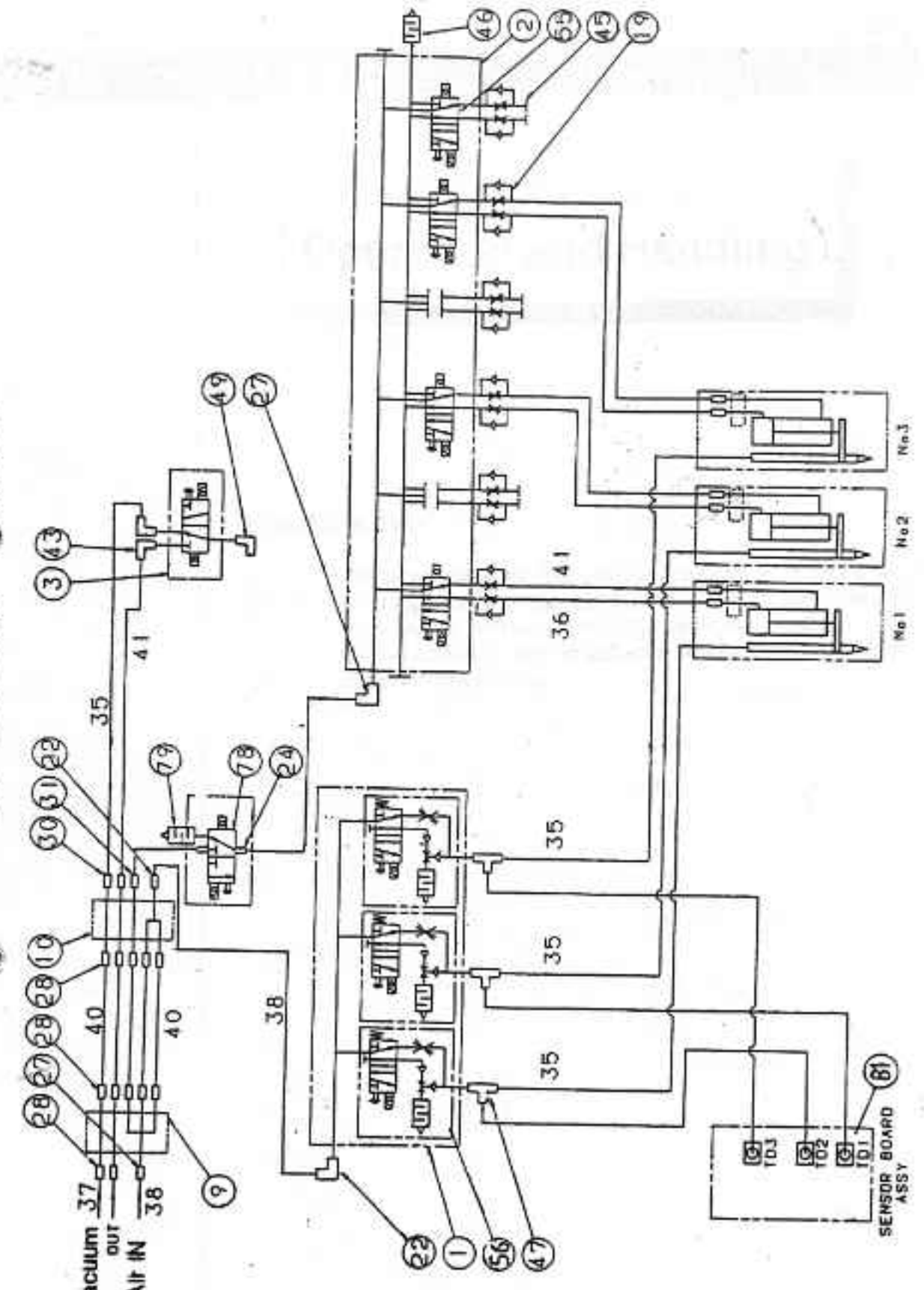
CHAPTER 3
Operation and Handling

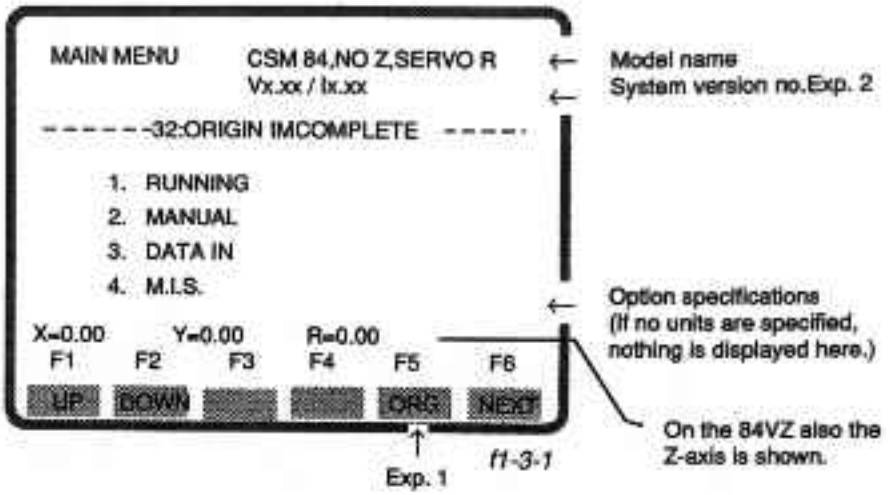


CSM46/60/3 - Air flow head section diagram

1-1-3
Main Menu

Press the "MAIN MENU" key.
The main menu screen is shown below. As explained previously, all operations begin by selecting the items on this menu display. The main menu is also the default screen which is displayed when the power is turned on.

Example:
CSM84



f1-3-1

[Exp. 1] Return to Origin

Pressing the F5 (ORG) key starts the return to origin operation. The sequence is: Z axis (CSM 84VZ only) - Y axis - X axis - R axis. When the return to origin is finished, the model name and "Return to Origin Not Yet Completed" message disappear from the top right of the screen, and a line above the function key displays the machine reference as a % value. From this point on, the F5 (ORG) key is invalid on this menu.

[Exp. 2] System version.

SYSTEM, IO and FDD (not used) ROM versions can be shown on the CRT display when the CSM is powered up.

V3.77/I1.02

V3.77 means system EPROM version on the CPU3 board in controller
I1.02 means IO ROM version on I/O board .

NOTE **If a return to origin has not yet been completed, the next screen of the "Running" item cannot be accessed.**

NOTE **The machine reference % is displayed in the sequence X-Y-(Z)-R. At the time of shipping this is adjusted to be 40-60%. If the value is not within this range, please adjust it in accordance with the procedures described in the service manual .**

1-1-1 Actual Operations

[Operation Keys]

The keys on the operation panel of the CSM connect the CSM with the Control Keyboard.

(1) Operation panel
This panel is used to control ordinary operations. All operations such as returning to the origin point, changing the PCBs being used, running the machine, and emergency stops can be handled through this panel.

(2) Control Keyboard
The Control Keyboard is connected to the "KEY CN" connector on the external device control section of the front panel. In addition to all of the operations listed above, data input and manual movement of the head can be controlled through this operation panel.

[Power Supply and Air Supply Connections]

(1) Power supply
Connect a power supply of 100, 110, 120, 200, 220, or 240V 2.5kVA or higher to the AC POWER section on the rear of the unit. The power is turned on and off by the Mains switch on the top right of the CSM.

(2) Air supply
Connect an air supply of 5kg/cm², 42Nl/min to the AIR section on the rear of the unit.

1-1-2 Emergency Stop

To stop the machine for any reason while it is in operation, press the Emergency Stop button next to the mains switch, or the one on the Control Keyboard. The machine stops immediately, and all operations are inhibited.
In order to restore normal operating conditions, first eliminate the cause for the emergency stop, and then cancel the lock on the Emergency Stop button (turn the button to the right) and press the READY switch.
This returns operation to the status at which it was interrupted, so all operations up to the point of the emergency stop should be cancelled. (During automatic loading of PCBs, pressing the RESET key and continuing automatic operation is inhibited). For more detailed information, see the attachment entitled "About Emergency Stop Functions".

1-1 An Overview

Operation of the surface mounter is configured as shown in Fig. 1-1 below. When the power to the mounter is turned on, the main menu screen is displayed. All operations begin with this screen.

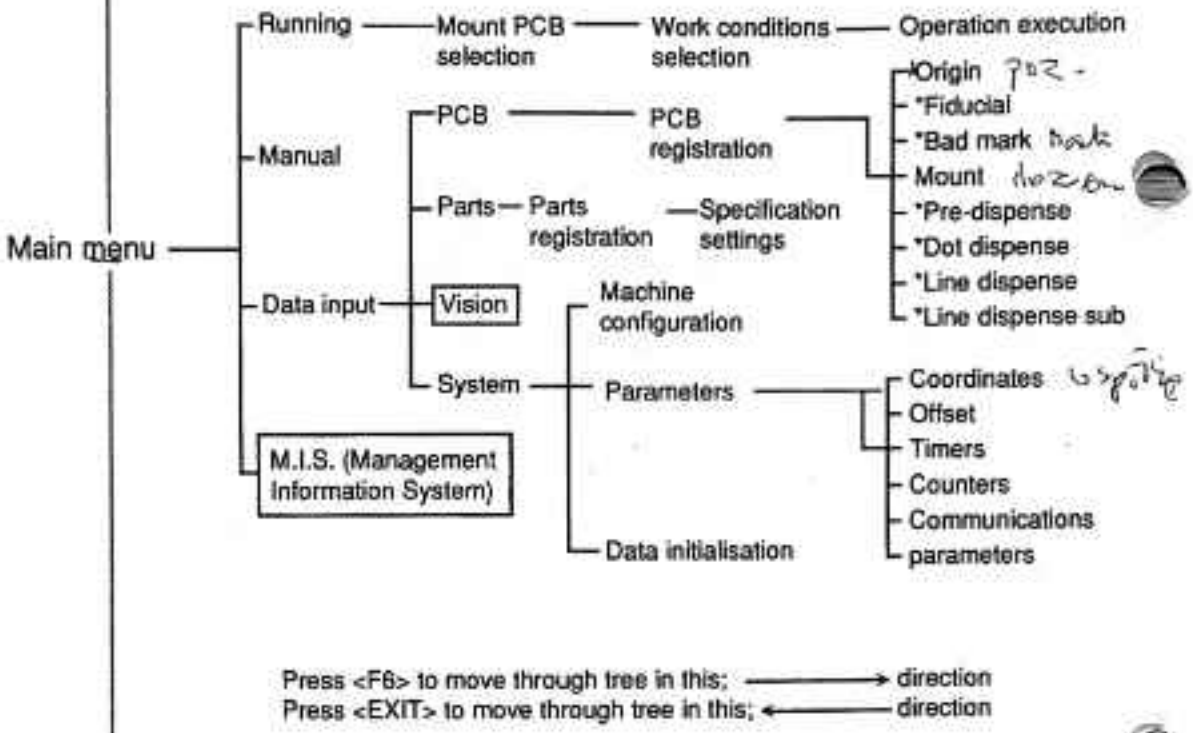


Fig. 1-1. System Configuration

NOTE

Items in boxes are optional specifications.
Points marked with an asterisk (*) are options for head specifications.

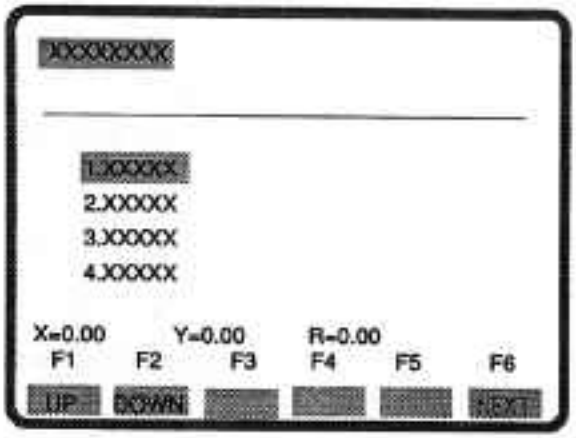
CHAPTER 3
Operation and Handling

GENERAL NOTE:

To include the latest changes, this chapter is based on software version **E62**. This can result that this chapter describes options which are not present in your version software. Since the software is upward compatible, all functions present in software versions prior to version E62 are included in this chapter.

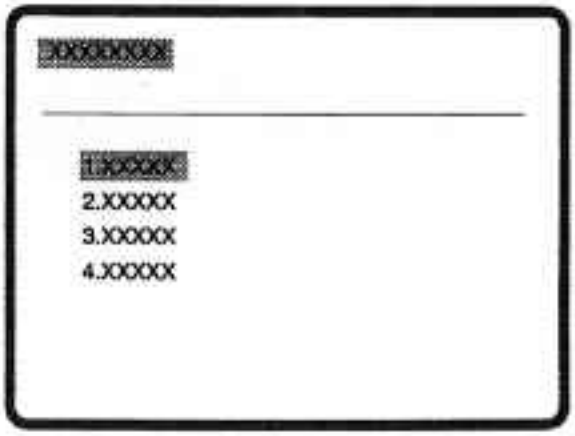
1-3-2 Moving to the desired item screen

There are two ways to display the screen in which the desired items are contained.
(1) When the function keys are displayed



1) Press the F6 (NEXT) key to move to the next screen. (On the main menu screen, pressing the number of the desired item will also display that screen.)

(2) When the function keys are not displayed



1) Press the number for the desired item to move to that screen.

1-3-3 Returning to the previous screen

To return to the previous screen, press the "EXIT" key.

1-3-4 Returning to the main menu

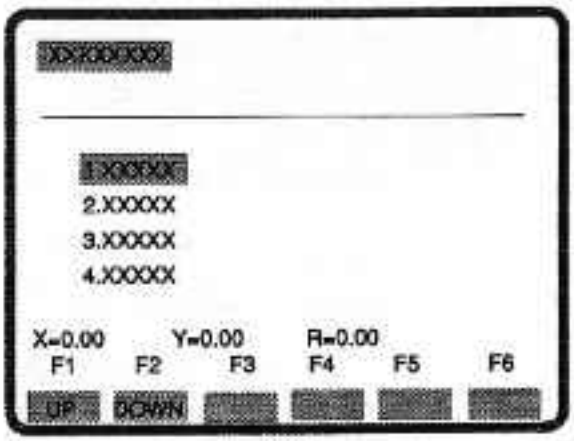
To return to the main menu, press the "MAIN MENU" key.

1-3 Screen Operation

Here, the operation items common to all screens are described.

1-3-1 Selecting the desired item (highlighted display)

In the screen below, the highlighted items are those which are currently selected. There are two ways to change the currently selected item.

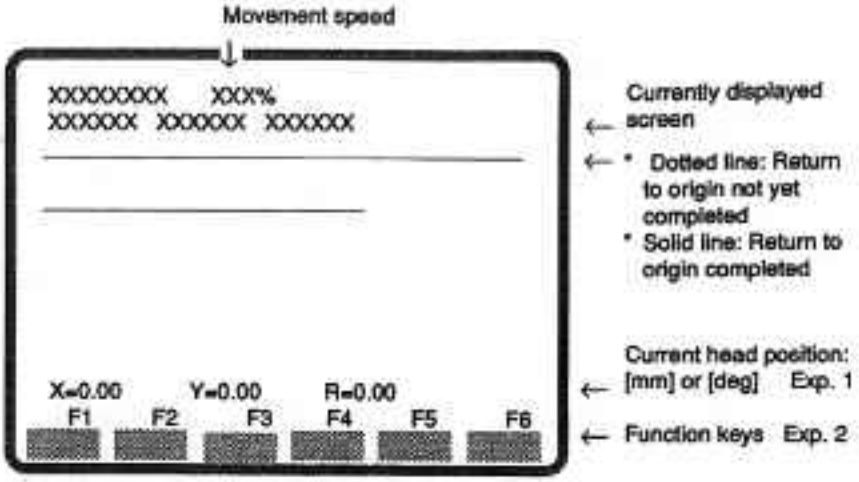


(1) Move the highlighted display upwards with the F1 (UP) key, or downwards with the F2 (DOWN) key.

(2) If the Control Keyboard is connected, the ↑ and ↓ keys can be used to move the highlighted display.

1-2 Screen Display

There are some display items which are common to all display screens. These are explained below.



f2-1

[Exp. 1]
When the current position is displayed, axis movement is enabled. The various axes can be moved using the X+, X-, Y+, Y-,Z+, Z-, R+ and R- keys.
The axis movement keys on the Control Keyboard can be used to move each of the axes. The speed of the axis movement is also displayed as a percentage, and can be changed by pressing the "SPEED" key. The user can also switch from this status to 3-stage manual speed setting.

[Exp. 2]
The function keys are displayed only when they are effective and may be used.

1-1-4 COMMON ROM

COMMON ROM VERSION.

The COMMON ROM version (ROM1) can be shown on the CRT display when the CSM operates and is in RUNNING mode.

00SM-062 means the COMMON ROM version is 062 for the CSM
00DS-062 means the COMMON ROM version is 062 for the DS*
00PP-062 means the COMMON ROM version is 062 for the LCS

This COMMON ROM (EPROM) is located on the CPU3 board in the controller. These ROMS are basically the same but they have different sub-programs in it. e.g.
00SM: vision, mech. alignment, prep. head
00DS: calib for dispensing, simultaneous pick
00PP: Z-axis, communications

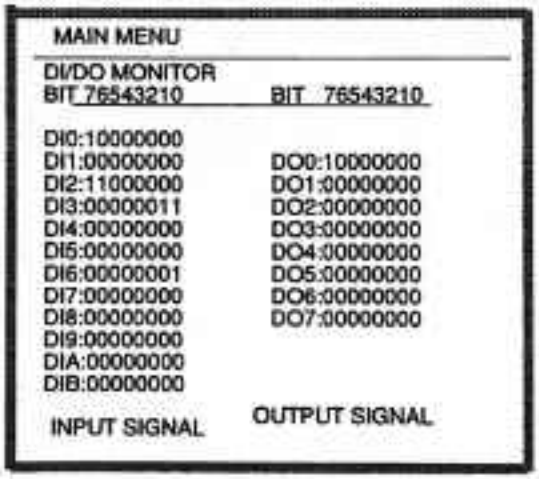
Remark: * DS means High-Speed **D**ispense and **S**immultaniuos Pick

VALID Firmware combinations:

COMMON	Robot
E55	v3.68
E55	v3.69
E55	v3.70
E56	v3.70
E56	v3.71
E57	v3.72
E58	v3.72
E62	v3.77
E63	v3.78
E64	v3.79

1-1-5 DI/DO Monitor

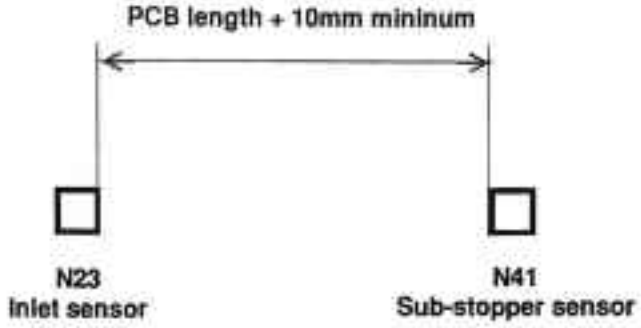
Press the "DI/DO" key
This screen is called the "DI/DO" monitor because it is used to check the status of all the input and output signals used by the surface mounter. The screen shown below is displayed by pressing the "DI/DO" key on the operation panel or on the Control Keyboard.



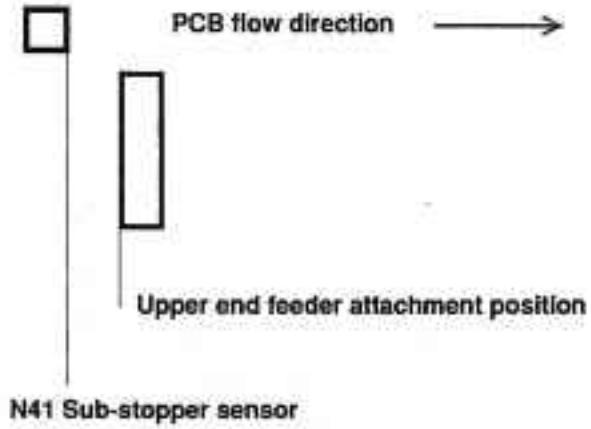
f1-4-1

As shown above, the left side of the screen shows the status of input signals, while the right side shows the status of output signals. For an explanation of these input and output signals,please refer to the service manual.
This DI/DO monitor screen can be accessed from any other screen. To return to the original screen, press the "DI/DO" key once again.
For example, this screen indicates DI 07,26,27,30,31,60=1, DO 07=1.

1. .



2. The sensor must be positioned above the upper end of the feeder attachment position.



[Exp. 8] BAD MARK CHECK
This is displayed only if the "Beam Sensor" item in the machine configuration data is set to "YES" and a vision board is mounted. Select the method by which the bad mark check is to be carried out. For details, please see section 4-5-6.

Display message	Bad mark check method
NOT USE USE MASTER MARK	Bad mark check is not carried out. Bad mark check is carried out unconditionally. Whether or not a bad mark check is carried out is determined by the master mark.

[Exp. 3] PRE-DISP, DOT-DISP
This is displayed only when the "Head * Specification" of the machine configuration data is set to "Dot Dispenser". The details concerning selection of the item are the same as for Explanation 5.

[Exp. 4] LINE-DISP
This is displayed only when the "Head * Specification" of the machine configuration data is set to "Line Dispenser". The details concerning selection of the item are the same as for Explanation 5.

[Exp. 5] MOUNT
The user can select here whether or not the mounting operation is to be run. The choices are displayed below.

Display message	Operation status
SKIP	Not run
EXEC.	Run

[Exp. 6] PCB FIX EQIP
Here, the user selects the clamping method. For details, please see Chapter 5, "Handling and Adjusting the Conveyor".

Display message	Clamping method
PIN	PCB secured by locating pins
EDGE	PCB secured by edge-clamp method
PIN+PUSH UP	PCB secured by locating pins and a pushup plate

NOTE **"Edge" is displayed only when the "Edge Clamp" item in the machine configuration data is set to "YES".**

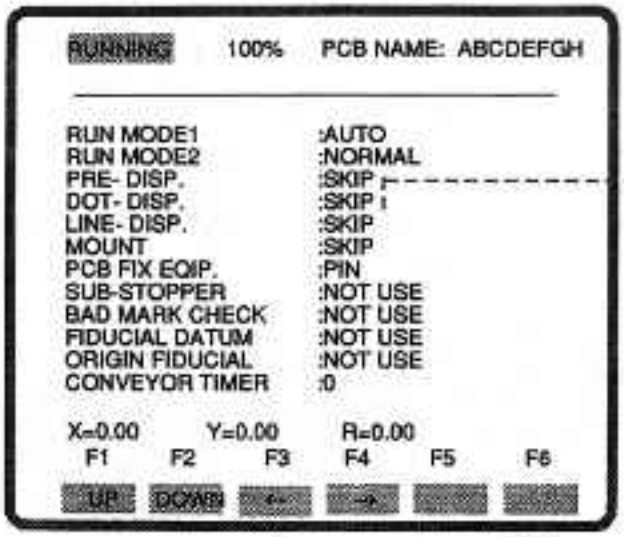
[Exp. 7] SUB-STOPPER
This is displayed only when the "Sub-stopper" item of the machine configuration data is set to "YES". When it is displayed, the user can decide whether or not the sub-stopper will be used.

Display message	Sub-stopper
NOT USE	Not used
USE	Used

NOTE **The position of the sub-stopper sensor must satisfy the two requirements listed below. Because of this, the position of the sub-stopper sensor has to be changed each time a PCB of a different size from the last is used. If the two conditions cannot be fulfilled with regard to the PCB being used, set the "SUB STOPPER" specification to "NOT USE".**
(Refer to the figures on the next page)

2-2 Operation Conditions Selection

The screen displayed during the initial operation status looks like that below. When operation has been interrupted, the the screen is displayed up to the item "Operation Mode 2", and only "Operation Mode 1" and "Operation Mode 2" can be selected.
In the operation interrupt status, press the "RESET" key to move to the initial operation status. (See Fig. 2-1.)



f2-1

[Exp. 1] RUN MODE 1
Select Mounting Operation Mode 1. The three types are described below.

Display message	Operation Mode 1
AUTO	Press "RUN" to initiate continuous operation.
STEP	Operation can be stopped at each step and re-started by pressing the "RUN" key.
JOB CONDITION	To change the work conditions used for normal operation.
UTILITY JOB	This is used when the various utilities are being run (for details, see Section 2-6, "Utilities").

[Exp. 2] RUN MODE 2
Select Mounting Operation Mode 2. The three types are described below.

Display message	Operation Mode 2
NORMAL	Normal operation is carried out.
CHECK	The operation is run as normal, but the mount head does not pick up a component, and the dispenser head does not go through the dispensing process.
PASS	The workpieces are passed through on a conveyor, with no other operations being carried out.

NOTE **"Pass" can be selected only when "Auto" is selected in Mode 1.**

2.1 General

This is used to select a PCB already registered by the user and the working conditions for that PCB.

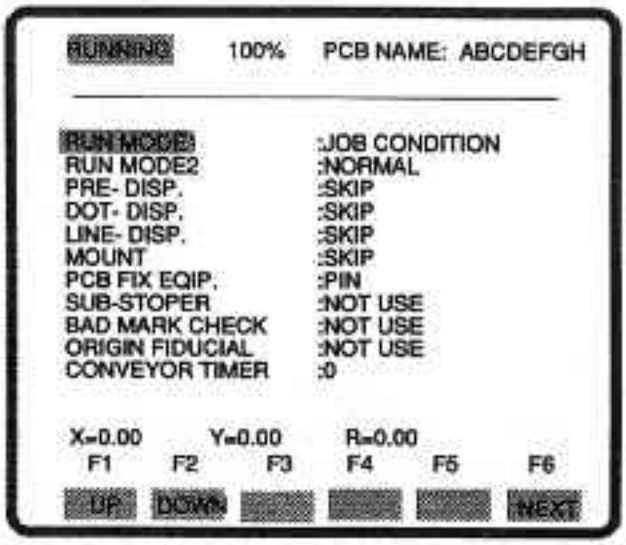
[Initial Operation Status]
This is the status from which all operations begin. This initial status is entered when any of the following occur:
(1) The power is turned on.
(2) Load the PCB or other data from the host PC.
(3) "RESET" is pressed on the work conditions selection screen.

[Operation Execution Status]
This is the status in which operations are being run. This status is entered when the following occurs:
(1) "RUN" is pressed on the work conditions selection screen.

[Operation Interrupt Status]
This is the status in which an operation has been stopped before it is completed. This status is entered when the following occur:
(1) "STOP" is pressed in operation execution status.
(2) An error is generated in operation execution status.

2-5 JOB Conditions

Select "Job Conditions" under "Operation Mode 1". The additional functions for automatic operation are provided here.



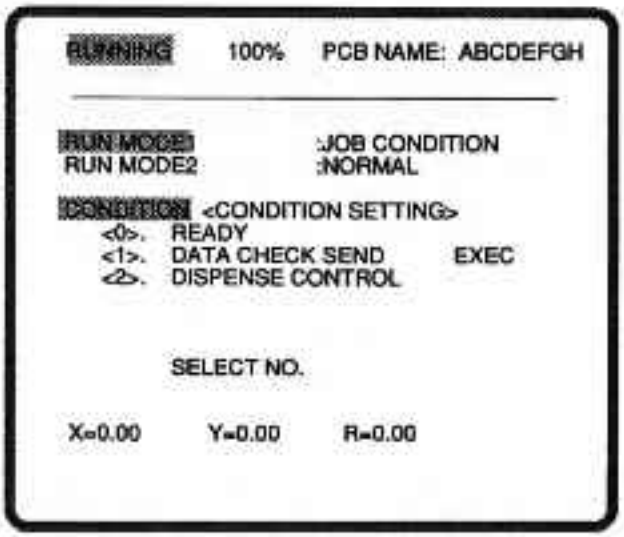
f5-1

To change from the main menu to the f5-1 screen, select the following:
MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Operation Mode 1

Operation Mode 1 contains the following modes:
Auto, Step, Work Conditions, and Utility.

Use the ←, →, f3 and f4 keys to change modes.

On this screen, press the "RUN" key to change to the screen shown below.



f5-2

Selecting any number displays the contents of the selected Job conditions.

2-4 Operation Errors

While the CSM is in operation, and any of the conditions listed below occurs, an error message will be displayed on the screen and the error lamp (yellow or red) lights. The unit enters the error interrupt status.

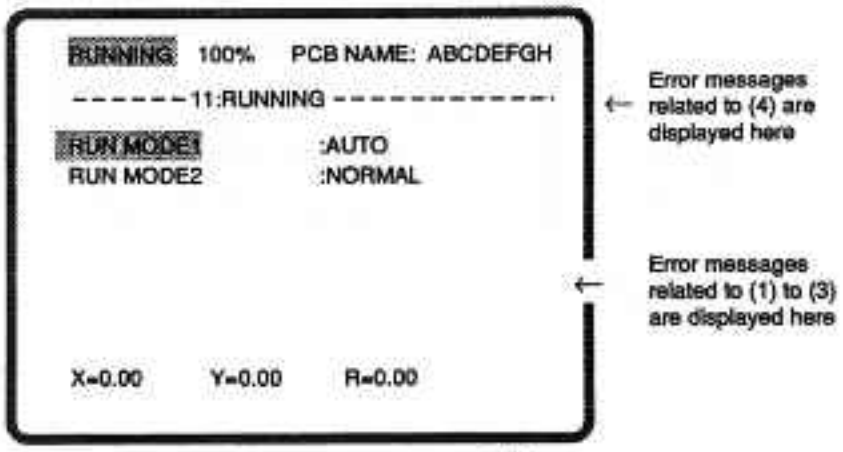
(1) Parts have run out or the feeder is defective, and the recovery operation has been carried out the requisite number of times.
(2) Because of a conveyor problem, the PCB is not transported to the set position within the specified amount of time.
(3) There is an error in the mount data input by the user.
(4) The system has detected an error.

If any of the above situations happens, follow the procedure outlined below.

[1] For (1), (2), or (3):
1) Eliminate the cause of the error.
2) Press the "ERROR CLEAR" key.
3) Press the "RUN" key to re-start operation.

If operation cannot be re-started from where it left off, press the "RESET" button to start again from the initial status.

[2] For (4):
In this case, the error message is displayed on the line above the "Operation Mode 1" item.
1) Check the error message.

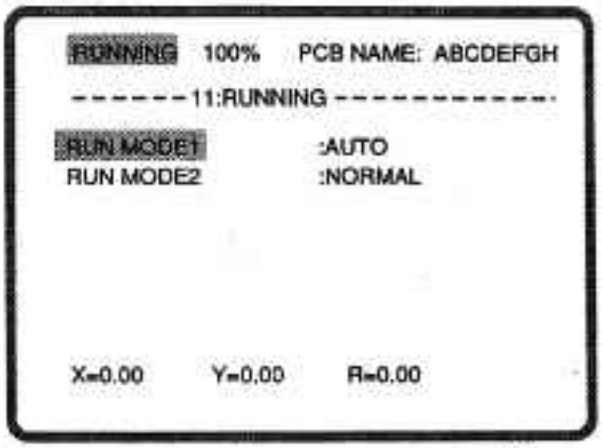


f4-1

2-3 Operation Execution

When the specifications for the operation conditions selected in 2-2 are finished, press the "RUN" key to initiate operation. The screen changes to that shown below, and the "Running" lamp (green) lights.
When "RUN" has been initiated from the initial operation status, all operations are started from the beginning. When "RUN" starts from the operation interrupt status, operation begins from the point where the interruption took place. (See Fig. 2-1.)

NOTE **When operation is interrupted, the message "79:Execution Interrupted" is displayed.**



f3-1

[Operation Speed]
During automatic operation, the movement speed of the head is displayed in percentage form at the top of the screen, just as for manual operation. The speed is changed in the same way as for manual operation, using the "SPEED" and "SHIFT + SPEED" keys to change the speed in 1% increments. (See Section 3.)

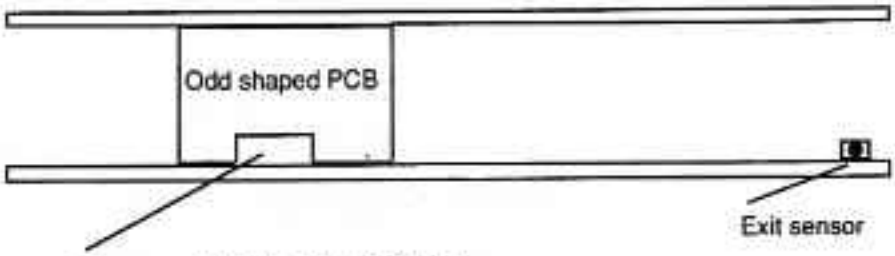
NOTE **Although the percentage may be the same for manual and automatic movement speed, the actual speeds themselves are different.**

NOTE **3-stage speed setting cannot be used in automatic operation.**

[Exp. 9] ORIGIN FIDUCIAL
This is displayed only if the "Beam Sensor" item in the machine configuration data is set to "YES" and a vision board is mounted. Select the method by which the mark specified as Fiducial Point No. 0 is to be used. For details, please see section 4-5-5.

Display message	Fiducial mark use method
NOT USE	Not used
PCB	Compensation for entire PCB
BLOCK	Compensation for each block

[Exp. 10] CONVEYOR TIMER
This selects the timer for the amount of time the conveyor stops when transporting PCBs. It is the time in which the exit sensor is free of a PCB before the belt stops. Time intervals can be selected between 0 and 2.0 seconds, in 0.5-second increments. This is to make sure that odd-shaped boards really left the station.



Exit sensor thinks that the PCB left the machine here. Therefore you can let the converyor run an extra amount of time to make sure the PCB really left the machine.

[Exp. 11] FIDUCIAL DATUM
Speciafies whether the fiducial coordinates in theboard file are relative to the PCB origin or are relative to the block origin. This setting must be defined first before the fiducial coordinates can be entered in the board file.

Display message	Fiducial mark datum
NOT USE	Not used
PCB	Relative to PCB origin
BLOCK	Relative to Block origin

2-5-1 Ending the Settings (0. concluding Settings)

On screen f5-1, press the 0 key and then the ↵ key to conclude the setting of work conditions. The mounting operation then starts in accordance with the selected work conditions.

2-5-2 Data Check Transmission (1. Data Check Transmission)

Normally, in automatic operation, it takes some time for operation to begin, because the data is checked and transmitted first. This part of the operation is called the "Data Check Transmission".

```
CONDITION <CONDITION SETTING>
   <0>.  READY
   <1>.  DATA CHECK SEND          SKIP
   <2>.  DISPENSE CONTROL

         SELECT NO.

 X=0.00      Y=0.00      R=0.00
```

f5-2-1

Selecting <1> on screen f5-1 and pressing the RETURN key ↵ displays the following screen.

If <0> "READY" is selected by pressing the 0 key, with "No Data Check Transmission" set, no data check is carried out. This can be done in order to start up the machine more quickly.

If "No Data Check Transmission" is selected and the <1> key, "No Data Check Transmission", is pressed again, then pressing the ↵ key will return to <1>, "Data Check Transmission". In other words, this can be used to turn the function on and off.

```
CONDITION <CONDITION SETTING>
   <0>.  READY
   <1>.  DATA CHECK SEND          EXEC
   <2>.  DISPENSE CONTROL

         SELECT NO.

 X=0.00      Y=0.00      R=0.00
```

f5-2-2

NOTE

When data created by the user is used for the first time, or data is modified or a different type of PCB used, there may be operational errors if no check or transmission of data is carried out. Particular caution is required in this respect with the CSM84V.

2-6-2 SPEEDCON (Speed control)

This program handles adjustments of: A) the speed of the up and down movement of the heads, B) the speed of the conveyor and C) the speed of the opening and closing of the jaws of the mechanical alignment unit.

```
UTILITY <ADJUSTING UTILITY>
        2. SPEEDCON
   ASSURE SPEED OF CYLINDER TRY 1 TIME A
   MOMENT, ASSURE AIR PRESSURE LEVEL
   BEFORE USE THIS.

   SELECT  EXEC(0) OR ABORT(1) ->

 X=0.00        Y=0.00        R=0.00
```

f6-2-1

To access screen f6-2-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) Æ 2 (2. SPEEDCON).

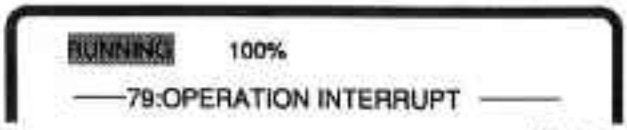
To run the program, select EXEC(0), and press the RETURN key (◈).

```
RUN MODE1          :UTILITY
RUN MODE2          :NORMAL

SPEEDCON <ADJUSTING HEAD SPEED>

      EXIT       =0
      HEADS      =1
      CONVEYOR   =2
      OTHERS     =3

      SELECT NUMBER:

      X=0.00        Y=0.00        R=0.00
```

f6-2-2

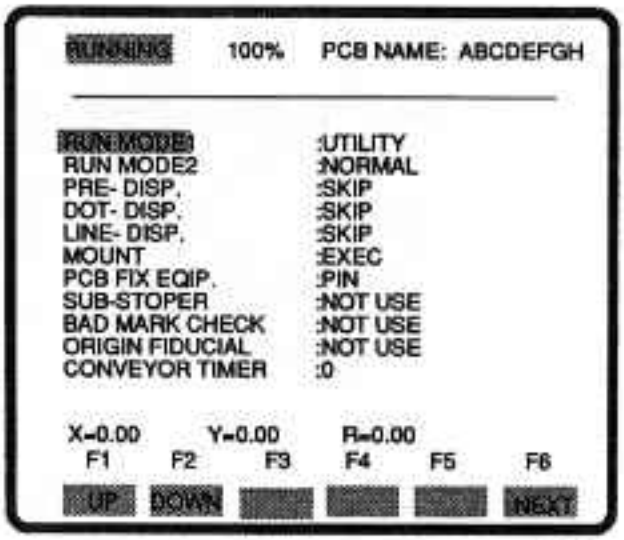
Select the location where the adjustment is to be made.

Under these conditions, pressing "EXIT" or the "MAIN MENU" key (MAIN) displays the message "Execution interrupted", and the program is interrupted.



f6-1-4

For this reason, the "RESET" key should be pressed before entering "EXIT" or "MAIN MENU". This returns to the original screen (f6-1-5).



f6-1-5

2-6-1 WARMUP

This is the program which warms up the machine after the power has been turned on. To run it, press <1> WARMUP (1) on the screen shown in f6-2.

```
UTILITY <ADJUSTING UTILITY>
        1. WARMUP
   WARM UP OF THE MACHINE.
   EXEC 10MIN EVERY MORNING,
   AFTER ASSURING AIR PRESS
   AND POWER ON.

   SELECT EXEC(0) OR ABORT(1) ->

 X=0.00      Y=0.00      R=0.00
```

To change from the main menu to the f6-1-1 screen, press MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 1 (1. WARMUP).

f6-1-1

To run the program, select "EXEC (0)" and press the RETURN key (◈).

```
RUN MODE1          :UTILITY
RUN MODE2          :NORMAL

WARMUP <PROGRAM FOR WARM-UP>
       10 MINUTES EVERY MORNING

PRESS RUN KEY

 X=0.00      Y=0.00      R=0.00
```

f6-1-2

When the "RUN" key is pressed, the program begins running.

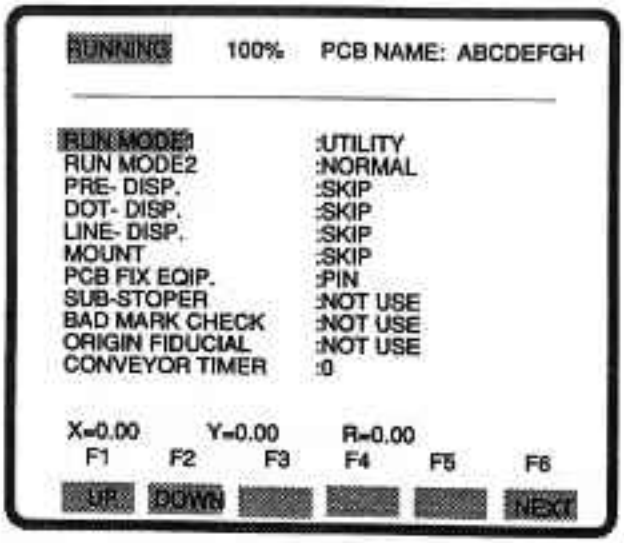
```
RUN MODE1          :UTILITY
RUN MODE2          :NORMAL

WARMUP <PROGRAM FOR WARM-UP>
       10 MINUTES EVERY MORNING
```

f6-1-3

When the machine has warmed up, press the "STOP" key to interrupt the program.

2-6 Utilities

"Utility" is a collection of programs used to adjust various functions. Some of these utilities are ment only for engineers because they can handle adjustments or calibrations of the system. To use it, select "Utility" in "Operation Mode 1".



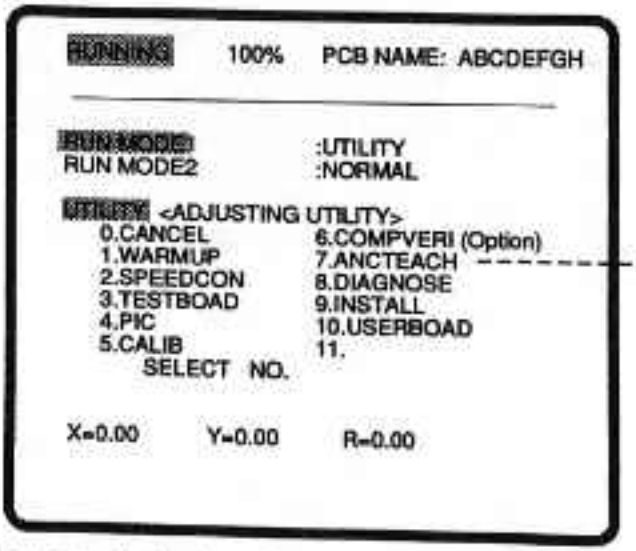
To change from the main menu to the screen in f6-1, press MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT).

Operation Mode 1 has the following modes: Auto, Step, Work Conditions, and Utility.

Use the ← and → keys to change modes.

f6-1

Pressing the "RUN" key at this point displays the following screen.



Note: *ANC TEACH is NOT available in the CSM84VZ machine.*

f6-2

Select any desired number to display the contents of the selected Utility function. Selecting the 0 (0) key on the f6-2 screen and pressing the RETURN key ( ) returns to the screen shown in f6-1.

When a UTILITY program ends , please press RESET key.
When RESET key is pressed in a UTILITY program the CSM asks whether to RESET it or not, then press RESET key once more to reset the UTILITY , or press another key to continue UTILITY.

```
TESTBOARD <MNTQFP TESTBOARD DATA>

   NEEDED CONP. IS AS FOLLOWS.
   NO1[R2125]  F10   NO5[VSOP40]  F117
   NO2[R3216]  F11   NO6[QFP44   ] F118
   NO3[TR     ]F12   NO7[QFP160]  F119
   NO4[SOP28] F116   NO8[QFP100]  F120


   ASSURE AND INPUT "0" ->_
```

f6-3-2

After confirming the part to be used, select 0 and press the RETURN key (◈).

```
TESTBOARD <MNTQFP TESTBOARD DATA>

   CORRESPONDING HEAD NO. IS
   NO1[R2125]  H1    NO5[VSOP40]  H0
   NO2[R3216]  H1    NO6[QFP44   ] H3
   NO3[TR     ]H1    NO7[QFP160]  H3
   NO4[SOP28] H3     NO8[QFP100]  H3


   INP. NO. MODIFY(0=OK)  ->_
```

f6-3-3

To change the specifications of the heads being used for the various parts, input the number of that particular head. If no change is to be made to the specifications, input 0.

```
TESTBOARD <MNTQFP TESTBOARD DATA>

   NEEDED CONP. IS FOLLOWS.
   NO1[R2125]  N     NO5[VSOP40]  N
   NO2[R3216]  N     NO6[QFP44   ] V2
   NO3[TR     ]N     NO7[QFP160]  V3
   NO4[SOP28] N      NO8[QFP100]  V7

   V=VISION    M=Mech. Alignm.  N=CHUCK

   INP. NO. MODIFY(0=OK)  ->_
```

f6-3-4

This determines the method to be used for mounting each of the various parts.

2-6-3 TESTBOARD (Test Board)

This program sets the data for the test board used as a reference for adjustments.
On screen f6-2, select 3. TESTBOARD (3).

```
UTILITY <ADJUSTING UTILITY>
        3. TEST BOARD
        EDIT PCB DATA OF
        ADJUST TYPE PCB,
        THIS CAN NOT WORK FOR
        OTHER PCB DATA.
  SELECT EXEC(0) OR ABORT(1) ->

 X=0.00      Y=0.00      R=0.00
```

f6-3-1

To access screen f6-3-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 3 (3. TESTBOAD).

To run the program, select EXEC (0), and press the RETURN key (⏎).

```
RUN MODE1       :UTILITY
RUN MODE2       :NORMAL

TESTBOARD <BOARD DATA EDITOR>

      1.MNTQFP
      2.MNTCHIP
      3.DISQFP
      4.DISCHIP
      5.MNTQFP(REV. TYPE BOARD)
      6.DISQFP(REV. TYPE BOARD)
      7.MATRIX                  ->_

      X=0.00      Y=0.00      R=0.00
```

f6-3-2

For example, press (1) to select 1. MNTQFP board.

B) Adjustments related to the conveyor

The speed of the air cylinder peripheral to the conveyor can be adjusted. For conveyor-related adjustments, select =2 (on screen f6-2-2, 2) and press the RETURN key (⏎).

```
SPEEDCON <ADJUSTING HEAD SPEED>

    LOCATE PIN =1


    SELECT NO. _
```

f6-2-5

Select 1 and press the RETURN key (⏎).

```
SPEEDCON <ADJUSTING HEAD SPEED>

    LOCATE PIN =1_


    SELECT NO. _
```

f6-2-6

In this example, if 5 is selected and the RETURN key (⏎) pressed, the locating pin moves up and down 5 times and then stops.

C)Adjustment of the Mechnical Alignment unit.

Adjustments can be made to the opening and closing of the mechanical alignment for the jaws, the vertical movement of the nozzle stations, and other factors.

```
SPEEDCON <ADJUSTING HEAD SPEED>

    BIG M.CENTERING          F-B=1  L-R=2
    SMALL M.CENTERING        F-B=3  L-R=4
    NOZZ. STATION UP-DOWN = 5  CLAMP = 6
    M. CENTERING UP-DOWN = 7

    SELECT NO. _
```

f6-12-7

A) Adjustments related to the head

The speed at which the head moves vertically or rotates (pneumatic type only) can be adjusted.
For head-related adjustments, select =1 (on screen f6-2-2, 1).

```
SPEEDCON <ADJUSTING HEAD SPEED>

HEAD 1 UP-DOWN=1      ROT.=4
HEAD 1 UP-DOWN=2      ROT.=5
HEAD 1 UP-DOWN=3      ROT.=6
HEAD ALIGNMENT=7      CLAMP=8

SELECT NUMBER:
```

f6-2-3

In this example, to adjust the speed at which Head 1 moves vertically, select 1 and press the RETURN key (⏎).

```
SPEEDCON <ADJUSTING HEAD SPEED>

WHICH DO YOU ADJUST? ->_
  UP     =0
  DOWN =1
```

f6-2-4a

When selected head is "STD" or "IC" type, MOUNTER ask "UPPER" side speed control or "LOWER" side speed control.

```
SPEEDCON <ADJUSTING HEAD SPEED>

HEAD 1 UP-DOWN=1

INPUT REV. TIMES, ->
```

f6-2-4b

In this example, select 5 and press the RETURN key (⏎) to move Head 1 up and down 5 times and then stop the head movement.

B) Parts

"2. Parts" is selected here (1 on screen f6-4-2).

```
VACPOS      <VERIFY FEEDER POS.>

DECIDE THE UNIT ->_
BEAM SENSOR =0   PREP_HEAD = 4
HEAD 1      =1   CAMERA    = 5
HEAD 2      =2
HEAD 3      =3
```

f6-4-9

```
VACPOS      <VERIFY FEEDER POS.>

INPUT PARTS NUMBER
0 MEANS ALL PARTS
```

f6-4-10

Input the number of the part which is to be checked. If 0 is input, all parts will be checked. When a part number is input, the head moves to a position over that part.

```
VACPOS      <VERIFY FEEDER POS.>

        TEACHIG UNIT =CAMERA
        PART NUMBER =13
CHANGE XY COORDINATE? ->_
        YES = 0
        NO  = 1
```

f6-4-11

If the coordinates need to be corrected, select "1" and press the RETURN key (⏎).
If no corrections are to be made, select "0" and press the RETURN key (⏎).

```
VACPOS      <VERIFY FEEDER POS.>

        TEACHIG UNIT =CAMERA
        PART NUMBER =13
PLEASE TEACH
AND PRESS RUN KEY
```

f6-4-12

Using the movement keys (X+, X-, Y+, Y-), correct the offset and then press the RUN key.

```
MNTPOS      <VERIFY PCB DATA>

  DECIDE THE UNIT ->_
  BEAM SENSOR  =0   PREP.HEAD    =4
  HEAD 1       =1   CAMERA       =5
  HEAD 2       =2
  HEAD 3       =3
```

f6-4-5

Here, VISION is selected (5).

```
MNTPOS      <VERIFY PCB DATA>

  TEACH.UNIT=CAMERA    MOUNTNO.=0
  X= 10.80    Y= 22.22    R= 0.00

  R  CHANGE ANGLE ? ->
     1=ANGLE CHANGES BY 90°
     0=OK
```

f6-4-6

To change the angle at which parts are mounted in 90° units, input 1. If no change is to be made, input 0 .

```
MNTPOS      <VERIFY PCB DATA>

  TEACH.UNIT=CAMERA    MOUNTNO.=0
  X= 10.80    Y= 22.22    R=90.00

  R  CHANGE ANGLE ? -> 1
     1=ANGLE CHANGES BY 90°
     0=OK
```

f6-4-7

The R data is changed from R=0.00 to R=90.00. If the RETURN key (⏎) is pressed at this point, the data changes as follows: R=180.00 R=-90.00 R=0.00.

If no change is to be made in the angle, or if all of the changes have been made, input 0.

```
MNTPOS      <VERIFY PCB DATA>

  TEACH.UNIT=CAMERA    MOUNTNO.=1
  X= 10.80    Y= 22.22    R=90.00

  XY CORRECT DATA
     AND PRESS RUN KEY
```

f6-4-8

Using the movement keys (X+, X-, Y+, Y-), correct the offset and then press the RUN key.

A) Board data

"1. Board" is selected here (1 on screen f6-4-2).

```
MNT:POS      <VERIFY PCB DATA>

   SELECT NO. -->
   1.POS     VERIFY POSITION
   2.HEAD    VERIFY HEAD
   3.PART    VERIFY PARTS
```

f6-4-4

Display changes to work area setting mode.

```
DEFINE SCAN AREA   -->_
0.QUIT     SETTING
1.LINE     DISPENSE
2.PRE      DISPENSE
3.DOT      DISPENSE
4.MOUNT
```

f6-4-4a

Pease input (0) in this stage.
If input 1~4 , you can define work area to exec.

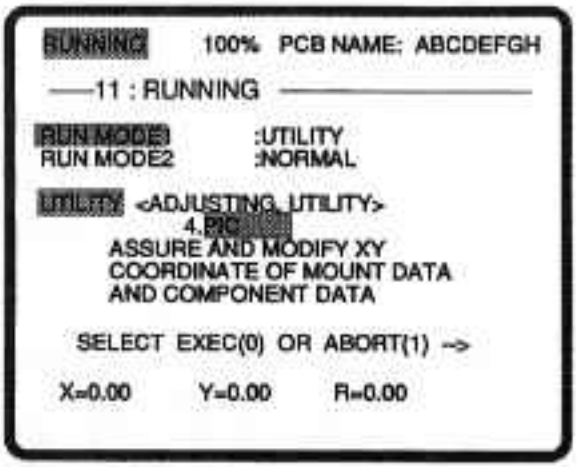
```
AUTO-SCANING?  -->
 NO =  OTHERS
 YES=  0
```

f6-4-4b

Please input (0) in use all.

2-6-4
PIC

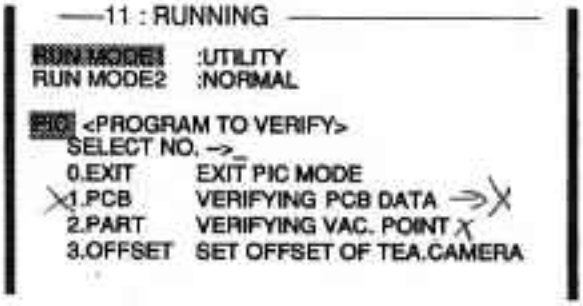
This program lets the user confirm and modify data already set for boards and parts.
Select 4. PIC (4 on screen f6-2).



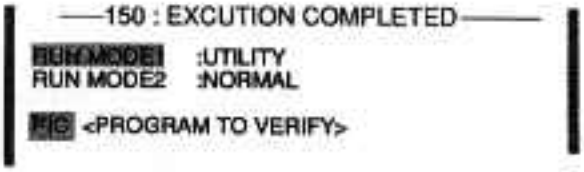
To access screen f6-4-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 4 (4. PIC).

f6-4-1

To run the program, select EXEC (0), and press the RETURN key (◈).
Select DELETE (1) and press the RETURN key (◈) to return to screen f6-2.



f6-4-2



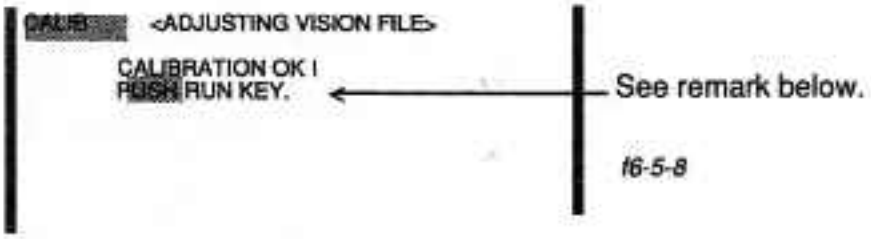
f6-4-3

The message "Execution completed" is displayed. Press the RESET key (RESET) to return to screen f6-1.

After that the CSM will start its initializing operation for fiducial vision file calibration. Push 'RUN' or 'RESET' according the messages appearing on the screen as shown below after adjusting the camera calibration settings. The next screen is requesting to push the 'RUN' key.

f6-5-7

This will continue until the system is correctly calibrated.



f6-5-8

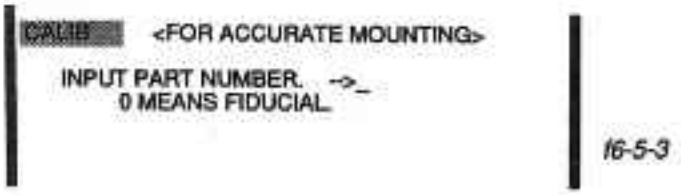
If the calibration is correct the system will indicate this and asks you to push the "RUN" key again. Remark: **if the calibration is ok there is no need to re-start the calibration again**, so press the RESET key.

f6-5-9

When pushing EXEC the system will go to screen f6-5-2 again.

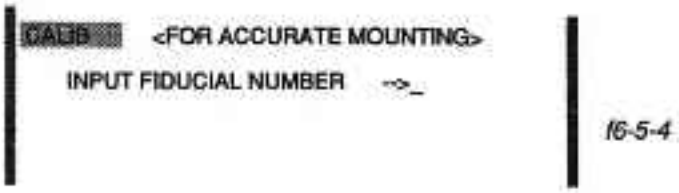
A))
Initial calibration of the fiducial vision file.

This part of the CALIB utility (calibration of the fiducial vision file) is needed when installing a fiducial camera or after readjustment or replacement of the fiducial camera. Your starting stage is the fig f6-5-3:



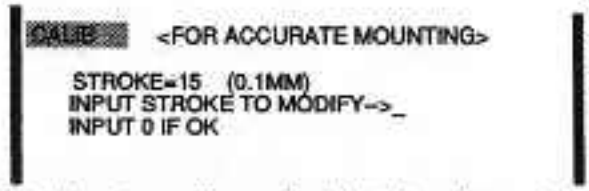
f6-5-3

input **'0' & 'ENTER'** to go into the fiducial vision file calibration'. Ofcourse you can only use this on a vision machine and on a board with fiducial marks. The machine will request 'fiducial data no.' as shown in next figure.



f6-5-4

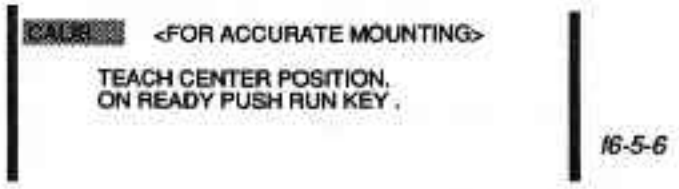
'PCB' data has 0~7 local fiducial data's. Please input fiducial data number which you want to adjust.



Stroke indicates the amount of camera movement. So a stroke of 15 means: 15x0.1mm=1.5mm

f6-5-5

Input '0' in this stage. If you find that the given stroke brings your fiducial mark to much to the outside of the screen, please input a smaller stroke on your next trial. Next message appears on the screen as seen below, after transporting a PCB to the work position and the CAMERA coming on the fiducial mark.



f6-5-6

If the fiducial mark is already in center position of the screen, please push 'RUN' key to continue. If the mark is not in the center of your screen, push 'X+','X-','Y+','Y-' until your fiducial mark is in the center, then push the 'RUN' key.

2-6-5 CALIB (Calibration)

REMARK: Before going into this utility make sure that all pre-conditions are met. To start a complete calibration follow the procedure as described in chapter 3, section 7.

The CALIB utility has the following functions:

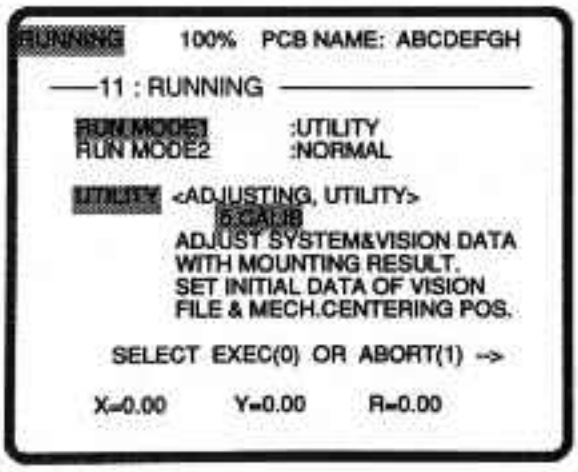
A)) **Initial calibration of the fiducial vision file.**
This part is needed when installing a fiducial camera. It is also needed after replacement or adjustment of parts of the fiducial camera. This function is not necessary on your daily work.

B)) **Initial (coarse) calibration of vision file for components.**
This part of the CALIB utility is needed when introducing a new component. Copy a known vision file to a not-used position and rename it, also change the parameters specific to the new component before entering this routine.

C)) **Fine calibration of a component vision file by means of mounting results.**
This part is needed when doing a fine calibration of a component visionfile. For this fine calibration it uses the mount result which has to be inputted when running this part of the utility. The program mount coordinates have to be very accurate (use CAD information) .

D)) **Dispensing dot recognition. (only for 00DS ROM)**
This calib function is used with the Dispense Control System which is described later on in this manual (see chapter 3 section 4-7).

On screen select '5. CALIB'.



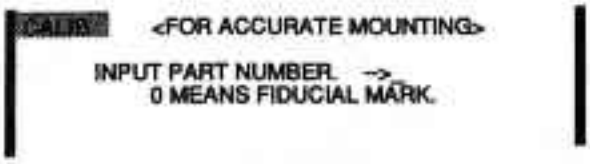
f6-5-1

To access screen f6-5-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 5 (5. CALIB).

To view a vision file while on screen f6-5-1, enter the following: STOP (STOP) → MAIN (MAIN MENU) → 3 (3. DATA INPUT) → 3 (3. VISION).

To return to screen f6-5-1 after checking the vision file, enter the following: MAIN (MAIN MENU) → 1 (1. RUN) → f6 (NEXT) → RUN.

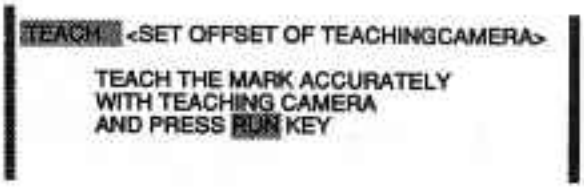
To run the program, select EXEC (0), and press the RETURN key (◈)



f6-5-2

C) Offset

"3.Offset" is selected here (1 on screen f6-4-2).



f6-4-13

Adjust teaching camera offset value in this mode.
Please select PCB with fiducial mark before running UTILITY and BEAM SENSOR =USE.
In ths mode , request PCB and set position and fiducial scanning , and request fiducial mark teaching by teaching camera (adjust offset).

Sometimes, the next messages will appear on the screen. It means 'some data for other component is also calibrated by this operation'. Usual, input '0' to continue. But if you do not want to modify other data, you can input '1' to abort the calibration.

```
CALIB    <FOR ACCURATE MOUNTING>
   THESE PARTS USE SAME VISION FILE.
   119
   OK? (YES=0   NO =OTHERS)-->_
```

f6-5-24

```
CALIB    <FOR ACCURATE MOUNTING>
   THESE PARTS USE SAME M.CENTERING.
   100
   OK? (YES=0   NO =OTHERS)-->_
```

f6-5-25

Next the machine will ask you following question:

```
CALIB    <FOR ACCURATE CALIBRATION>
   CHANGE HEAD OFFSET? -->_
        YES  0
        NO   OTHERS
```

f6-5-26

CAUTION

When a new **Head Offset** is choosen (selection was 1), **ALWAYS** re-check the positions of the nozzle station and Mechanical Alignment unit. These positions are related to the Head 3 offset value. Wrong Head3 offset data may cause damage to the head3 assembly when using the nozzle station.

In case of trying to make **initial data (e.g. for the first time)** for the machine, choose '0'. If not, choose '1'. If there is a head offset, which is not known by the system, it is not possible to get a perfect mount result. To get rid of this initial head off-set choose '0'. This selection however means that it will have influences on other data too, because this head off-set is a part of the machine parameter file.So under normal conditions **always choose '1'**. If you choose '0', the next messages will appear on screen.

```
CALIB    <FOR ACCURATE CALIBRATION>
   THESE MOUNT DATA SAME HEAD.
   111  15  30 119
   OK? (YES=0   NO =OTHERS)-->_
```

f6-5-27

If all operations of the CALIB are finished, push 'RESET' key according to the message appearing on the screen as shown below.

```
CALIB    <ADJUSTING VISION FILE>
   PUSH RUN TO EXEC AGAIN
   OR PUSH RESET TO EXIT.
```

f6-5-28

C))

Fine calibration of a component vision file by means of mounting results

The fine calibration procedure needs the previously determined correction in rotation and X/Y shift at 0 and 180 (or 90 and -90) degree. (see chapter 3, section 7). **First run this part for the rotation correction and if ok, run this part of CALIB again for the X/Y shift correction.**

```
CALIB.      <FOR ACCURATE MOUNTING>

INPUT PART NUMBER.  ->_
     0 MEANS FIDUCIAL.
```

f6-5-19

input component number(1~120).

```
CALIB.      <FOR ACCURATE CALIBRATION>

WHICH DO YOU DO?->_
        INIT.ADJUSTING =0
        FINE ADJUSTING =OTHERS
```

f6-5-20

In this stage, **input '1'** to start with the fine calibration.

```
CALIB.      <FOR ACCURATE CALIBRATION>

WHICH MOUNT ANGLE DO YOU CHOOSE?->_
  0 & 180  -> INPUT 0
    90 & -90  -> OTHERS
```

f6-5-21

Now select the mount angle which you are going to use for adjusting. This angle can be found in the mount data. Input the measured offset data of the component as shown below.

```
CALIB.      <FOR ACCURATE CALIBRATION>

0°   X= 0.01  Y= 0.02  R= 0.00
180° X=-0.03  Y= 0.02  R=0.00
```

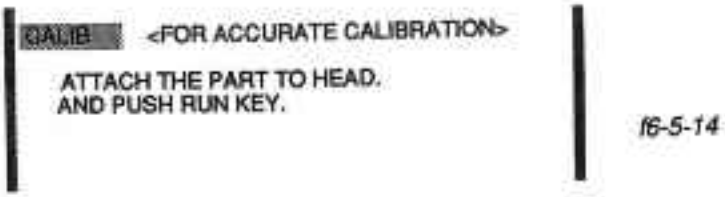
Remark: only X/Y shifts are inputted in shown examples. Do not input Rotation and Shift at the same time.

f6-5-22

After finished input data, assure that your (+) (-) sign and values are correct according next screen, if OK input '0'.

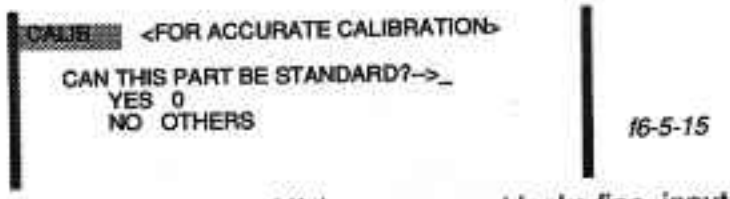
```
CALIB.      <FOR ACCURATE CALIBRATION>

0°   X= 0.01 Y= 0.02 R= 0.00
180° X=-0.03 Y= 0.02 R=0.00
OK? (YES=0   NO =OTHERS)->_
```

f6-5-23



f6-5-14

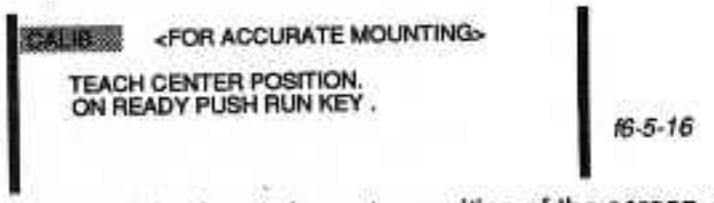
Then the CSM will bring the specified component over the fixed camera, and ask following question:



f6-5-15

Observing the screen, and if the component looks fine, input '0' else input '1'. (please use a so called 'GOLDEN COMPONENT')

A golden component is a perfect component which is used as a reference to qualify other components of the same type.

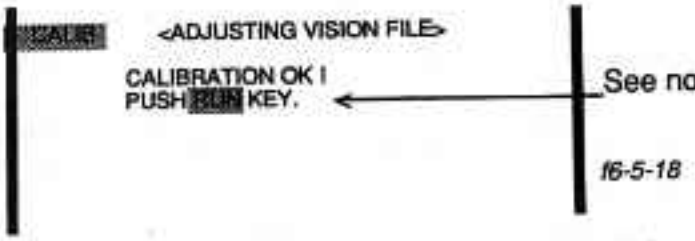


f6-5-16

If the component is already in center position of the screen, push 'RUN' key to continue.If the mark is not center of the screen, push 'X+','X-','Y+','Y-','R+','R-' until your component moves to center position of screen, and push 'RUN' key.
Next message appears on screen as shown below, after adjusting the camera calibration settings. Next screen requesting to push 'RUN' key.

f6-5-17

This will continue until the system has adjusted the correct calibration values. After each calibration-loop you have to push 'RUN' key again.



f6-5-18

NOTE: If the calibration is ok the system will indicate this and asks you to push the 'RUN' key if you want to re-start the calibration. The system returns then to fig. f6-5-10. Normally this is not needed. To terminate this session press RESET.

B))
Initial (coarse) calibration of a component vision file.

This part of the CALIB utility is needed to do the **initial (coarse)** calibration of a new component. Make sure that the correct vision file is present in the parts number file.

```
CALIB    <FOR ACCURATE MOUNTING>

INPUT PART NUMBER.  ->_
     0 MEANS FIDUCIAL.
```

f6-5-10

input the component number(1~120).

```
CALIB    <FOR ACCURATE CALIBRATION>

WHICH DO YOU DO?->_
        INIT.ADJUSTING =0
        FINE ADJUSTING =OTHERS
```

f6-5-11

In this stage, **input '0' to start 'Initial adjusting** of vision file for component.

```
CALIB    <FOR ACCURATE CALIBRATION>

 STROKE=50   (0.1MM)
INPUT STROKE TO MODIFY->_
INPUT 0 IF OK
```

f6-5-12

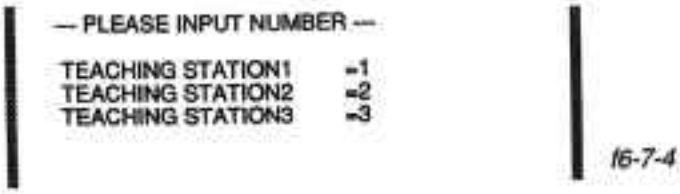
Input '0' on this stage. But if you find that too much stroke brings your component outside the screen, please input a smaller stroke on your next trial.

In case of nozzle change head, you will find following messages.Then if you need to exchange nozzles, please do it manually.If not, simply push 'RUN' key to continue.

```
CALIB    <FOR ACCURATE CALIBRATION>

 NO.1 NOZZLE IS ON HEAD.
 EXCHANGE NOZZLE AND
PRESS RUN KEY.
```

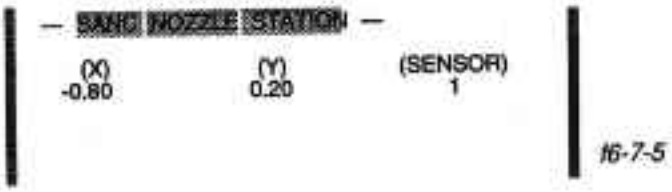
f6-5-13

In case your component is at the LCS , following messages request you to put a component on the head manually. If not at the LCS ,the machine will pick up the component automatically. After you put the component on the head, please push the 'RUN' key.

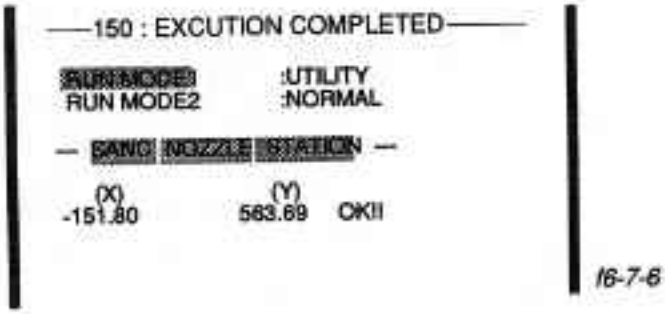


f6-7-4

The nozzle station to be adjusted is selected here. In this example, "No. 1" (1) is selected, and the RETURN key (⏎) pressed.



f6-7-5



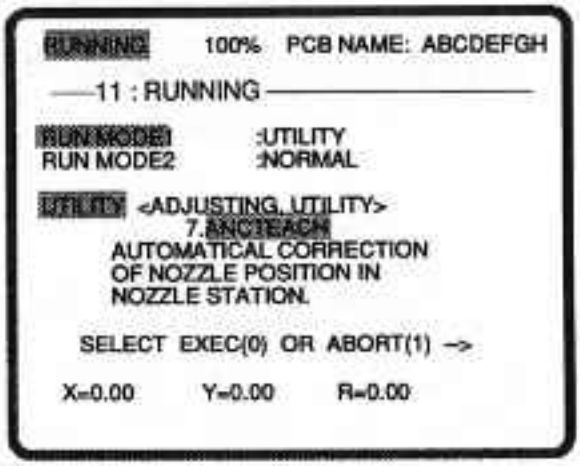
f6-7-6

When "OK!!" is displayed, the adjustment is finished.
Press the "RESET" key to return to screen f6-1.

2-6-6
ANCTEACH

NOTE: *This utility is not available on the CSM 84VZ.*

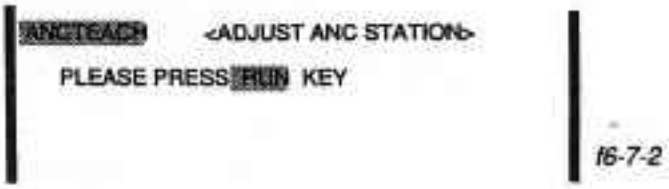
This program is used to adjust the position data of the nozzles of the Automatic Nozzle Change station.
To access the program, select "7. ANCTEACH" on screen f6-2.



To access screen f6-7-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 7 (7. ANCTEACH).

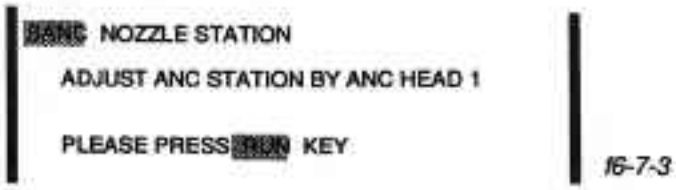
f6-7-1

To run the program, select EXEC (0), and press the RETURN key (◈).



f6-7-2

Press the "RUN" key .



f6-7-3

Press the "RUN" key.

In the case of "NO" , the display shows:

```
CALIB <FOR ACCURATE MOUNTING>

   GO TO VISION MODE AND
   ADJUST PARAMETER SUCH AS
   OBJECT,BINARY,CUT AND FILL.
   AND THEN RETURN HERE AND
   PRESS RUN TO CONTINUE !
```

and machine stops the program. Please change to VISION mode , and set vision file NO.30 , and return to the RUNNING mode by pressing the RUN key.

In the case of "YES" , the display shows "SETTING CONDITION DISPLAY"

```
CALIB <FOR ACCURATE MOUNTING>
                        RESULT    SETTING
  0.Exit.
  1.NUMBER OF OBJECT      9          5
  2.MINIMUM AREA         46         10
  3.MAXIMUM AREA         85        200
  4.SHAPE TOLERANCE       7         15
  5.DISPENSE TIMER       50         50
    INPUT NUMBER (OK=0) -->
```

[RESULT] means a result data by vision moving camera .
[SETTING] means a condition for production defined by [RESULT].
[1.NUMBERS OF OBJECT] means a threshold value for recognized dot number N .
[2.MINIMUM AREA] means a threshold value for recognized dot area S .
Dot area under S/100 (mm2) is recognized as noise .
[3.MAXIMUM AREA] means a threshold value for recognized dot area L .
Dot area over L/100 (mm2) is recognized as obstacle .
[4.SHAPE TOLERANCE] means a tolerance for recognized dot roundness .
Usually [4.SHAPE TOLERANCE] is 10 to 20 (%).
For example [4.SHAPE TOLERANCE] over 28% cannot recognize round or square .
[5.DISPENSE TIMER] means a timer of a pre dispense in PRE-DISPENSE (DATA IN PCB PRE DISPENSE)

Edit 1~4 with data and input "0" to exit "SETTING CONDITION DISPLAY" .
Then the machine starts recognition again .
If "SETTING CONDITION DISPLAY"'s condition is hard , the display shows "SETTING CONDITION DISPLAY" .

If recognized clearly in the condition of "SETTING CONDITION DISPLAY" , CALIB finishes .

D))
Dispense Dot Recognition.

Prepare one PCB which was dispensed in very good condition **without** the DISPENSE FEED-BACK SYSTEM.
Goto RUN MODE 1 and select UTILITY after that select 5. = CALIB.

```
UTILITY <ADJUSTING UTILITY>
            5.CALIB
  ADJUST SYSTEM&VISION DATA
     WITH MOUNTING RESULT.
     SET INITIAL DATA OF VISION
```

Input "0" and push the enter key , then program is loaded .

```
CALIB <FOR ACCURATE MOUNTING>

INPUT PART NUMBER.          -->
  0 MEANS FIDUCIAL MARK.
999 MEANS DISPENSE
```

Input 999 for DISPENSE FEED-BACK SYSTEM .

```
CALIB <FOR ACCURATE MOUNTING>

INPUT HEAD NUMBER           -->
```

Input dispense head number.
Next insert the PCB which was dispensed in **very good condition without** DISPENSE FEED-BACK SYSTEM .
The CSM then clamps the PCB and moves the teaching tool (e.g. camera) to the center of all selected dots while the vision CRT (if present) displays the dots.

```
CALIB <FOR ACCURATE MOUNTING>


CAN THIS DOT BE AS STANDARD?  -->
 YES   0  NO   OTHERS
```

Input "0" , because of PCB which was dispensed in very good condition without DISPENSE FEEDBACK SYSTEM .
Next teach the center of dots using the had-held keyboard axis keys . After this push the RUN key to start recognition .

```
CALIB <FOR ACCURATE MOUNTING>

IS THE DETECTION GOOD?      -->_
YES   0  NO   OTHERS
```

In this example, the part number used for teaching is 120 (1 2 0).

```
PICKR <FOR TEACH VACUUM POINT OF PPF>

  IS PART ON TRAY -> _
  YES=1      NO=0
```

f6-10-4

This sets "Tray Part" (1).

```
PICKR <FOR TEACH VACUUM POINT OF PPF>

  INPUT STARTING
  STACKER NO. -> _
```

f6-10-5

To set, for example, the same type of part in Nos. 2 to 5 of the stacker, the following settings are made:
The starting stacker number is 2.
The ending stacker number is 5.

The starting stacker number is set to 2 (2 ◈).

```
PICKR <FOR TEACH VACUUM POINT OF PPF>

  INPUT ENDING
  STACKER NO. -> _
```

f6-10-6

The ending stacker number is set to 5 (5 ◈).

```
PICKR <FOR TEACH VACUUM POINT OF PPF>

  1.PICKING ANGLE      =0.00
  2.CHECK LEVEL        =HI
  3.LOWER TIMER        =0.25
  4.MECHA. CENTERING   =NOT USE
  5.VISION FILE NO.    =NOT USE
  INPUT NUMBER YOU WANT CHANGE
  IF IT IS OK INPUT 0.
```

f6-10-7

n this example, the Vision File No. is changed from "unknown" to "No. 2". Select "5. Vision File No." (5).

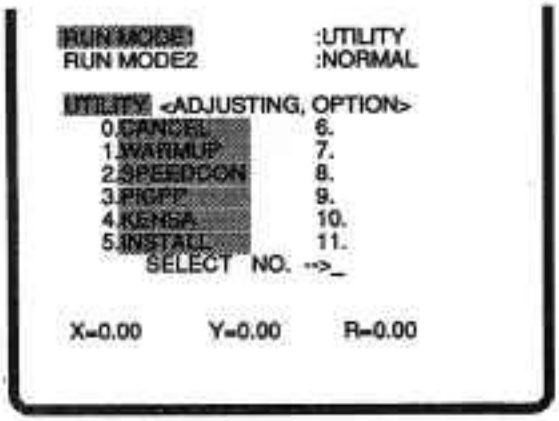
```
PICKR <FOR TEACH VACUUM POINT OF PPF>

  INPUT VISION
  FILE NO. -> _
  -1
```

f6-10-8

The vision file number is 2 (2).

2-6-9 PICPP Position Inspection and Correction Pick and Place (LCS) unit.

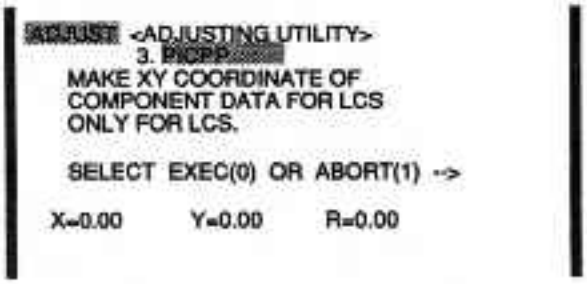
This program is used to teach the pickup position for parts set in the (LCS). It can only be used with the LCS.



f6-10-1

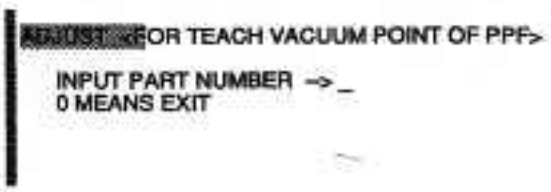
To access screen f6-10-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN.

Select "3. PICPP" (3).



f6-10-2

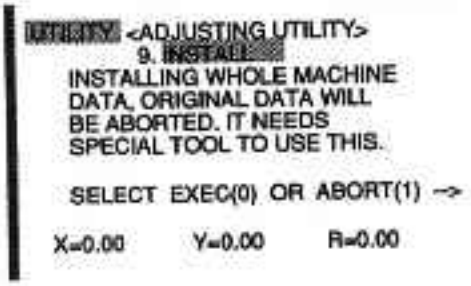
To run the program, select EXEC (0), and press the RETURN key (◈).



f6-10-3

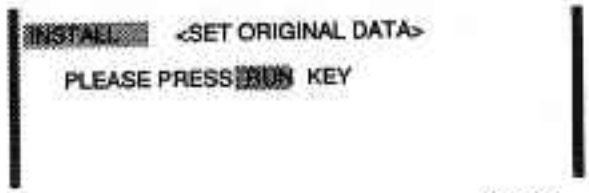
2-6-9 INSTALL

This program is used when the initial machine settings are made.
Normally this program is not used by the user.
On screen f6-2, select "9. INSTALL".



f6-9-1

To access screen f6-9-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 9 (9. INSTALL).



f6-9-2

2-6-7 DIAGNOSE

This program is checking the machine conditions, at f6-2, choose 8 (DIAGNOSE).

```
UTILITY <ADJUSTING UTILITY>
        8. DIAGNOSE
   MACHINE DIAGNOSIS
   MACHINE DIAGNOSE ITSELF.
   SOME WRONG ADJUSTING CAN
   BE DETECT BY USING THIS.

   SELECT EXEC(0) OR ABORT(1) -->

 X=0.00      Y=0.00      R=0.00
```

To access screen f6-8-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 8 (8. DIAGNOSE).

f6-8-1

To run the program, select EXEC (0), and press the RETURN key (◈). Operate the machine according to the messages below :

```
DIAGNOSE    <FOR DIAGNOSING>
   PLEASE PRESS RUN KEY
```

f6-8-2

```
DIAGNOSE    <FOR DIAGNOSING>
   SET PCB AT ENTRANCE
```

f6-8-3

```
DIAGNOSE    <FOR DIAGNOSING>
   CHECK AIR SPEED CONTROLLER
   PLEASE PRESS RUN KEY
```

f6-8-4

```
DIAGNOSE    <FOR DIAGNOSING>
   OK !!
   PLEASE PRESS RUN KEY
```

f6-8-5