20
	16	Rotation 2 intermediate position	OUT 11	IN 26
	17	Free		
	18	Free		
	19	Grip part 2	OUT 12	IN 27
	20	Release part 2	OUT 13	
	21	Grip part 3	OUT 14	IN 28
	22	Release part 3	OUT 15	
	23	Grip part 4		
	24	Release part 4		
	25	Grip part 5		
	26	Release part 5		
	27	Grip part 6		
	28	Release part 6		
	29	Grip part 7		
	30	Release part 7		
	31	Grip part 8		
	32	Release part 8		
	90	Inhibits "between steps" watchdog.	-	-
	99	Wait for validation of program nuimber (for automatic program change)	-	-

IX - 2. List of inputs and outputs

IN (000 to 127) = INPUTS

	Definition
IN 00	Robot in automatic mode
01	Robot in Step by Step mode
02	Dead man
03	Robot in adjust mode
04	Variable speed drive unit OK
05	Robot powered
06	Sensors consistent
07	Free
08	
09	
10	
11	Ejectors IN
12	Ejectors OUT
13	Machine in auto or semi-auto
14	Mould closed
15	Machine open
16	Free
17	Machine axis
18	Arm free area
19	Arm up
20	End of slow approach
21	Part 1 present
22	Horizontal gripper
23	Vertical gripper
24	Rotation 2 + direction
25	Rotation 2 - direction
26	Rotation 2 intermediate position
27	Part 2 present
28	Part 3 present
29	Mould partially open
30	Core pullers in position 1
31	Core pullers in position 2

OUT (000 to 127) = OUTPUTS

	Definition
OUT000	Fault
001	Reserved for Alarm
002	High-speed validation
003	Free
004	Release part 1
005	Grab part 1
006	Rotation 1 horizontally
007	Rotation 1 vertically
008	Rotation 2 + direction
009	Rotation 2 - direction
010	Intermediate stop IN
011	Intermediate stop OUT
012	Grab part 2
013	Release part 2
014	Grab part 3
015	Release part 3
016	Free
017	
018	
019	
020	
021	
022	
023	
024	
025	
026	Enable movement 1 of core pullers
027	Enable movement 2 of core pullers
028	Machine cycle validation
029	Ejectors IN validation
030	Ejector OUT validation
031	Partial opening validation

X - Operator Test Procedures

- - - - - - - > Adjust Mode

- - - - - - - > Test Function

- - - - - - - > Disp Monitor Function

- - - - - - - > Production Function

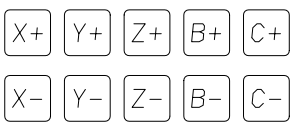
ADJUST MODE

Axis Movement in Adjust Mode

Continuous movement

1. Select Adjust mode. 

2. Press the key corresponding to the axis to be moved using the blue keys:



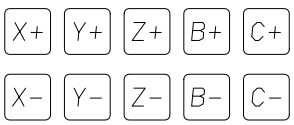
ADJUST
X = 3458.7 Y = No init Z = No init
B = C = Ks =
[Cont.] [j=0.1] [j=1] [Offset]

0.1 mm Pulsed Movement

1. Select Adjust mode. 

2. Press F2 [J = 0.1]

3. Press the key corresponding to the axis to be moved using the blue keys:



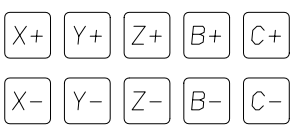
ADJUST
X = 3458.7 Y = No init Z = No init
B = C = Ks =
[Cont.] [j=0.1] [j=1] [Offset]

1 mm Pulsed Movement

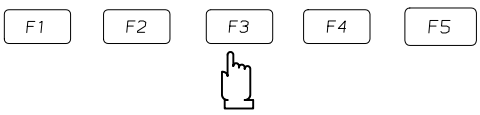
1. Select Adjust mode. 

2. Press F3 [J = 1]

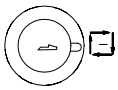
3. Press the key corresponding to the axis to be moved using the blue keys:



ADJUST
X = 3458.7 Y = No init Z = No init
B = C = Ks =
[Cont.] [j=0.1] [j=1] [Offset]



Adjusting the overall Speed

The robot is in mode  or 

1. Press POINT . . . . . .

2. Select key V↗ to increase speed.

   or V↘ to decrease speed.

Adjustment between 15% and 100% is possible.

ADJUST
X=00194.6 Y=00511.1 Z=00236.6
B = C = Ks = 075%
[Cont.] [j=0.1] [j=1] [Offset]

TEST MODE

Checking an action

1. Select Adjust mode 

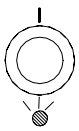
2. Press [A] then enter the No. of the action (e.g. : ACT13)

ACT13 -> S... -> E ... = (E... =)

3. Select by pressing [ENR] . . . . . .

This records only the action request; you must complete the procedure in order to validate your selection.

ACT13 -> S.008 -> E -024 = 0 (E.025 = 1)

4. Press the Power button 

-> *The green indicator light lights up.*

ACT13 -> S.008 -> E -024 = 0 (E.025 = 1)

5. Press the [START] key to validate and execute the corresponding function . . . . . .

Checking an input

1. Select mode 

2. Press [E IN] then enter the input No. (e.g.: input IN17).

3. Validate by pressing [ENR] . . . . . .

The input status is indicated by the far left value. The following values indicate the status of the following inputs.

INPUT number : 0101 -> 0100 1000 1000

Checking and activating an output

1. Select mode 

2. Press [S / OUT] then enter the output No. (e.g.: output OUT29).

3. Validate by pressing [ENR] . . . . . .

   The output status is indicated by the far left value. The following values indicate the status of the following outputs.

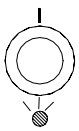
OUTPUT number : 029 ->0000 0000 0000 0000
FORCING programmes ->

4. Press [SET] (to set output to 1) . . . . . .

   or [RESET] (to set output to 0)

   This only records the action request: you must complete the procedure in order to validate your selection.

OUTPUT number : 029 ->1000 0000 0000 0000
FORCING programmes ->

5. Press the Power button 

   -> *The green light lights up.*

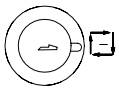
6. Press [START] to validate the output and execute the corresponding function.

DISP MONITOR FUNCTION

Accessing the Display Monitor Function

The robot is in mode . STOP 

or . STEP BY STEP 

or. AUTO 

1. Press [EXIT] several times to return to the menu opposite . . . .

2. Press [F5] [MONIT] . . . . . .

```
MP 01 [                                    ]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MP01 /      / -SP    /      / -PLC   - - SPP   /   /
INPUTS read :      000  ->0010 1100 0000 0001
FORCING programmes ->
[BIOTW] [Count ] [WWords] [Axis]
```

Input Display

This function is selected by default when you access DISP Monitor mode. . . . . .

If not:

1. Press [F1] [BIOTW]

2. Press [E IN].

3. Enter the number of the input to be displayed.

4. Validate by pressing [ENR] . . . . . .

(Example : input IN 17).

```
MP01/000 / -SP    /     / -PLC  - - SPP  /  /
INPUTS read :     000   -> 0010 1100 0000 0001
FORCING programmes ->
[BIOTW] [Count ] [WWords] [Axis]
```


```
MP01/000 / -SP    /     / -PLC  - - SPP  /  /
INPUTS read :     017   -> 0101 0000 1000 0110
FORCING programmes ->
[BIOTW] [Count ] [WWords] [Axis]
```

Output Display

1. Press [F1] [BIOTW]

2. Press [S OUT].

3. Enter the number of the output to be displayed.

4. Validate by pressing [ENR] . . . . . .

(Example : output OUT 29).

```
MP01/000 / -SP    /     / -PLC  - - SPP  /  /
OUTPUTS read :    029   -> 0000 0000 0000 0000
FORCING programmes ->
[BIOTW] [Count ] [WWords] [Axis]
```

Timer Display

1. Press [F1] [BIOTW]

2. Press [T].

3. Enter the number of the timer to be displayed.

4. Validate by pressing [ENR] . . . . . .

(Example : Timer 10).

MP01/000 / -SP / / -PLC - - SPP /
TIMER Number : 0010 = 0000
BIT associated = 0
[BIOTW] [Count] [WWords] [Axis]

Counter Display

1. Press [F2] [Count]

2. Enter the number of the counter to be displayed.

3. Validate by pressing [ENR] . . . . . .

(Example : Counter CNT 0141).

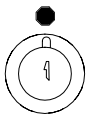
MP01/000 / -SP / / -PLC - - SPP /
COUNTER num 0141 = 0032

[BIOTW] [Count] [WWords] [Axis]

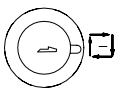
[F1] [F2] [F3] [F4] [F5]

PRODUCTION FUNCTION

Accessing the Production Function

The robot is in mode . STOP 

or. STEP BY STEP 

or . AUTO 

1. Press [EXIT] several times to return to the menu opposite . . . .

MP 01 [ ]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

2. Press [F3] [PRODUC] . . . . . .

MP [ ]

[Times] [Count] Production information

Cycle Times Display

1. Press F1 [Times]

2. Press F1 [T1] to display the total application cycle time.

Press F2 [T2] to display the robot cycle time . . . . . .

Press F3 [T3] to display the robot operating time in the press . . . . . .

MP [ ]

Application cycle time : M s
[T1] [T2] [T3] [ ] [ ]

MP [ ]

Robot cycle time : M s
[T1] [T2] [T3] [ ] [ ]

MP [ ]

Robot time spent in mould : M s
[T1] [T2] [T3] [ ] [ ]

Production Counters Display

1. Press F2 [Count] . . . . . .

2. Press F1 [Done] to display the number of parts unloaded from the press.

Press F2 [To Do] to display the number of parts to be unloaded from the press . . . . . .

Press F3 [Cnt0]

F4 [Cnt1]

F5 [Cnt2]

to display the value of the counters used for specific applications.

MP [ ]

Number of parts made :
[Done] [To Do] [Cnt 0] [Cnt 1] [Cnt 2]

MP [ ]

Number of parts to be done :
[Done] [To Do] [Cnt 0] [Cnt 1] [Cnt 2]

MP [ ]

Value of counter number 0000
[Done] [To Do] [Cnt 0] [Cnt 1] [Cnt 2]

XI - Maintenance

XI - 1. Faults

XI - 1. 1.Procedure in Case of Robot Error

- **Note any external data** which may be of later use:
  - . physical position of the robot,
  - . environment status (press, peripherals),
  - . visual data displayed on the robot (light stack, liquid crystal display).

- **Analyse the causes of error** using all the data displayed on the screen:

```
MP   /     / -SP    /     / -PLC  - - SPP  /   /

[Help]  [Histo]
```

press this key to display a brief help screen.

- If the data you have, for example:
  - . results of the previous two points,
  - . the wiring diagram and technical manuals

is not sufficient to rapidly detect the causes of the problem, contact our After Sales Service.

XI - 1. 2.Help

If a fault occurs, the manipulator stops and displays a message:

Example :

```
MP   /     / -SP    /     / -PLC  - - SPP  /   /
                              [ STOP ]
D_1 : Loss of power
[Help]  [Histo]
```

Press Help [F1] to display information about the type of error that has occurred and has not been cleared, the procedure to restart, and a reference to the Sepro documentation, on lines 2 and 3.

```
MP [                                          ]
Robot on safety cams, Emergency stop
depressed or power released
[Help]  [Histo]
```

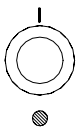
To exit “Help”, press [EXIT] or select one of the following:

- POINT
- HISTO
- START

XI - 1. 3.Restarting After a Fault

Clearing the "Power Loss" Fault

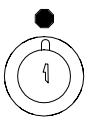
1. Select Adjust mode 

2. Press the Power button 

3. Does the green light light up?

NO: Check the components in the emergency stop line.

YES: Does this light stay on when the button is released?

YES: - Select STOP mode 

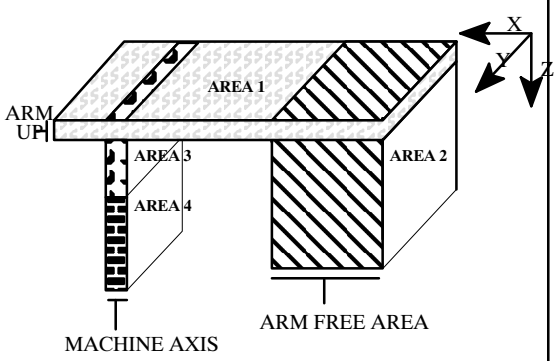
- Is the light still lit:

Yes: The failure has been cleared.

No: The robot is outside the safety zone. Move robot to arm up position.

NO: - The robot has overtravelled on one or several axes.

- Follow the "How to Correct Overtravel" procedure.

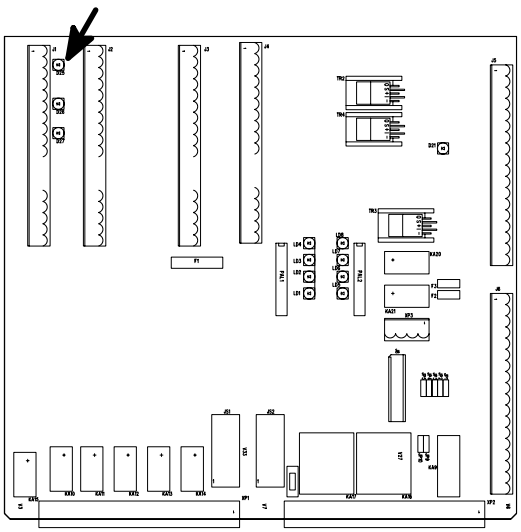


How to Correct Overtravel
(Robot with SECU 94 board)

1. Use map SECU94 to determine which axis has overtravelled.

   1 - Open the cabinet door. (Access is authorized according to personnel qualification).

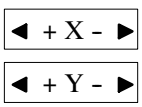
   2 - Check indications on SECU 94 board :

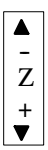


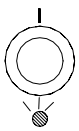
○ D25	off	Overtravel on Z axis
○ D26	off	
○ D27	off	
● D25	on	Overtravel on Y axis
○ D26	off	
○ D27	off	
● D25	on	Overtravel on X axis
● D26	on	
○ D27	off	
● D25	on	No overtravel
● D26	on	
● D27	on	

2. Select Adjust mode  .

3. Use the labels on the axes to determine in which direction the robot will be freed:





4. Press the Power button 

   -> *The green light lights up.*

   Hold the Power button and at the same time press the blue movement key corresponding to the overtravelled axis (Clear axis by 100mm).

N.B. : <u>CLEARING A DRIVE FAILURE</u>:

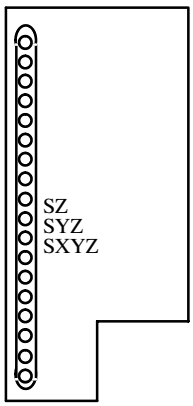
If the axis does not move, the drive of the axis concerned may be faulty. In this case, press the [DRIVE RESET] button located in the cabinet beside the drive.

How to Correct Overtravel
(Robot with SECU 89 board)

1. Use map SECU89 to determine which axis has overtravelled.

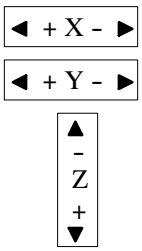
   3 - Open the cabinet door. (Access is authorized according to personnel qualification).

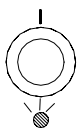
   4 - Check indications on SECU 89 board :



2. Select Adjust mode  .

3. Use the labels on the axes to determine in which direction the robot will be freed:



4. Press the Power button 

   -> *The green light lights up.*

   Hold the Power button and at the same time press the blue movement key corresponding to the overtravelled axis (Clear axis by 100mm).

N.B. : <u>CLEARING A DRIVE FAILURE</u>:

If the axis does not move, the drive of the axis concerned may be faulty. In this case, press the [DRIVE RESET] button located in the cabinet beside the drive.

○ SZ off ○ SYZ off ○ SXYZ off		Overtravel on Z axis
● SZ on ○ SYZ off ○ SXYZ off		Overtravel on Y axis
● SZ on ● SYZ on ○ SXYZ off		Overtravel on X axis
● SZ on ● SYZ on ● SXYZ on		No overtravel

Restarting after Part Grip Failure

MP / / -SP / / -PLC - - SPP / /
[STOP]
D_33 : Faulty part gripping in mould.
[Help] [Histo]

To restart a new press cycle:

1. Press the button RESET PRESSE .

2. Press START .

3. VCM is validated. The robot waits for the mould to re-open.

To re-lower and take the part:

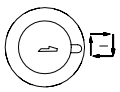
1. Press START .

2. The robot performs the pick and place cycle.

Accessing the Check Function

The robot is in mode. STEP BY STEP

or . AUTO



MP 01 [ ]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

1. Press EXIT several times to return to the menu opposite . . . .

2. Press F1 [CHECK].

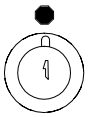
The variable required to continue the cycle is displayed above the word ->Check<- . . . . . .

Example : IN 029

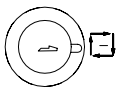
MP [ ]

I-29
[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]

Accessing the Historic Function

The robot is in mode. STOP 

or . STEP BY STEP 

or . AUTO 

1. Press [EXIT] several times to return to the menu opposite . . .

2. Press [F2] [HISTO].

   . Press [N] and [O] to display the faults.

   . The fault occurrence time and the robot restart time are displayed for each fault. The reference time is the time during which the robot was under power, which can be displayed using the Maintenance function.

   . Press [F1] [Help] to display information on the type of fault on line No. 2 of the readout.

   . Use keys [F2] [Print]

   [F3] [Def/Def]

   [F4] [StopP]

   to access the printer link.

   The [StopP] key can be used to interrupt data exchange with the printer if you are in “PRINT” mode.

   Pressing [StopP] interrupts the printing of the faults if you are in “Def/Def” mode.

```
MP 01 [                                    ]


[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MP  [                                      ]
D-    -> - - H - -          Restart -> - - H - -
D-    -> - - H - -          Restart -> - - H - -
[Help]  [Histo]  [Print]   [Def/Def]  [stopP]
```

XI - 2. Error Messages

D_1 : Loss of power		
[H E L P]	→	Robot on safety cams, Emergency stop depressed or power released
D-2 : Faulty axis speed driver		
[H E L P]	→	Reset the variator fault once it has been identified
D-3 : Dead man switch released		
[H E L P]	→	The DEAD MAN button must be pressed to continue the robot cycle
D-4 : Movement outwith safety cams		
[H E L P]	→	Select ADJUST MODE to bring the robot back to an authorized area.
D-5 : Arm not on BHM cam		
[H E L P]	→	Select ADJUST MODE to raise Z arm or test if movement is pneumatic
D_6 : Loss of FAL not requested		
[H E L P]	→	Remove grip head from placing area. Check positioning of FAL
D-7 : Loss of FAL not requested		
[H E L P]	→	Remove grip head from placing area. Check positioning of FAL
D-8 : Loss of part outwith AM/ZBD cams		
[H E L P]	→	Part lost. Perform a Home return before restarting AUTOMATIC cycle.
D-9 : Pneumatic pressure fault		
[H E L P]	→	Pneumatic supply faulty or bad pressure sensor adjustement
D-10 :		
[H E L P]	→	Inputs or bits control watchdog time elapsed. (Time value = parameter 7)
D-11 : Incorrect encoding of MP number		
[H E L P]	→	Check the encoding program number and the parity wire
D-12 : MP .. not found !		
[H E L P]	→	This program does not exist. Check the requested number
D-13 : Code : 0x.... invalid !		
[H E L P]	→	Unknown code. Check the step contents then perform a Home return cycle.
D-14 : Operande of : invalid		
[H E L P]	→	Unknown operande. Check contents of faulty step.
D-15 : Return address not found !		
[H E L P]	→	Return address not found. Check if the return LABEL exists
D-16 :		
[H E L P]	→	Inputs to be checked on movement startup are faulty.
D-17 : Incorrect program in memory !		
[H E L P]	→	Bad save copy in EEPROM. Correct by using [Confg] option in [Memo_M] mode

D-18 : EEPROM module missing !

[H E L P] → Impossible to save on EEPROM module
Module does not exist

D-20 : Incoherent safety board inputs

[H E L P] → Check diagnostic on the board safety

D-21 : Faulty host computer serial link

[H E L P] →

D-22 : Incorrect PLC program instruction

[H E L P] → Incorrect PLC program. Check instruc-
tion OR repeat [Exec] command.

D-23 : Too much successive IF in PLC

[H E L P] → The successive IF instructions in PLC
must not exceed 16.

D-24 : One parallel SP already in use

[H E L P] → Preceding parallel SP must be completed
before starting the next one.

D-25 : Inputs modulo..... faulty !

[H E L P] → Access to Inputs Modulo(16) impossible

D-26 : Outputs modulo.... faulty !

[H E L P] → Access to Outputs modulo(16) impossible

D-27 : BUS ERROR

[H E L P] → BUS ERROR
Switch power off and on again

D-30 : Faulty press opening signal !

[H E L P] → Mould closing and opening without
PART MADE signal. Restart...

D-31 : Faulty part made signal

[H E L P] → PART MADE signal received while mould
open ?

D-32 : Robot arm in IMM without MO

[H E L P] → Loss of MOULD OPEN signal while robot in
the press.

D_33 : Faulty part gripping in mould.

[H E L P] → Part not correctly gripped after timeout
programmed in parameter 8

D-34 : Press door opened during cycle !

[H E L P] → Press door opened while the robot takes
part in mould. Emergency relay released.

D-35 : Axis board . faulty.....E = ..

[H E L P] → Check the plugging, components and
addressing of the axes board

D-36 : Axis or axes not initialized !

[H E L P] → One or more axes are not initialized. Select ADJUST mode to initialize

D-37 : Division by 0 !

[H E L P] → Check axis parameters values or operands values if MP step with calculation

D-38 : -> Requested outside limits

[H E L P] → Position of the travel motion to be performed beyond robot capabilities.

D-39 : -> Axes board missing

[H E L P] → Axis declared in parameter without an axes driver board ?

D-40 : -> Speed control gap too large

[H E L P] → Maladjustement of variator or position information fault related to encoder

D-45 : -> Motorized movement jammed

[H E L P] → Check brake, brake supply or velocity reference connection

D-50 : -> Speed over limit

[H E L P] → Check wiring of motor/variator and division of velocity reference

D-55 : -> Movement in reverse direction

[H E L P] → Check variator and parameter configuration

D-60 : -> Counting fault

[H E L P] → Check initialization cam and signals from pulse generator

D-65 : -> PFC parameters incoherent

[H E L P] → Incoherent value attached to PFC parameters. Check

D-70 : -> -> Mov. set in motion unfinished

[H E L P] → The previous movement set in motion before the control point is unfinished.

D-75 : -> Position over limits

[H E L P] → The current position of the axis concerned lies outwith the limits. Check

D-80 : -> Movement not allowed

[H E L P] → Movement not allowed. Check the program or setup of the parameters

D-85 : -> Same movement in MP and SPP !

[H E L P] → Same motions to be executed simultaneously in MP and SPP !

D-90 : -> Movement not motorized

[H E L P] → Movement requested not declared. Check the setup of the parameters.

D-95 : -> Axis control fault

[H E L P] → Axis Control fault. Check the Setup of parameters and AXES board

D-100 : Action after IF invalid

[H E L P] → Inside MP, IF, L, R, MASTER or SLA instructions cannot be used after IF

D-101 : Master movement not declared

[H E L P] → CTL movement must be preceded by the Master code.

D-102 : Instruction not allowed

[H E L P] → This instruction is not allowed. Check the program.

D-103 : Movement requested unknown

[H E L P] → Check the program to be executed or the parameters of the requested movement

D-104 : Descending movement impossible

[H E L P] → Robot arm needs either signals AM, MO and PF or signals ZBD to descend

D-105 : Too many overlapping SP (n > 3)

[H E L P] → More than 3 successive sub-routines cannot be called (maxi 3 calls)

D-107 : Rotative filling not allowed

[H E L P] → This movement (B or C) can only be used in a general filling sub-routine.

D-108 : This axis cannot be freed !

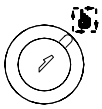
[H E L P] → Axis declared -> (cannot be freed) Check setup of the parameters

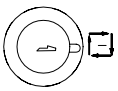
D-109 : ADC . either missing or invalid

[H E L P] → The ADC converter is neither in place or in order.

XI - 3. Maintenance Function

Accessing the Maintenance Function

The robot is in mode. STEP BY STEP 

or . AUTO 

1. Press [EXIT] several times to return to the menu opposite . . . .

2. Press [F4] [MAINT]. . . . . .

```
MP 01 [                                    ]

[CHECK] [HISTO] [PRODUC] [MAINT] [MONIT]
```

```
MP  [                                      ]

[English]          [Times]   [Confg]  [Maint]
```

1 - Changing the Language

1. Press [F1] [English]

   All messages will now be in English.

   Press [F1] [Local].

   All messages are in English.

2 - Accessing the Maintenance Times

1. Press [F3] [Times]

2. Press [F1] [T1] to display the cabinet total supply time. . .

   Press [F2] [T2] to display the robot total Auto run operating time. . . . . .

   Press [F3] [T3] to display the robot Auto mode run time since the last cycle start. . . . . .

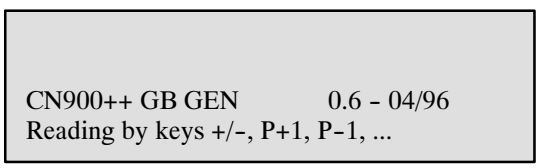
```
MP 01 [                                    ]
Supply times totalization
                                -> H  mn
[ T1 ]   [ T2 ]   [T3 ]     [  ]    [  ]
```

```
MP 01 [                                    ]
AUTO mode run times totalization
                                -> H  mn
[ T1 ]   [ T2 ]   [T3 ]     [  ]    [  ]
```

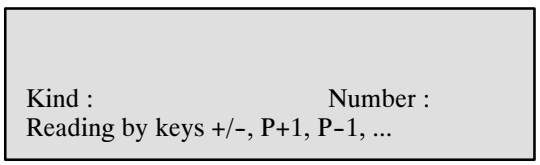
```
MP 01 [                                    ]
Last time between two AUTO mode run.
                                -> H  mn
[ T1 ]   [ T2 ]   [T3 ]     [  ]    [  ]
```

3 - Configuration Display

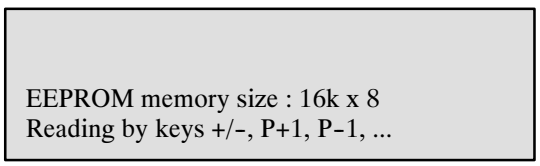
1. Press [F4] [Confg] to display the Sepro software version . .



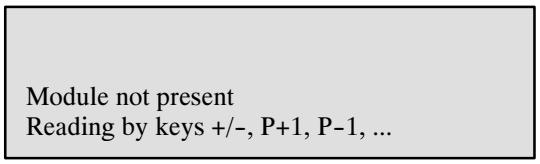
2. Press [P+1 M] to display the robot type and serial No. . . . . .



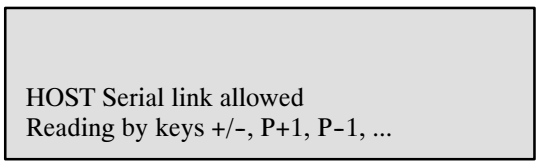
3. Press [P+1 M] to display the backup memory size . . . . . .



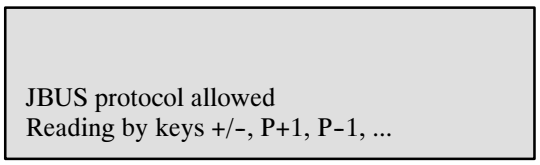
4. Press [P+1 M] to display the presence or absence of the optional EEPROM module . . . . . .



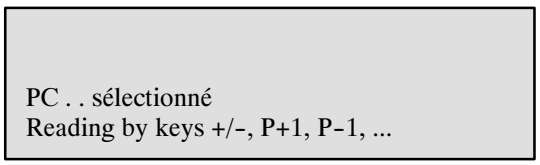
5. Press [P+1 M] to display the presence or absence of the serial link option . . . . . .



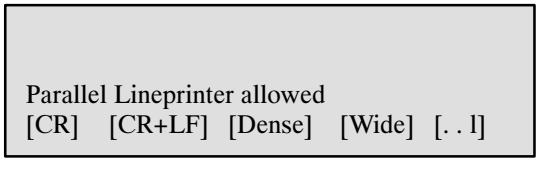
6. Press [P+1 M] to display the presence or absence of the JBUS protocol option . . . . . .

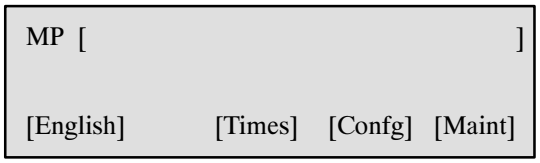


7. Press [P+1 M] to display selection of PC, PC/JBUS or E17 (Euromap 17) protocol. . . . . .



8. Press [P+1 M] to display the presence or absence of the printer parallel link . . . . . .





4 - Axis Maintenance Display

1. Press [F5] [Maint]

2. Press [F1] [Axes] . . . . . .

3. When [ENR] is pressed, the value of the Km counter is copied into the last maintenance counter . . . . . .

   Keys X, Y, Z, B and C on the programming keyboard can be used to read the results for each axis.

MP [ ]

[English] [Times] [Confg] [Maint]

[Axis] [Actions]

Axes . . . . : X
Distance covered. . . . . : kms
Last maintenance . . . . . : x 1000
Press ENR to validate maintenance

5 - Action Maintenance Display

1. Press [F5] [Maint]

2. Press [F2] [Actions] . . . . . .

3. When [ENR] is pressed, the manoeuvre counter value is copied into the last maintenance counter . . . . . .

   Use keys [+ SPACE] [- ⊟] , [P+1 M] [P-1 T] or [N ↑] [U ↓] to select the required action.

[Axis] [Actions]

ACT_09
Number of manoeuvres. . . . . : x 1000
Last maintenance . . . . . : x 1000
Press ENR to validate maintenance

XII - Bibliography

1 - Simple Pick and Place Applications

- CN900++ Operating Manual
- Using the CNC 900++ printer link
- CN900++ Hardware architecture
- CN900++ Programming Level I

2 - Supplement for advanced applications (Stacking, peripheral units control, dialogue with other machines) (to be requested if necessary).

- CPU Board
- DIAL Board
- 32EO Board
- 32S Board
- 3 AXES Board
- Secu 94 Board
- 4 Brakes Board
- Z89 Brake Board
- CN900++ Programming Level II
- CN900++ Parameters
- CN900++ encoding and adressing of instructions
- Monitoring an external axis

3 - SAP Option

- Operating handbook with SAP assisted programming

4 - PC Option

- NEWAS900

We're Here to Help

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

How to Contact Customer Service

To contact Customer Service personnel, call:

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

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

Before You Call ...

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

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

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

EQUIPMENT GUARANTEE

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

PERFORMANCE WARRANTY

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

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

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

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

WARRANTY LIMITATIONS

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