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

   1.USE M. CENTERING      =NO
   2.TRAY SIZE X*Y         = 5      10
   3. PARTS PITCH X*Y      = 31.00  20.00
   4. ACCESS POINT         = 1      1
   5.DUMP POINT            =TRAY BACK
   INPUT NUMBER YOU WANT CHANGE
   IF IT IS OK INPUT 0.
```

f6-10-9

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

   PLEASE TEACH
   AND PRES RUN KEY
```

Under the conditions on this screen, the manual movement keys X+, X-, Y+ and Y- are effective.

f6-10-10

Teach the pickup position and press the RUN key.

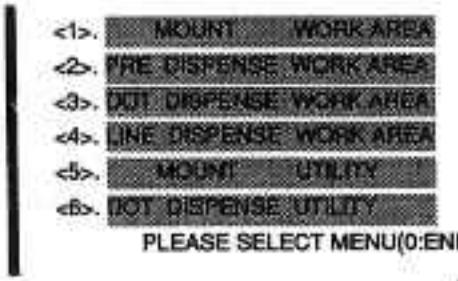
```
PICPP  <FOR TEACH VACUUM POINT OF PPF>

   INPUT PART NUMBER -> _
```

f6-10-11

To continue the teaching procedure, input the next part number.
To end the procedure, input 0.

(1) MENU

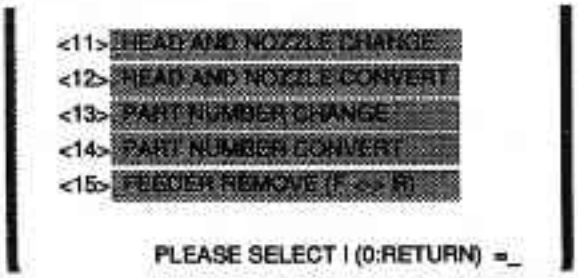
USERBOARD MENU



To run the program , Screen shows fig 6-11-3. menu screen. If inputted 5 key in fig 6-11-3. , screen changes to fig 6-11-4. If inputted 6 key in fig 6-11-3. , screen changes to fig 6-11-5. Fig6-11-3,4,5 shows editor menu.

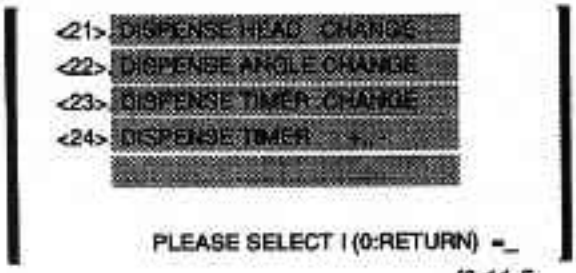
f6-11-3

Utility for user mount board data



f6-11-4

Utility for user dot dispense board data



f6-11-5

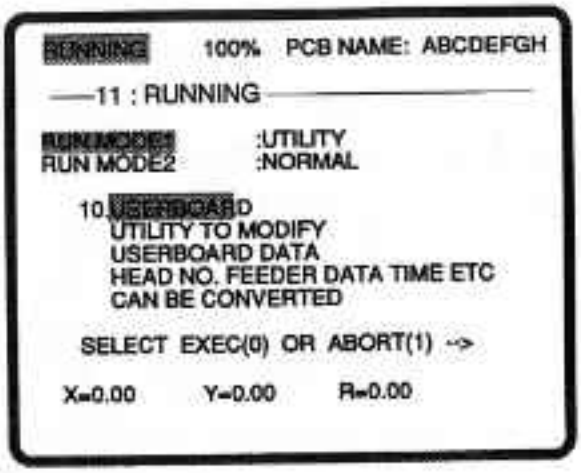
After selected menu (number inputted) , screen shows fig 1-4, and inquire run or cancel.

Only selected menu is displayed.
Run or cancel key-in is inquired.
Inputted 0 key on the fig 6-11-6. screen , this selected menu is cancelled and screen changes to fig 6-11-3.

f6-11-6

2-6-10
USERBOARD

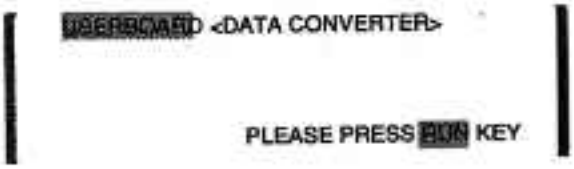
This program is used to edit user board data.
Before software version E52, RUN MODE 1: JOB CONDITION could edit the work area. After software version E52, RUN MODE 1: UTILITY (USERBOARD) is created instead of RUN MODE 1: JOB CONDITION. USERBOARD can edit work area and other functions, for example head , feeder parts number , dispensing timer and so on. At f6-2, choose 10 (USERBOARD).



To access screen f6-11-1 from the main menu, enter the following: MAIN (MAIN MENU) → 1 (RUN) → f6 (NEXT) → Select Operation Mode 1: Utility → RUN (RUN) → 10 (10.USERBOARD).

f6-11-1

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



f6-11-2

Press the "RUN" key .

(2) WORK AREA SETTING

<1>. MOUNT WORK AREA
<2>. PRE DISPENSE WORK AREA
<3>. DOT DISPENSE WORK AREA
<4>. LINE DISPENSE WORK AREA

This function is used to execute a part of the mount , pre dispense , dot dispense and line dispense dataor to change to the "SKIP?" function.

```
<*>.  ********  WORK AREA
            START = 0      END = ***
PLEASE SET WORK AREA
            FROM =_        TO  = _
PLEASE SELECT OBJECT
 (EXEC:1 , SKIP:2 , CANCEL:0)   _
```

Display current PCB data
Please input work area!
Select function exec/skip of "SKIP?" or cancelof this function.

f6-11-7

(caution)
Only the contents of the "SKIP?" item in the specified data range are changed. No other data is modified.

(3) MOUNT UTILITY

<11>. HEAD AND NOZZLE CHANGE

This function is used to change mount head and nozzle data in the specified data range.

```
<11> HEAD AND NOZZLE CHANGE
            START = 0      END = ***
PLEASE SET WORK AREA
            FROM =_        TO  = _
SELECT HEAD , NOZZLE (1-3 , 0:CANCEL)
            HEAD  =_       SANC NOZZLE =_
```

Display current PCB data
Please input work area!
Select function exec/skip of "SKIP?" or cancelof this function.

f6-11-8

(caution)
Only the contents of the "HEAD" and "NOZZLE" item in the specified data range are changed. No other data is modified.

<24>. DISPENSE TIMER + -

This function is used to add or substruct dot dispense timer data in the specified data range.

```
<24>. DISPENSE TIMER    + -
          START = 0      END = ***
PLEASE SET WORK AREA
               FROM = _       TO  = _
SELECT DOT DISPENSE TIMER
          (-125<->125 , 0:CANCEL) _
```

Display current PCB data
Please input work area!
Please input addtion(+) or substruction(-) dot dispense timer data!

(caution)

Only the contents of the "TIMER" item in the specified data range are changed. No other data is modified.

2-6-11 COMPVERI (option)

The COMPONENT VERIFICATION utility is a tool for the CSM which allows you to test the TWO-LEAD components: resistors, inductors, capacitors in a semi-automatic way.

Different modes are:

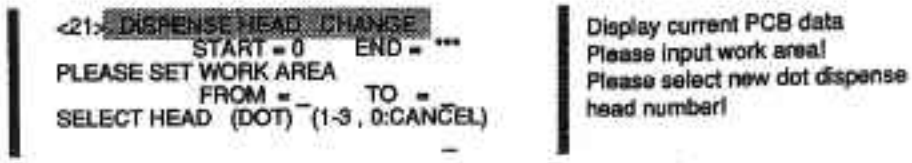
- Check after changing a feeder
- Check each component on the first board of a batch
- Continues check of all two-lead components.

For more information of how to use this utility see separate manual of this option.

(4) DOT DISPENSE UTILITY

<21>. DISPENSE HEAD CHANGE

This function is used to change dot dispense head data in the specified data range.

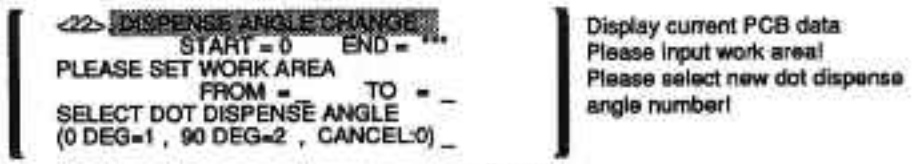


f6-11-16

(caution)
Only the contents of the "HEAD" item in the specified data range are changed. No other data is modified.

<22>. DISPENSE ANGLE CHANGE

This function is used to change dot dispense angle data in the specified data range.

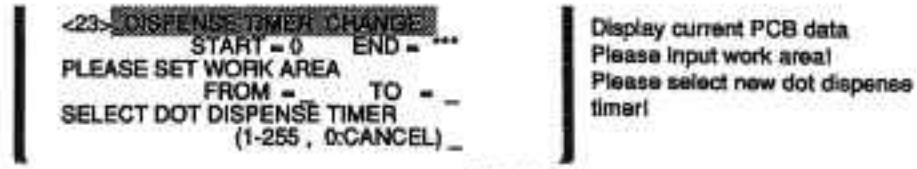


f6-11-17

(caution)
Only the contents of the "R" item in the specified data range are changed. No other data is modified.

<23>. DISPENSE TIMER CHANGE

This function is used to change dot dispense timer data in the specified data range.

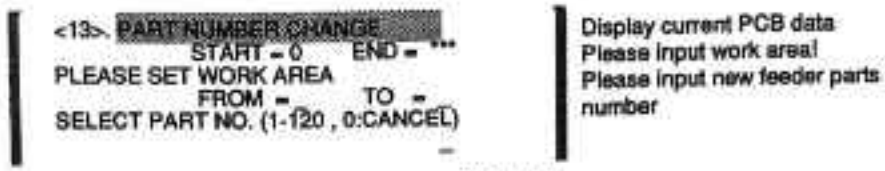


f6-11-18

(caution)
Only the contents of the "TIMER" item in the specified data range are changed. No other data is modified.

<13>. PART NUMBER CHANGE

This function is used to change "PART" data in the specified data range.

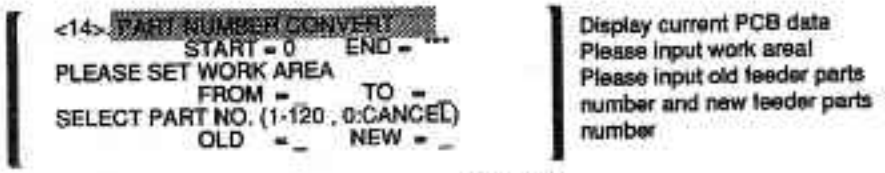


f6-11-13

(caution)
Only the contents of the "PART" item in the specified data range are changed. No other data is modified.

<14>. PART NUMBER CONVERT

This function is used to convert "PART" data in the specified data range.

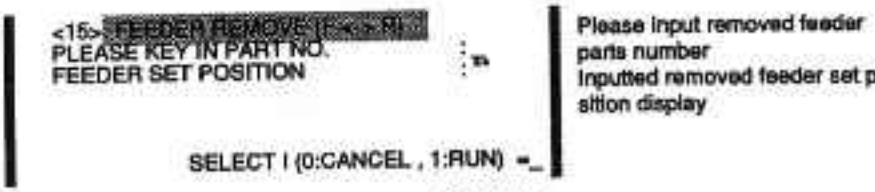


f6-11-14

(caution)
Only the contents of the "PART" item in the specified data range are changed. No other data is modified.

<15>. FEEDER REMOVE (F <-> R)

This function is used to correct mount angle (180 deg) data , if feeder removed (front<-> rear) , in the specified data range.



f6-11-15

(caution)
Only the R of the mount board data in the specified data range are added or substruct 180 deg. . No other data is modified.

<12>. HEAD AND NOZZLE CONVERT

This function is used to convert mount head and nozzle data in the specified data range.

```
<12>. HEAD AND NOZZLE CONVERT
(1). HEAD 1          = HEAD 1
(2). HEAD 2          = HEAD 2
(3). HEAD 3 NZZL 1 = HEAD 3 NZZL 1
(3). HEAD 3 NZZL 2 = HEAD 3 NZZL 2
(3). HEAD 3 NZZL 3 = HEAD 3 NZZL 3
              (1-5:MENU , 0:SETTLED) 1
```

f6-11-9

In the left side , current head and nozzle setting displays (OLD).
In the right side , after convertion head and nozzle setting displays (NEW).
(This screen shows no head and nozzle are converted)
Please input leftside menu number (1-5).
(This screen shows (1).head 1 is selected)

```
<12>. HEAD AND NOZZLE CONVERT
(1). HEAD 1          = HEAD 1
(2). HEAD 2          = HEAD 2
(3). HEAD 3 NZZL 1 = HEAD 3 NZZL 1
(3). HEAD 3 NZZL 2 = HEAD 3 NZZL 2
(3). HEAD 3 NZZL 3 = HEAD 3 NZZL 3
            SELECT HEAD NO. (1-3) 3
```

f6-11-10

Please input new head NO.
(This screen shows (1).head 1 is converted to head 3)

```
<12>. HEAD AND NOZZLE CONVERT
(1). HEAD 1          = HEAD 1
(2). HEAD 2          = HEAD 2
(3). HEAD 3 NZZL 1 = HEAD 3 NZZL 1
(3). HEAD 3 NZZL 2 = HEAD 3 NZZL 2
(3). HEAD 3 NZZL 3 = HEAD 3 NZZL 3
            SELECT NOZZLE NO. (1-3) 1
```

f6-11-11

Please input new nozzle NO.(In the case of nozzle change station and nozzle change head exist)

```
<12>. HEAD AND NOZZLE CONVERT
(1). HEAD 1          = HEAD 3 NZZL 1
(2). HEAD 2          = HEAD 2
(3). HEAD 3 NZZL 1 = HEAD 3 NZZL 1
(3). HEAD 3 NZZL 2 = HEAD 3 NZZL 2
(3). HEAD 3 NZZL 3 = HEAD 3 NZZL 3
              (1-5:MENU , 0:SETTLED) 0
```

f6-11-12

In the right side , after convertion head and nozzle setting displays (NEW).
(This screen shows head no.1 are converted to head no.3 and nozzle no.1)
.If all setting done , please input 0:SETTLED key in this screen mode.

```
<12>. HEAD AND NOZZLE CONVERT
(1). HEAD 1          = HEAD 3 NZZL 1
(2). HEAD 2          = HEAD 2
(3). HEAD 3 NZZL 1 = HEAD 3 NZZL 1
(3). HEAD 3 NZZL 2 = HEAD 3 NZZL 2
(3). HEAD 3 NZZL 3 = HEAD 3 NZZL 3
          SELECT ! (0:CANCEL , 1:RUN) =_
```

f6-11-13

screen inquires RUN or CANCEL of this mode.
Inputted 0 key on the screen , this selected menu is cancelled and screen changes to fig 6-11-1.

(caution)

Only the contents of the "HEAD" and "NOZZLE" item in the specified data range are changed. No other data is modified.

Manual Function Key Table

Part 2

Page	Function Key	CRT Display	Operation	DO No.	Explanation
4	F1	H1 DOWN	Head 1 descent ON/OFF	20	4
	F2	H1 TURN	Head 1 rotation ON/OFF		5
	F3	H1 VAC	Head 1 picking ON/OFF	24	6
		H1 DISP	Head 1 dispensing ON/OFF		
	F4				
5	F1	H2 DOWN	Head 2 descent ON/OFF	21	4
	F2	H2 TURN	Head 2 rotation ON/OFF	23	
		HP VAC	Spare head picking ON/OFF		7
	F3	H2 VAC	Head 2 picking ON/OFF	25	6
		H2 DISP	Head 2 dispensing ON/OFF		
	F4				
6	F1	H3 DOWN	Head 3 descent ON/OFF	40	4
	F2	H3 TURN	Head 3 rotation ON/OFF	42	7
		HP DOWN	Spare head descent ON/OFF		
	F3	H3 VAC	Head 3 picking ON/OFF	44	6
		H3 DISP	Head 3 dispensing ON/OFF		
	F4	H3 VCHG	Head 3 strong vac. ON/OFF	46	12

Note: *CSM 84VZ only.*

[Exp 3]
The back light on head 3 is used at the moment of component recognition (above a fixed camera)

CAUTION:

DO NOT LET THE BACKLIGHT LEDs ON FOR TOO LONG.
During normal operation the back light is only on for a very short period. Leaving the backlight LEDs on in manual mode for a too long period, may cause damage to the backlight PCB (if the LEDs stay on too long, the heat radiated by the LEDs causes such a concentrated field of heat that it can result in the LEDs starting to de-solder themselves.).

3-2 Manual Operation of Actuators Using the Function Keys

Manual operation of various kinds of equipment is possible using the function keys of either the hand-held control unit or the CSM itself. At the bottom of the screen, the six keys F1 to F6 and their corresponding instruments and operations are noted in symbol format. The display can be switched to the one shown below by pressing the F5 (BACK) and F6 (FWD) keys. These function keys are effective not only in manual mode, but at any time that they are displayed on the screen.
The operations of the function keys may not always be displayed, depending on the specifications of the equipment (see 4-4-1, "Machine Configuration").

Manual Function Key Table Part 1

Page	Function Key	CRT Display	Operation	DO No.	Explanation
0	F1	ORIGIN	Initialize X-Y-R axes		
	F2				
	F3				
	F4				
1	F1	M-CONV	Conveyor motor ON/OFF	06	
	F2	M-STP.	Main stopper up/down	10	
	F3	LOCATE	Locating pins up/down	11	
	F4	CAMERA	Teaching camera ON/OFF	30	8
2	F1	REVERSE	Conveyor reverse function ON/OFF	31	
	F2	S-STP.	Sub-stopper up/down	00	1
	F3	PUSHUP	PCB pushup plate up/down	32	
	F4	CLAMP	Edge positioning clamp ON/OFF	33	2
3	F1	C-SPD.	Conveyor low-speed ON/OFF	34	
	F2	PUSHIN	PCB push-in up/down	35	2
	F3	DO(36)	Head 3 back light ON/OFF	36	3
	F4	COUNT	PCB counter	37	

CSM84VZ only

[Exp 1] S-STP
Displayed if the "SUB STOPPER" item in the machine configuration data is "YES".

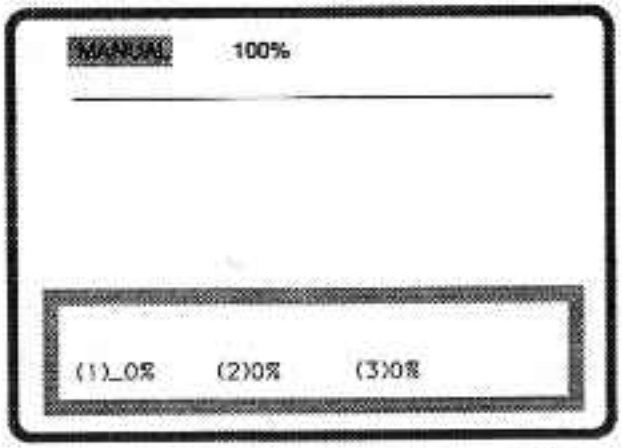
[Exp 2] CLAMP, PUSHIN
Displayed if "EDGE CLAMP" is "YES".

3-1-2 Setting the Manual Speed

There are two ways to set the manual movement speed of the head, described below.

[Speed setting in 1% increments]
Speed is decreased by 1% of the current value each time the "SPEED" key is pressed, and incremented by 1% each time the SHIFT + "SPEED" keys are pressed.

[3-stage speed setting]
Using this function, three speed levels can be set in advance, and then accessed simply by pressing the "SPEED" key. To change the movement speeds, press, while you are in the manual screen (see previous page), the "S" key (=[SHIFT][←—]). The screen shown below appears. Input up to three speeds. The value is input by pressing the key after the numerals are entered. When inputting of the speeds is finished, press "EDIT" or "EXIT" to exit the setting screen. After this, each time the "SPEED" key is pressed, the movement speed changes in the order of (1) to (3).
To cancel the preset speeds and return to 1% incremental speed setting, input 0 for all three values.



f1-2-1

Preferred settings:

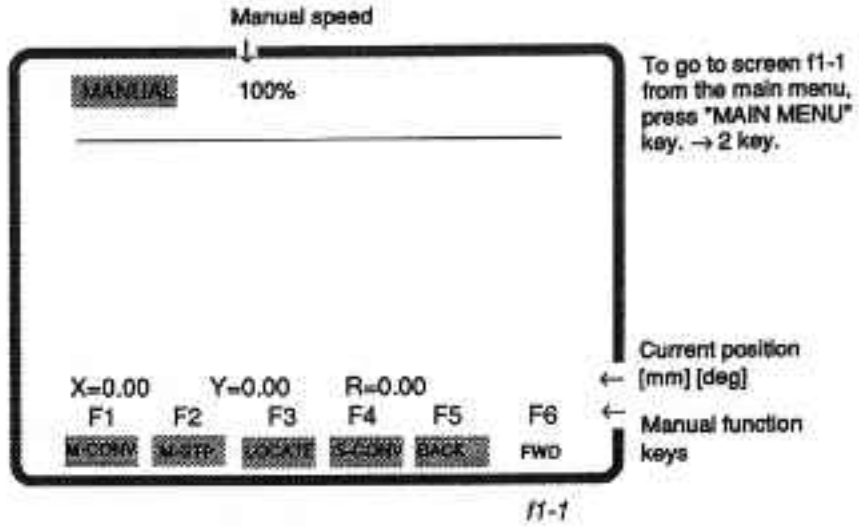
a) 3-stage speed setting:
(1) 2% (2) 20% (3) 100%

b) Speed setting in 1% increments
(1) 0% (2) 0% (3) 0%

SECTION 3 Manual

3-1 Manual Movement of the Head

Selecting "MANUAL" on the main menu displays the manual screen shown below. In this mode, operations such as head movement, rotation, ascent/descent, and operation of other equipment units can all be controlled manually.



f1-1

Movement and rotation of the head can only be controlled through the keys of the control keyboard.

3-1-1 Manual speed

The manual speed of the head is displayed at the top of the screen as a percentage figure. The value can be set between 1-100%, with 100% being the maximum possible speed. Pressing the control keyboard movement keys "X+", "X-", "Y+", "Y-", "R+", and "R-" moves and rotates the head. When the key is released, movement stops. Setting this value to 1-5 initiates fix-step movement, so that the head moves only the specified distance each time the key is pressed.

Set value %	XY direction speed [mm/s]	Movement distance [mm]	Rotation speed (R) [rpm]	Rotation angle [deg]
100	50.0	–	24.0	0.15
5	–	0.20	–	0.08
4	–	0.10	–	0.04
3	–	0.04	–	0.02
2	–	0.02	–	0.01
1	–	0.01	–	

The values as shown above indicate the distance of the fix-step movement.

4-1-2 Data files

Data is stored on the floppy disk in the form of data files. Aside from PCB data and M.I.S. data, all of the file names are fixed, as shown in the table below.

Data	Filename (Floppy)	Filename (online)	Data contents
System data	USER. MCH	MCH	Entire system
PCB data	***. BRD	BRD	One PCB
Parts data	USER. FDR	FDR	All registered parts
Vision data	USER. VIS	VIS	Entire vision
M.I.S. (Management Information System)	***. PRD	PRD	All M.I.S. data

The system data file (USER.MCH) contains the data unique to each individual machine, input into the system at production time. This data should be handled with particular care.
When CSM is shipped, this file is already stored in the memory of the controller. **It is strongly recommended to make a software back-up on a floppy disk as soon as the machine is powered up at installation. This disk should be kept as a master disk.** Make a second back-up of this USER.MCH file for 'everyday' use.

NOTE:

4-2 Data Initialization

In case of a malfunction it is possible that all the machine data (described previously) is reset (e.g. lost of battery power or replacement of the CPU board). For this reason, a floppy disk containing the machine USER file must be loaded via a PC after the power is turned on. Under normal conditions this USER file will stay in the memory because the memory is always under power (battery back-up). However, if the USER data is damaged it is not possible and even dangerous to operate the machine (e.g. no software limits etc). In that case it is necessary to load in or create new USER machine data.

The machine user file (USER.MCH) is particularly important, as it contains the data unique to each individual machine, which is input when adjusting production output. Make sure to load in a correct USER.MCH file via a Personal Computer (PC) using the UFOS-TOOLBOX utility (option) or equivalent.

NOTE:

If, after initialization of the system, the text on the screen is in the Japanese language than proceed as follows to switch over to English:

System with vision: push <main menu> , <3 >(data input),
< 4 > (system), < 3 > (initialize) and at last <enter key>
System without vision: push <main menu>, <3 > (data input),
< 3 > (system), < 3 > (initialize) and at last <enter key>

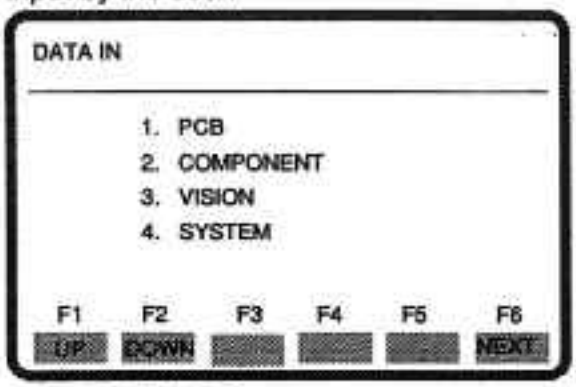
CAUTION:

After this action your PCB, component and vision data files are deleted!!, so make sure that there is a back-up of these files.

SECTION 4 DATA INPUT

4-1 Overview

Selecting "DATA INPUT" (3) on the main menu (MAIN) displays the initial data input screen shown below.
The term "data" includes both system configuration data and data input by the user.



To access screen f1-1 from the main menu, press MAIN (MAIN MENU) → 3 (3. DATA INPUT).

← Option (displayed only if unit attached)

← Exp. 1

← Function key display

f1-1

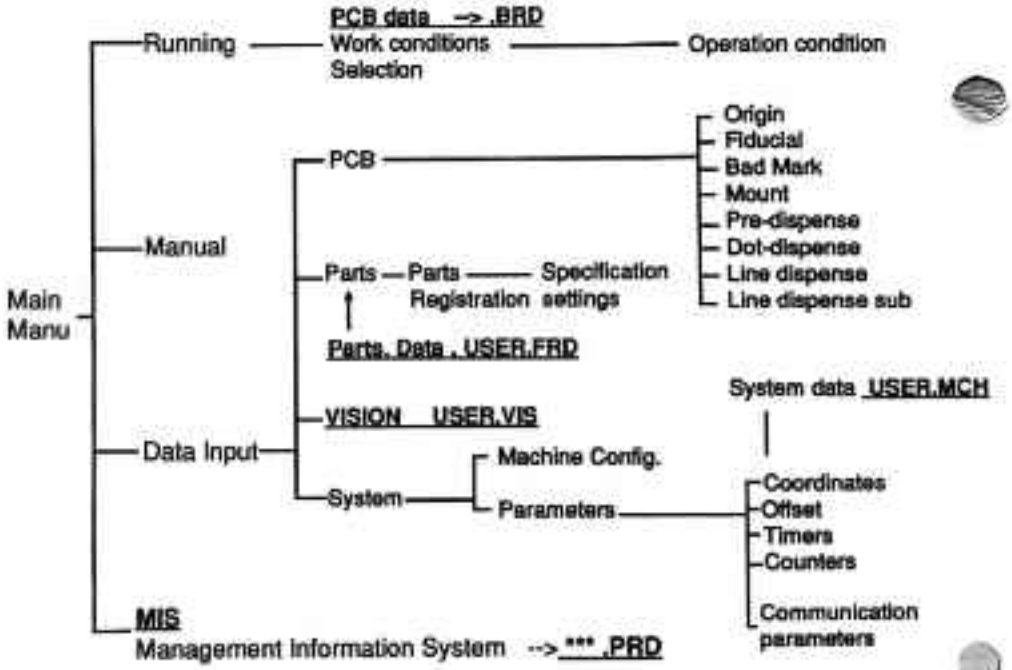
[Exp. 1] SYSTEM
This is displayed only in the initial operation status, to move to the next screen.

4-1-1 Types of data

Data is divided into four types (or up to 5 types if optional equipment is being used). (See Fig. 4-1.)

1.	System	Standard
2.	PCB	Standard
3.	Parts (components)	Standard
4.	Production control data	Standard
5.	Vision	standard for 84V/VZ, Option for 66

All of the data above is input by the user except for part of the system data and the production control data.



Manual Function Key Table

Part 3

Page	Function Key	CRT Display	Operation	DO No.	Explanation
7	F1	TRAY-S	ON/OFF	41	9
	F2	TRAY 0B	ON/OFF	43	
	F3	TRAY1B	ON/OFF	45	
	F4	TRAY2B		47	
8	F1	MA. (Y)	Mechanical alignment Y direction jaw open/close ON/OFF	50	10
	F2	MA.(X)	Mechanical alignment X direction jaw open/close ON/OFF	51	
	F3	NZL(1)	Nozzle station clamp ON/OFF	52	11
	F4	NST. UP	Nozzle station up/down ON/OFF	53	
9	F1	MA.U/D	Mechanical centering ascent,descent ON/OFF	54	10
	F2	NZL 3		55	11
	F3	TRAY 3B		56	9
	F4	TRAY 4B		57	

[Exp. 9] TRAY-S, TRAY0B, TRAY1B, TRAY2B, TRAY3B, TRAY4B
This is displayed unless "TRAY HANDLING" is "NO".

[Exp. 10] MA.(Y), MA.(X), MA.U/D
This is displayed if "M.CENTERING *" is "YES".

[Exp. 11] NZL(1), NST.UP, NZL3
This is displayed if "NOZZLE STATION" is "ANE Type" or "VISION-ANE Type".

[Exp. 12] H3 VCHG
This toggle function is used to get stronger vacuum to the vision head when using the Automatic Nozzle Exchange feature.

[Exp: 4] HEAD 1 DOWN, HEAD 2 DOWN, HEAD 3 DOWN This is displayed unless the "Head * SPEC." is "NO".

[Exp. 5] H1 TURN
This is displayed if the "HEAD 1 SPEC." is "DOT DISPENSER" or "LINE DISPENSER".

[Exp. 6] H1 VAC, H1 DISP, H2 VAC, H2 DISP, H3 VAC, H3 DISP
Depending on the head specification, the display content appears as shown below.

HEAD * SPEC	CRT Display
NO	None
STANDARD IC ANE VISION ANE	H*VAC
DOT DISPENSER	H*DISP
LINE DISPENSER	

* = 1, 2, 3

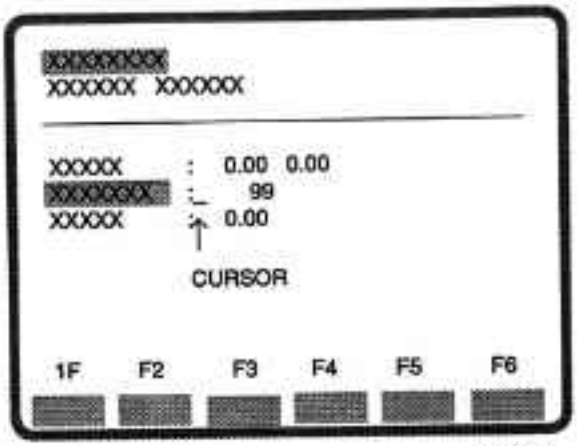
[Exp. 7] H2 TURN, HP VAC, H3 TURN, HP DOWN
Depending on the specifications for the spare head unit and the head, the display contents appear as shown below.

PREP.HEAD		CRT Display
YES		HPVAC,HPDOWN
NO	HEAD * SPEC.	
	DOT DISPENSER LINE DISPENSER	H*TURN
	OTHER	None

[Exp. 8] CAMERA
This is displayed if "TEACHING CAMERA" is "YES".

4-3-2
Data input

On the screen shown below, the numerical items displayed on the right side are currently input items. Use the following procedure to change these items.



f3-2-1

1) Use the F1 and F2 keys to move the highlighted display to the items to be changed (on the left side).
2) Press the "EDIT" key to display the cursor.
3) Enter the new data with the ten-keys. Pressing the ⏎ key inputs the entered value. When inputting is finished, the cursor disappears from the screen.

NOTE

While the cursor is displayed, the effective keys are the ←, → "INS", "DEL", "EDIT", numeric keys, and ⏎. Pressing the "EDIT" key before inputting any values cancels all values input up to that point. The cursor also disappears.

NOTE

For data appearing with decimal points, make sure you include the decimal point when you change the value. If the decimal point is not included in the new value, the error "101: Format Error" will be displayed and input will be inhibited.

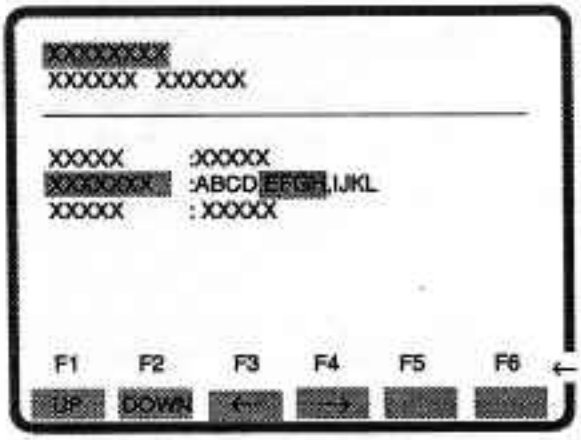
4-3 Basic Data Inputting Operations

First, the various operations which share the data input screen will be explained.

4-3-1 Selection type input

On the screen shown below, the items displayed on the right, as well as highlighted items, are those currently input. Use the following procedure to change these items.

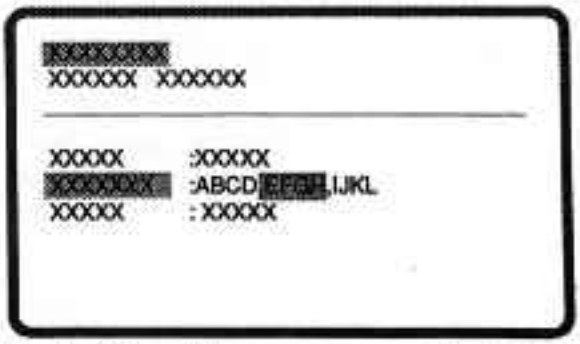
(1) When there is a function key display:



f3-1-1

If the control keyboard is connected, the ↑ ↓ ← and → keys have the same functions as the function keys, and can be used in the same way.

1) Using the F1 and F2 keys, move the highlighted display to the item to be changed. Use the F3 and F4 keys to change selected items on the righthand side.
2) When there is no function key display:



f3-1-2

3) Use the ↑ and ↓ keys to move the highlighted display to the items to be changed, and the ← and → keys to change selected items on the righthand side.

[Exp.3] POINT REGISTER
When teaching input for mount and dot dispense point data, one point can be taught and the coordinate input, or two points can be taught and their average value input (only placement positions).

[Exp. 4] HEAD1 SPEC, HEAD2 SPEC, HEAD3 SPEC
This sets the specifications of the head with which the mounter is equipped. These specifications are set as shown in the table below, so if changing to a different head specification, change the setting on this screen.

Display Message	Head Specification
No	Not provided
Standard	Standard head - straight arm chuck
IC	Standard head - bend arm chuck (for ICs)
AANC	Automatic Nozzle Change precision head
VISION	Automatic Nozzle Change Vision head
Dot dispenser	Standard dispenser head
Line dispenser	Line-drawing dispenser head
Mech. chuck	
Gripper	

[Exp. 5] BEAM SENSOR, PREP. HEAD, EDGE CLAMP, M. CENTERING1, M. CENTERING2.
This is where the presence or absence of optional equipment is specified. See Chapter 3, "Option Specifications".

[Exp. 6] TEACHING CAMERA
This sets whether or not a special teaching camera is provided. This item is not displayed if the mounter is equipped with a vision board.

[Exp. 7] CONVEYOR SPEC.
This sets the conveyor carrying method. If the conveyor is equipped with a U-turn function (see "Option Specifications"), specify "Return". This will cause PCBs to be ejected from the same side on which they were loaded. If "Return" is set for a conveyor which does not actually have a U-turn function, erroneous operation will result, so please be careful.
When "manual" is specified, PCBs are loaded and ejected by hand.

[Exp. 8] : TRAY HANDLING
This determines the settings for a tray supply device. This device is an optional specification. For setting it, please refer to the table below.

Display Message	Tray Supply Device Specifications
NO	Manual Tray Feeder
TRAY STACKER	Auto tray supply device
TRIPLE PALLET	3-stage tray supply device
LCS	External supply device
MANUAL+LCS	Fixed tray and LCS both used

[Exp. 9] : FIXED CAMERA 2, 3 AND 4
This sets the specifications for fixed vision camera conditions. When a vision device is not being used, this is not displayed.

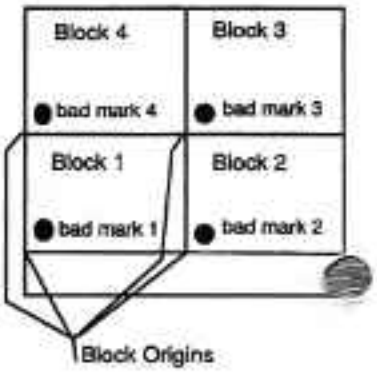
To access screen f4-1 from the main menu, press MAIN (MAIN MENU) → 3 (3. DATA INPUT) → 4 (4. SYSTEM) → 1 (1. MECH. CONF.).

DATA IN
SYSTEM MACHINE CONFIG.

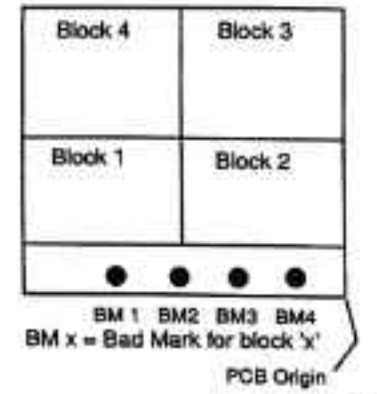
CMU MODE	:ONLINE,OFFLINE	Exp. 2
POINT REGISTER	:1POINT, 2POINT	Exp. 3
MOUNT R ATTRIBUTE	:REL,ABS	Exp. 12
HEAD1 SPEC.	:NO	
HEAD2 SPEC.	:NO	Exp. 4
HEAD3 SPEC.	:NO	
BEAM SENSOR	:NO,YES	Exp. 5
TEACHING CAMERA	:NO,YES	Exp. 6
PREP. HEAD	:NO,YES	Exp. 5
CONVEYOR SPEC.	:LINE,RETURN,MANUAL	Exp. 7
EDGE CLAMP	:NO,YES	Exp. 5
SUB-STOPPER	:NO,STANDARD,W SEN	Exp. 13
M.CENTERING 1	:NO,YES	
M.CENTERING 2	:NO,YES	Exp. 5
NOZZLE STATION	:NO,YES	Exp. 10
TRAY HANDLING	:NO	Exp. 8
CAMERA2	:NO,YES	
CAMERA3	:NO,YES	Exp. 9
CAMERA4	:NO,YES	
PCS	:NOT USE, USE	Exp. 16
TRAY EMPTY CHECK	:NO,YES	Exp. 14
FIDUCIAL DATUM	:MOUNT POINT, BLOCK ORIGIN	Exp. 15
BAD MARK DATUM	:PCB-, BLOCK ORIGIN	Exp. 1
MSG OUT TO CMU	:NO,YES	Exp. 12

[EXP 1] : Bad Mark Datum

A PCB can exist of more than 1 block (sometimes called 'circuits'). In order to find out if a block is correct, bad mark locations can be used. Bad marks can have two types of locations: A bad mark can be located in every block, with the same offset towards the block origin. Only one location must be specified since all other bad marks have exactly the same offset. All PCB block origin coordinates must be known. At run mode the system will first check all bad marks, see which block is correct and will then start placing the components on the PCB. In this case the bad mark positions are relative to the block origins. **Bad Mark Datum = Block Origin**



A second way of defining bad marks is that the positions of these bad marks are relative to the PCB Origin. Bad marks can now be located anywhere, but for system speed performance they are kept close together and as close as possible to the PCB origin. Since the bad marks are only relative to one point, all bad mark locations must be teached. In run-mode the head will travel shorter distances in pre-checking the bad marks before mounting the PCB. This process will enhance system performance. **Bad Mark Datum = PCB Origin**



[EXP 2] : CMU MODE

This sets the communication mode through the RS232c port to ONLINE or OFFLINE.

4-4 System Data Input Screen

This section describes the actual data items and the input screen. Operations pertaining to system data are organized as shown in the relational diagram below.

As explained previously, these items appear on the screen **only in initial operation status.** They cannot be changed when operation is interrupted.

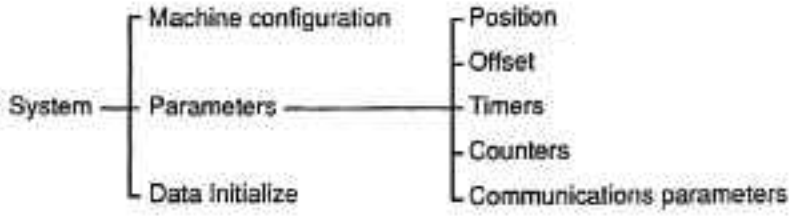


Fig. 3-2 System Organization Diagram

4-4-1 Machine Configuration

This data is set at final production prior shipping. Since the head specifications and optional units differ for each mounter being shipped, these data items set the specifications for that particular machine. There is no need to change the data as long as these specifications are not changed.

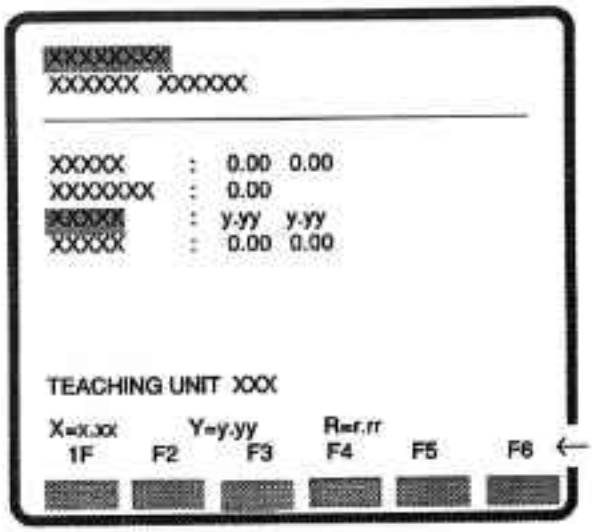
Please refrain from changing the data needlessly, as this can cause the specifications and settings to be inconsistent. If this happens, correct operation cannot be guaranteed, and incorrect setting screens may be displayed.

If optional equipment is added, change the settings for the items which require updating. In the following section, the item " Machine Configuration" will be explained.

All changes to data are made by selecting the item to be changed (see 3-3-1).

4-3-3 Teaching input

"Teaching input" means inputting the robot's current XY coordinate data. Because of this, teaching input is only possible as data handling coordinates. On the screen shown below, the data displayed on the righthand side is the currently input coordinate data. Use the following procedure to enter data as teaching input data.



Current X, Y, R coordinate data.

1) Use the F1 and F2 keys to move the highlighted display to the item you want to change. Teaching input can be entered for the item displaying the current position. In addition, the unit being used for teaching at the current point is displayed at the right side after "Teaching Unit".
2) When "One Point" is set in the "Teaching Input" item under the machine configuration data, use the ◈ key to input the current coordinate data for the robot.
3) When "Two Points" is set in the "Teaching Input" item under the machine configuration data, press the ◈ key twice in succession to input the value. The average of the first and second coordinate values is input as the coordinate data.

NOTE

Before inputing this data, always carry out a return to origin.
The ten-key input explained previously can also be carried out with this item.
Two-point teaching is possible only for mount or dot dispense point data.

[Exp. 3] NOZZLE1 XY, NOZZLE2 XY, NOZZLE3 XY
This sets the nozzle station position coordinates for ANE or VANE (VISION ANE) heads. It is displayed if "Nozzle Station" in the machine configuration data is "YES". For the teaching unit when this coordinate value is input, the head number input for "ANE" or "VANE" in the head specification of the machine coordinate data is displayed. R data is set to 0.00 when the nozzle station attached as standard, parallel in relation to the conveyor.

[Exp. 4] M. CENTERING1 XYR, M. CENTERING2 XYR
The mechanical alignment position coordinates are set here.
This is displayed when the "Mechanical Alignment" item of the machine configuration data is set to "YES".
For the teaching unit when this coordinate value is input, the head number input for "ANE" or "VANE" in the head specification of the machine coordinate data is displayed.
The R data is the value that compensates for erroneous attachment of the mechanical alignment. If there is no error, -90.0 is input.
Remark: -1 means UNIT = LOW (big jaws), -2 means UNIT=HIGH (small jaws).

NOTE **With this mounter, there is never more than one ANE or VANE head used at a time. If the specifications have been set up this way, the teaching unit cannot be displayed, which also indicates that teaching input is not possible. (See 4-3-3, "Teaching Input".)**

[Exp. 5] CAMERA2,3,4 XY
This sets the position coordinates for the fixed vision camera, and is displayed if the "Fixed Camera" item of the machine configuration data is set to "YES". For the teaching unit when this coordinate value is input, the head number input for "Vision" in the head specification of the machine coordinate data is displayed.

Exp. 6] TEMP.STA1 XY
The No. 1 temporary station is used for the two types of applications described below, and the coordinate position data is specified here. When the "PREP. Head" option of the machine configuration data is set to "YES", or the "Tray Handling" is set to LCS or "Fixed Tray+LCS", this is displayed.

1) When a prep. head is being used and components are being supplied to the tray, this is where they are placed temporarily.
2) When a LCS is being used and supplied components being received, this is the supply location.

NOTE **The Prepatorial head and LCS cannot both be equipped at the same time.**

[Exp. 7] TEMP.STA2 XY
This is the coordinate position data when components are supplied via a shuttle on the LCS side, to the NO. 2 temporary station. It is displayed when "Tray Handling" of the machine configuration data is "LCS" or "Fixed Tray + LCS".This station is mainly used to bring defect components back to the LCS for discharging.

4–4-2
POSITION

This data is set at the time of production shipping adjustment. Coordinates are explained below. Data may be changed by using the control keyboard or input by teaching input.

To go to screen f4-2 from the main menu, press "MAIN MENU" key. → 3 key → 4 key → 2 key → 1 key.

DATA IN SYSTEM		50% PARAMETER	CORDINATES	
+SOFTLIMIT XY	:	0.00	0.00	
Z	:	0.00		Exp. 8
R	:	0.00		
-SOFTLIMIT XY	:	0.00	0.00	
Z	:	0.00		
R	:	0.00		
LOCATE PIN	:	0.00	0.00	Exp. 10
PCB CORNER	:	0.00	0.00	Exp. 11
WAITING PNT	:	0.00	0.00	Exp. 1
DUMPING PNT	:	0.00	0.00	Exp. 2
FRONT FDR. DATUM	:	10		
DATUM XY	:	0.00	0.00	Exp. 9 Standard
REAR FDR. DATUM	:	40		Option
DATUM XY	:	0.00	0.00	
NOZZLE 1 XY	:	0.00	0.00	
NOZZLE 2 XY	:	0.00	0.00	Exp. 3
NOZZLE 3 XY	:	0.00	0.00	
M.CENTERING 1 XY	:	0.00	0.00	
R	:	0.00		Exp. 4
M.CENTERING 2 XY	:	0.00	0.00	
R	:	0.00		
CAMERA 2 XY	:	0.00	0.00	
CAMERA 3 XY	:	0.00	0.00	Exp. 5
CAMERA 4 XY	:	0.00	0.00	
TEMP.STA1 XY	:	0.00	0.00	Exp. 6
TEMP.STA2 XY	:	0.00	0.00	Exp. 7

TEACH UNIT XXX
X=0.00 Y=0.00 R=0.00
F1 F2 F3 F4 F5 F6

Remark:

All coordinates are related to MACHINE ORIGIN!!

F4-2

[Exp. 1] WAITING PNT
This sets the standby position coordinates for the head. To change the standby position, select coordinates that meet the conditions below.

1) The unit will not be affected by the warming-up process of the head (for example, a conveyor).
2) The sub-stopper sensor and set position sensor will not be affected by the head (this can cause erroneous operation).

[Exp. 2] DUMPING PNT
This establishes the position where components are discarded. If there is a picking or mounting error, the head moves to this position and discards the part. Setting of this point is left to the user.

[Exp. 13] SUB-STOPPER.
The Sub-stopper can be changed in the following modes:
- 'STANDARD' TYPE
- 'W SENSOR' TYPE This is a new sub-stopper system with 2 sensors. (Option)
- 'MOVING' TYPE This is a new sub-stopper system for high speed PCB exchange. (Option)

[Exp. 14] : TRAY EMPTY CHECK
When set to NO, after the last component is picked, the head will try to pick the next component again at the beginning of the defined tray. The tray must have been refilled by then.
When set to YES; after the last component is picked, the CSM will place the component and then will execute an error. The orange warning light is switched on and an error message 'Tray Empty' will be shown on the screen. This is to indicate that the empty tray must be replaced.

[Exp. 15]: FIDUCIAL DATUM (=Local Fiducials)
When set to **Block Origin** the local fiducial coordinates are relative to the block origin. In case of more blocks per PCB, teaching of local fiducials is done for one block only since the coordinates are the same for every block.
When set to **Mount Point**, the local fiducial coordinates are relative to the mount point. All local fiducials, on one or more blocks on a PCB, must be teached seperately.

[Exp. 16]: PCS
When this option is set to 'NOT USE', the CSM cannot be controlled by the Production Control System software. When set to 'USE', the CSM can be controlled by the Production Control System software.

Note: *This option is only available in firmware version -063 and higher*

[Exp. 10] : NOZZLE STATION
The equipment conditions for the nozzle station device are set.

Display Message	Tray Supply Device Specifications
No	Not equipped
AANC type	ANE head
VISION HEAD type	For VISION head

[Exp. 11] : MSG out to CMU
This parameter must be set to YES, if all the error messages which are displayed on the CSM -error-line are to be send to an external device.

[Exp. 12] MOUNT R ATTRIBUTE
The difinition of the Rotation (R) in the mount data is selectable.
"REL" shows the mount data R relative see fig. 4-1-1
"ABS" shows the mount data R absolute see fig. 4-1-2
(CAUTION)
Do not change "ABS" or "REL" during RUNNING. The "ABS" data will not be supported by the APG/LOP software rel 2.1 package.

RELative

Feeder angle				
Pick up angle	0 deg	180 deg	90 deg	-90 deg
Mount angle 0 deg				
180 deg				
90 deg				
-90 deg				

fig. 4-1-1

ABSolute

Feeder angle				
Pick up angle	0 deg	180 deg	90 deg	-90 deg
Mount angle 0 deg				
180 deg				
90 deg				
-90 deg				

fig. 4-1-2

4-4-3
Offset

To go to screen f4-3 from the main menu, press "MAIN MENU" key. → 3 key → 4 key → 2 key → 2 key.

```
DATA IN
SYSTEM PARAMETER OFF SET

CAMERA          :   0.00   0.00      Exp. 1
BEAM SENSOR     :   0.00   0.00      Exp. 2
HEAD.1 XY       :   0.00   0.00
       R        :   0.00             Exp. 3
HEAD.2 XY       :   0.00   0.00
       R        :   0.00
HEAD.3 XY       :   0.00   0.00
       Z        :   0.00             Exp. 4
       R        :   0.00
PREP.HEAD       :   0.00   0.00      Exp. 5
TRACK WIDTH     :   0.00
```

F4-3

CSM84VZ Only

CAUTION
When changing the **head 3 offset, ALWAYS** check the positions of the e.g. ANE station, MA-Unit, LCS shuttle pad, Feeders. When using the ANE Station with incorrect Head 3 Offset may cause damage to the Head 3 Assembly.

[Exp. 1] CAMERA
This is displayed if a vision board is specified, or if the "Teaching Camera" item in the machine configuration data is set to "YES".

[Exp. 2] BEAM SENSOR
This is displayed if the "Beam Sensor" item in the machine configuration data is set to "YES".

[Exp. 3] HEAD1,2,3 XYZR
This is displayed unless the head specification in the machine configuration data is set to "NONE". For a dispenser head, the R offset is not displayed.

CSM84VZ Only
The Z offset is the Z coordinate value at the point where the underside of the nozzle and the surface of the PCB first come in contact. The value is normally between -20.00mm and -21.00mm.

[Exp. 4] PREP. HEAD
This is displayed if the "Spare Head" item in the machine configuration data is set to "YES".

[Exp. 5] TRACK WIDTH (Option)
Input the initial conveyor width at the origin point of the conveyor (at the back). Input a value which is 0.5mm smaller than the actual value.

XY Offset

Suppose that components from one supply device (for example, feeder bar No. 10) are being picked up by various different heads (1-3). Because the movement target positions for the XY robot are different, the nozzle of each head moves to the picking position of feeder No. 10. Since there is only one picking coordinate data item for feeder No. 10, the XY coordinate data for the feeder **must be compensated for each head.** This compensation of the XY coordinates is called "offset". With the CSM the unit whose XY offset amount is 0.00 is the "teaching reference". The offset for each head indicates the amount of shift for this teaching reference unit. (See Fig. 4-5.)

[Exp: 9] FRONT FDR. DATUM, REAR FDR. DATUM, DATUM XY
This is the reference data for automatic calculation of the picking position coordinates for the tape feeders (8, 12, 16, 24, 32 embossed and 44 embossed) set on the front and rear plates. In the "Front Feeder Reference", the user specifies which front/rear feeder bar position is to be the reference feeder, and in "Reference XY Position", the picking position coordinates for that reference feeder.
The standard specifications contain the picking position coordinates for the 8mm tape feeder which is 10th from the left end. This serves as a reference in calculating the picking position coordinates for all of the feeders set on the front and rear plates.
Setting is done in the same way for the rear feeders.

NOTE **Always use an 8mm tape feeder for teaching the reference position, and use a teaching unit which will be displayed on the screen. If either of these rules is not followed, the head cannot move to the correct picking position.**

NOTE **Depending on the conditions of the optional equipment, teaching input may not be possible for the 10th feeder from the left end.
In this case, change to the "* Feeder Reference" and input new coordinates for "Reference XY Position".**

[Exp. 10] LOCATE PIN XY
The position coordinates of the PCB positioning pins on the fixed side are input.

[Exp. 11] PCB CORNER XY
The position coordinates of the PCB corner at the front of the subsequent machine side are input, when the pcb is secured in the work area.

Setting the + XY soft limit

As shown in Fig. 4-4, an 8mm tape feeder can be attached in the No. 2 position from the right end of the rear feeder bar.
Next, the picking position of this feeder for Head No. 2 is taught. Move along the XY axis in the + direction, approximately 1mm at a time from this position, to set the position through teaching input.

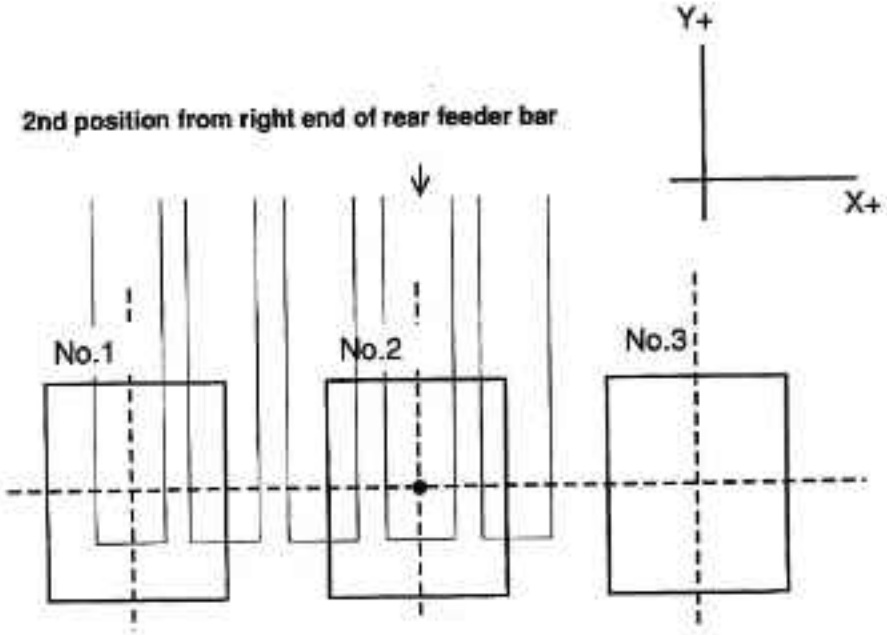


Fig. 4-4. + soft limit

NOTE

Never run this setting unless a return to origin has already been carried out. Depending on the condition of the optional equipment, there are times when the limit value cannot be determined using this method.

[Exp. 8] +SOFTLIMIT XYZR, -SOFTLIMIT XYZR
The XY data contains the movable range for the head. After a return to origin has been completed, if the robot tries to move beyond this movable range in either manual movement or in the automatic operation mode, movement is stopped; in manual mode, a movement stop is applied, and in automatic operation mode, an operation interrupt status is applied. In the same way, the R data sets the allowable rotation for the head.
With standard specifications, this is set to a value less than the relevant soft limit data value.

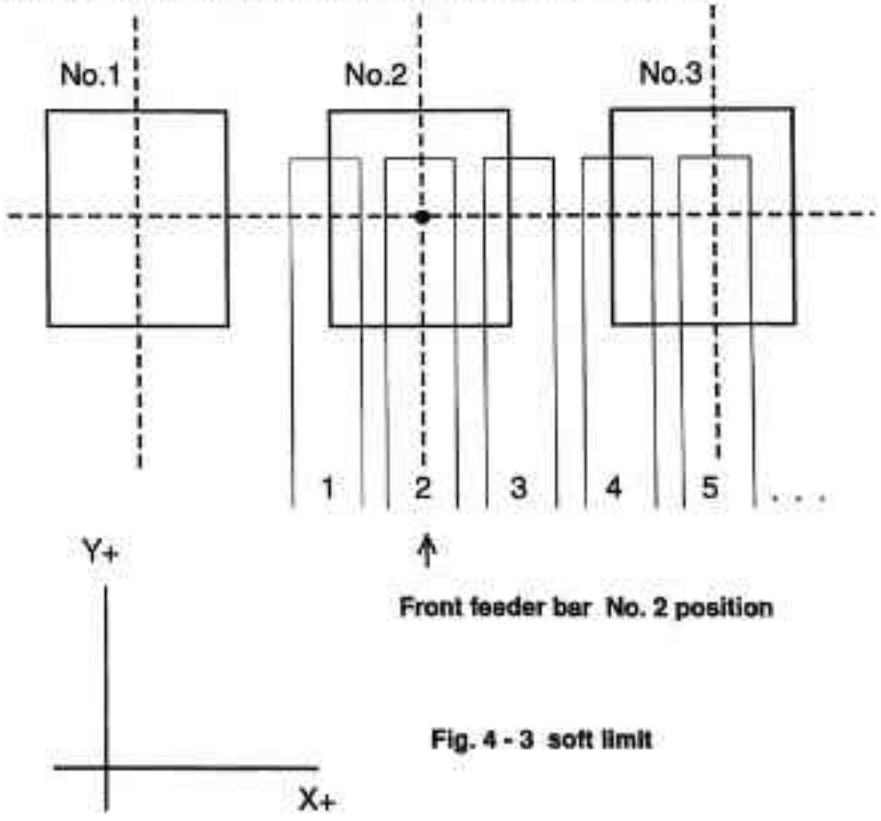
CSM84VZ only:

The Z data contains the movable range for the Z-Axis Servo. The values of the Z-axis soft limit in the plus and minus directions should be input as follows:

Z-Soft Limit in the plus direction:	Between +1.00 and +3.00 mm
Z-Soft Limit in the minus direction:	Between -22.00 and -25.00 mm

Setting the - XY soft limit

As shown in Fig. 4-3, an 8mm tape feeder can be attached in the No. 2 position from the left end of the front feeder bar.
Next, the picking position of this feeder for Head No. 2 is taught. Move along the XY axis in the + direction, approximately 1mm at a time from this position, to set the position through teaching input.



Front feeder bar No. 2 position

Fig. 4 - 3 soft limit

4-4-7 AUTO MATIC CONVEYOR WIDTH CONTROL SYSTEM (Option)

<1> Settings

Machine with AUTOMATIC CONVEYOR WIDTH CONTROL shows below message when machine powers on .

```
YM*** ,SERVO Z,**** R
```

AUTOMATIC CONVEYOR WIDTH CONTROL uses the Z axis for conveyor width , and Z origin existed conveyor maximum width . So system uses W axis for display a real conveyor width .

```
W = (Z origin(maximum) width) - Z
```

Please set TRACK WIDTH in OFFSET (DATA IN SYSTEM PARAMETER OFFSET) .The width of 0.5 (mm) is needed so the PCB can go smoothly through the conveyor without jamming.

```
TRACK WIDTH = (Z origin(maximum) width)-0.5 (mm)
```

Please set SOFT LIMIT Z+ and SOFT LIMIT Z- in POSITION (DATA IN SYSTEM PARAMETER POSITION).

```
SOFT LIMIT Z+ = TRACK WIDTH - 30mm(minimum size)+0.50mm
SOFT LIMIT Z- = -0.50mm
```

Please set PCB WIDTH in PCB SHAPE (DATA IN PCB PCB SHAPE).

```
PCB WIDTH = measured PCB width
```

<2> EXECUTION in RUNNING Mode

Machines with AUTOMATIC CONVEYOR WIDTH CONTROL stops and shows below message when automatic operation is executed by RUN key in RUNNING mode . In the case of within 1.0 (mm) conveyor width motion , operation continues .

```
JOB  :INITIALIZE
 CONVEYOR WIDTH WILL
 BE CHANGED TO 128
 ASSURE THE SAFE
 AND PUSH RUN KEY
```

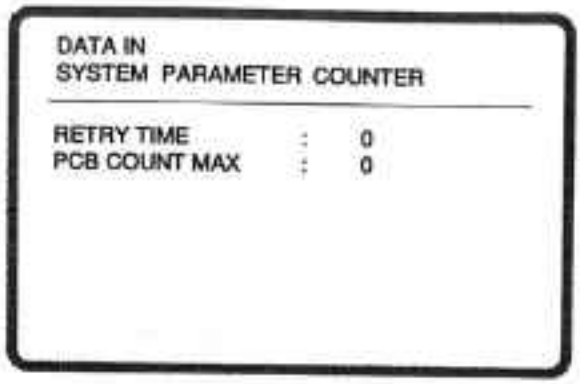
Please remove PCB on conveyor and push-up pins , and push RUN key , then conveyor width operation starts . After this , conveyor keep position .

NOTE

1) While the display shows "OPERATION INTERRUPTED" , don't change conveyor width in manual mode .

2) Remove the PCB from the conveyor and let the 'push-up' pins down, before starting the conveyor width operation.

4-4-5 Counters



F4-5

To go to screen f4-5 from the main menu, press "MAIN MENU" key. → 3 key → 4 key → 2 key → 4 key.

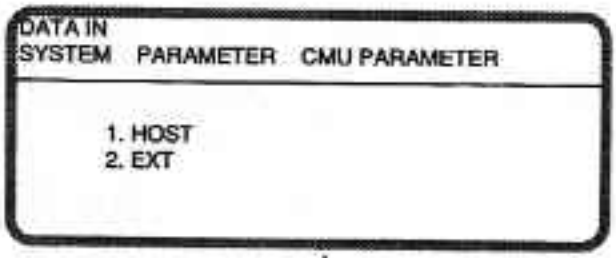
Exp. 1
Exp. 2

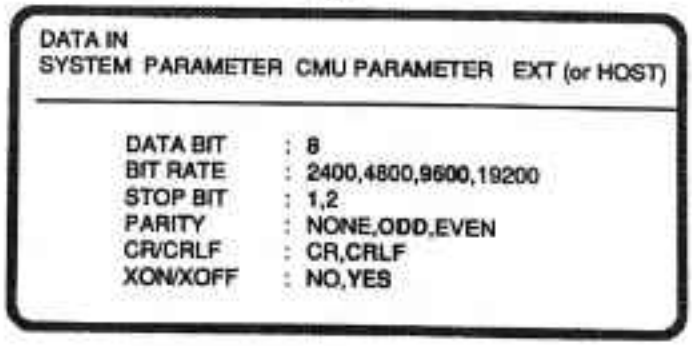
[Exp. 1] RETRY TIME
This sets the number of retries carried out after erroneous picking or mounting in the mounting operation. It is normally set to 3, but a value from 0-7 can be input. If 0 is set, no retry is carried out.

[Exp. 2] PCB MOUNT MAX
This is used when the mounter is connected to a loader. It is normally set to 0. A value between 1-255 can be input, and when that number of PCBs has been produced, operation stops to prevent loader overflow.
Remark: 0 means continous production.

4-4-6 Communi-cations pa-rameters

These are the parameters which set the conditions for communication between the CSM and an external host computer when an RS-232C interface is used. For details on communications conditions, please refer to Section 5, "RS-232C Interface". Data setting is done through selection-type input (see 3-3-1). Starting UFOS version E64 settings for the HOST as well as for the EXT port can be defined seperately.

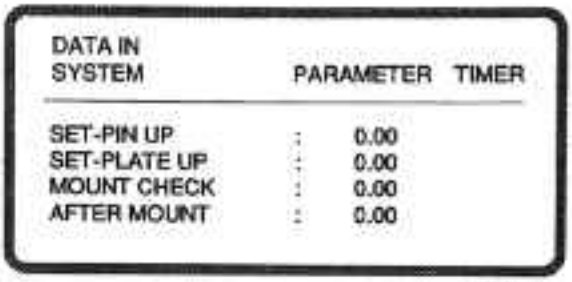




Note: Seperate HOST and EXT settings only possible with UFOS versions E64 and Higher

NOTE: The high lighted parameters are the standard settings.

4-4-4
Timers



F4-4

To go to screen t4-4 from the main menu, press "MAIN MENU" key. → 3 key → 4 key → 2 key → 3 key.

Exp. 1
Exp. 2
Exp. 3
Exp. 4

[Exp. 1] SET-PIN UP
This sets the time from the point where the set position sensor detects a PCB to where the locating pin ascent command is transmitted.
Normally, this setting does not have to be changed.
With a variable-speed conveyor, the timer has to be adjusted so that the setting of the low-speed knob, the position of the PCB set position sensor, and the time from the set position sensor detection to the pin ascent are all coordinated with each other.

[Exp. 2] SET-PLATE UP
This sets the time from the point where the set position sensor detects a PCB to where the pushup plate ascent command is transmitted.
Normally, this setting does not have to be changed.
With a variable-speed conveyor, the timer has to be adjusted so that the setting of the low-speed knob, the position of the PCB set position sensor, and the time from the set position sensor detection to pushup are all coordinated with each other.

[Exp. 3] MOUNT CHECK
This is displayed, and can be set, when "ANE", or "VANE" is set for the "Head * Specification" in the machine configuration data.
With these heads, a mounting check is carried out right after picking and mounting are finished. This is the mounting check timer for the time starting right after mounting is finished to the point where the sensor is checked. If this time interval is not set large enough, the checking procedure cannot be conducted properly.

[Exp. 4] AFTER MOUNT
This is displayed, and can be set, when "ANE", or "VANE" is set for the "Head * Specification" in the system machine configuration data.
With these heads, a mounting check is carried out right after mounting is finished. This is the post-mounting check timer for the time starting right after mounting is finished to the point where the negative-pressure generating switch is turned on. Be careful that sufficient time is provided for checking, especially if the parts being mounted are taller than ordinary parts.

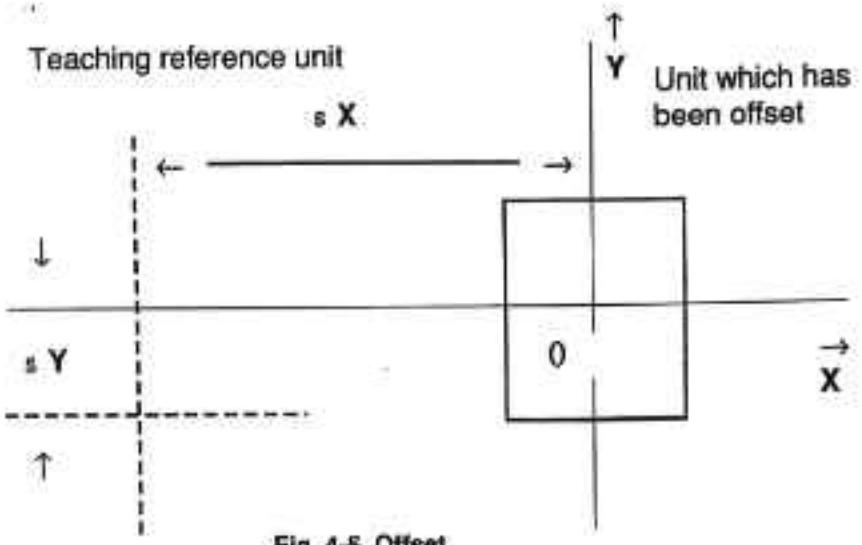


Fig. 4-5. Offset

The center of a unit which has been offset can be thought of as the coordinate axis which serves as the origin. The + direction of the coordinate axis is the same as the robot XY axis. At this point, the center coordinate of the teaching reference unit becomes the offset of the other unit. In actuality, the same point is taught with each of the various units, and then, from the XY data obtained by teaching the unit to be offset, the XY data obtained by teaching with the teaching reference unit is subtracted. In this way, the offset can be obtained for each unit. (See Section 4, Chapter 2, "Using Utilities".)
The teaching references for the CSM are determined in the priority order shown below.

Camera ---- Beam sensor ----- Head 1
← High priority Low priority

NOTE

On the offset setting screen, the unit shown in the uppermost position is the teaching reference. The XY offset values for the teaching reference unit (the uppermost unit in the display) will always be 0.00 for both the X and Y values.

R Offset

This is used for the angle compensation of a chuck-type mounting head. When the R rotation axis is 0.00 [deg], the chuck angle will never be 0.00. The R offset is used to correct this, and is determined by the actual component to be mounted.

3) To delete a point that has been input, use the "DEL" key. When the screen shown below is displayed, input the point number to be deleted, or the range of point numbers. When the ◈ key is pressed, a confirmation message is displayed. Follow the directions in the message. To cancel, press the "EXIT" key.

f5-3-2

NOTE **Bad mark points cannot be deleted.**

4) When copying an input point to another number, use the "COPY" key. The screen shown below is displayed. Input the original point number range and the first point number of the destination point. When the ◈ key is pressed, a confirmation message is displayed. Follow the directions in the message.
The original point becomes the point shown in the display. To cancel, press the "EXIT" key.

f5-3-3

NOTE **When copying from mount point data to dot dispense point data, insert a "D" at the beginning of the destination, as shown here. ####-####. D#### When copying from dot dispense point data to mount point data, insert an "M" at the beginning of the destination, as shown here. ####-####. M#### When copying between mount point and dot dispense point data, or copying fiducial point data, only XY coordinate data is copied. Deleting and copying point data can only be done on the leftmost page.**

[Point Data Input]
This is based on the data input operation (par. 4-3), but there are some operations which are unique to the point input screen.

1) Ten-key (keys 0-9) input is done one item at a time. When input is completed by pressing the ↵ key, the cursor moves to the next item. The item to which the cursor moves next is determined by the results of data input up to that point and the settings of the system machine configuration data (par. 4-4-1). Always make sure that coordinate data contains a decimal point.
For some items, when the cursor moves it changes to a highlighted display. For these items, use the ← and → keys to select the content, and the ↵ key to terminate the input. The "EDIT" key can also be used to conclude input for these items, but if this is done, the cursor disappears and will not move to the following items.

2) Teaching input is only possible on the leftmost page. Use the ↑ and ↓ keys to move the highlighted display to the point number where teaching input is to be entered. As explained previously, for teaching input of mount and dot dispense points, either one-point or two-point input is possible. One-point data is input by pressing the ↵ key once. For two-point data, two points are taught, and their average value is input. Two-point teaching is used when teaching the center of a pad on the PCB. By teaching two points on a diagonal line on the pad, the center position can be input. When teaching of the first point is concluded (by pressing the ↵ key), a message is displayed indicating that the next point can be taught. Continue teaching input. If teaching is not continued, the first point input is cancelled, and the message described previously disappears from the screen. If this happens, it is necessary to start over again, teaching from the first point. Teaching of block origins beyond the No. 1 origin point is only possible when the PCB origin and No. 1 block origin has been input. Subsequent points can only be taught if the PCB origin and No. 1 block origin have been input. At the right side of the teaching unit display screen, the current coordinate origin is displayed. Values entered through teaching input are automatically related to values of that origin.

NOTE

Teaching input of fiducial point data is not possible. Fiducial point data is supposed to be provided by the CAD department.

It is not possible to teach the ROTATION.

4-5-3 Point input screen

In this section, the displays and operations common to all of the point input screens are explained.

[Basic Configuration of Point Data]

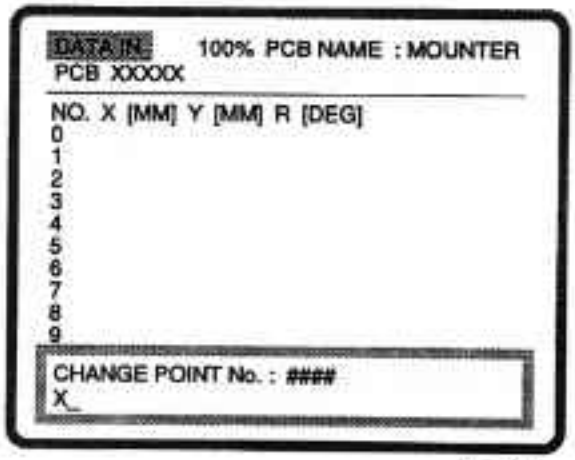
All point data is composed of the two types of data listed below.

(1) X, Y, (R) coordinate data

(2) Other necessary information

[Displays and Operations on Point Data Screens]

1) Up to a total of 2560 points of point data can be input **for all** of the PCB's. So with 10 PCB files each file can contain 256 points of point data. Ten points are displayed on the screen at one time. Use the "ROLL UP", "ROLL DOWN", ↑ and ↓ keys to change the point data display.
2) Because one point contains a great deal of information, this cannot all be displayed on the screen at one time. Use the -> key to see the right page and the ← key to see the left page. When moving from the point table screen (par. 4-5-2) to the various point screens, the leftmost page is displayed. The number of pages varies depending on the point. Coordinate data is displayed on the leftmost page.
3) To change the displayed point, the desired point number can be input directly. When the numeric keys are pressed, a screen like that shown below is displayed. The first number pressed is displayed; continue inputting. When the ◈ key is pressed, the point data for the number input at that point is displayed, starting at the top. If the input number exceeds the maximum point number (for fiducial points, this is 7), the error message "120: NO POINT" is displayed, and the system returns to the original screen.



f5-3-1

NOTE

This direct point display function does not work for bad mark points.

4-5 PCB Data Input Screen

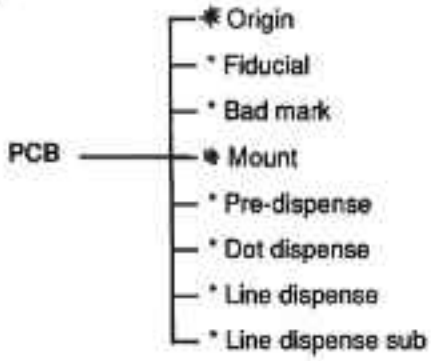
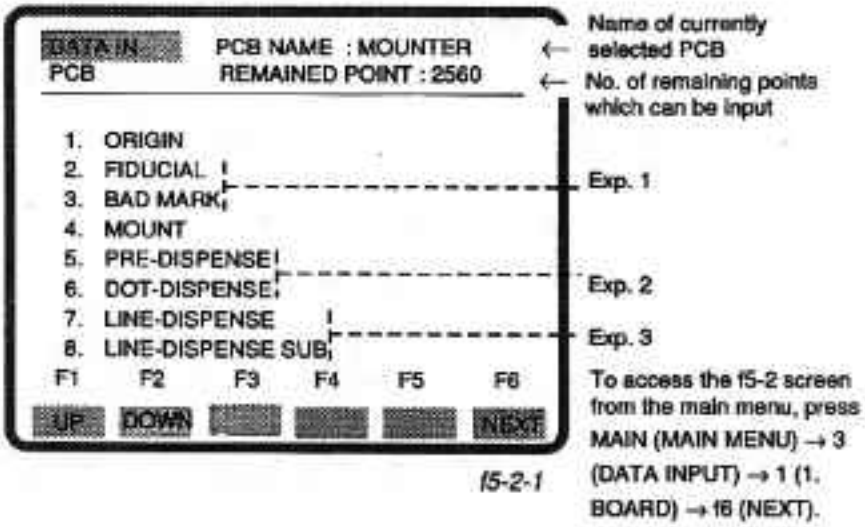


Fig. 4-6. Relational Diagram of PCB

4-5-2 Point table

This function displays a table of PCB points read from the host PC. This screen is used to access the input screens for the various points.



f5-2-1

[Exp. 1] Fiducial/Bad Mark
The fiducial and bad mark items are displayed only when a vision board has been installed, or when the "Beam Sensor" item in the machine configuration data is set to "YES".

[Exp. 2] Pre-dispense/Dot Dispense
The pre-dispense and dot dispense items are displayed only when a head exists for which "Dot Dispenser" or "Line Dispenser" is set in the head specification item of the machine configuration data.

[Exp. 3] Line Dispense/Line Dispense Sub
The line dispense and line dispense sub items are displayed only when a head exists for which "Line Dispenser" is set in the head specification item of the machine configuration data.

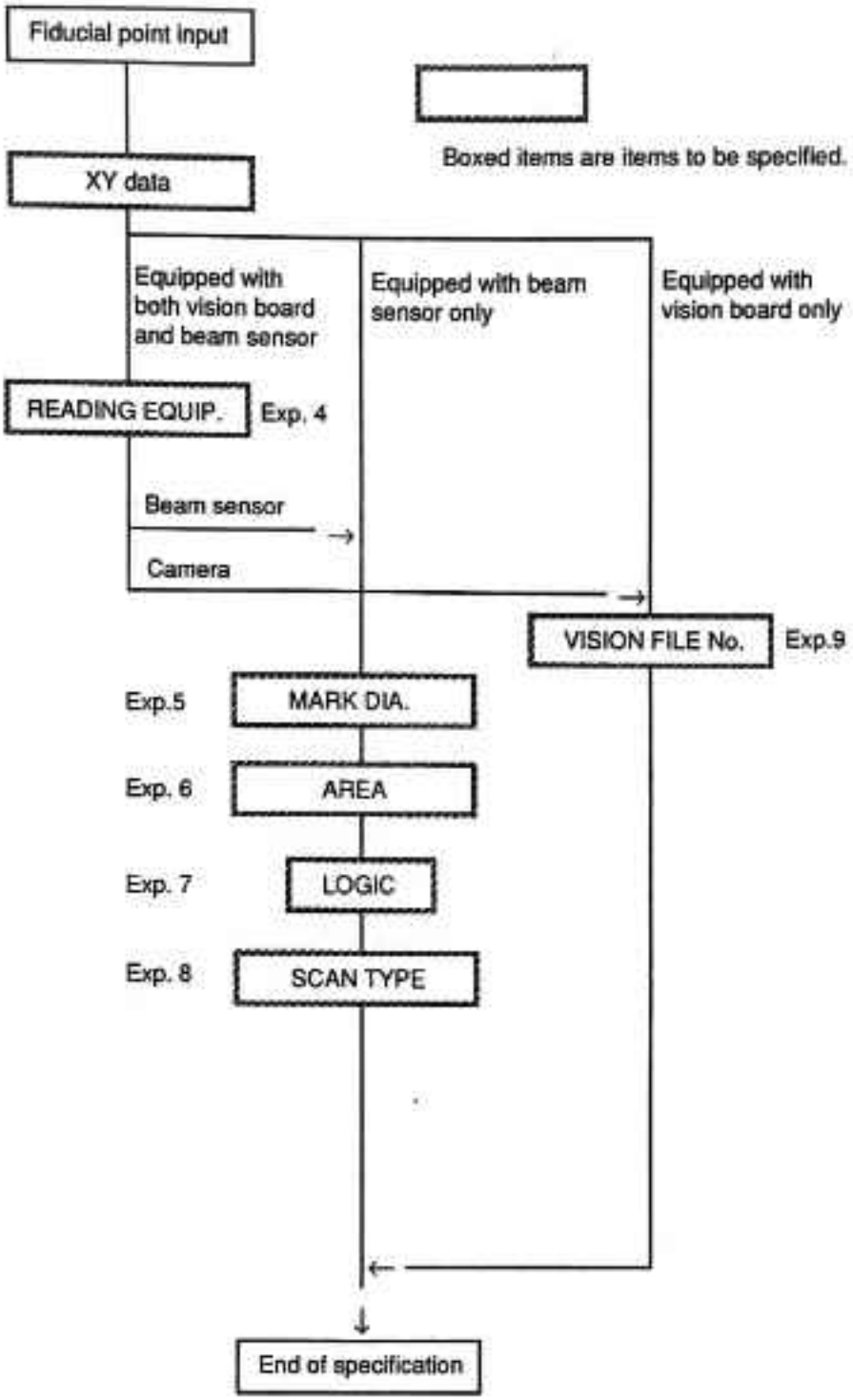


Fig. 4-7. Fiducial Point Input Screen Flow

[Exp. 3]
Because two marks form one group, the coordinates are set separately for each mark. First, the coordinates for the scanning mark are set on the left side, and then the coordinates for the other mark are set on the right. Input the XY coordinates for these marks related to the origin values as shown below.

How the mark is used:	Data origin:	Fiducial tye:
No. 0 group is used for compensation of entire PCB, as in method 1).	PCB origin	PCB fiducial
No. 0 group is used for compensation of individual blocks, as in method 2).	Block No. 1 origin	Block fiducial
Groups No. 1 to No. 7 is used for compensation of the point or local fiducials.	Mount point origin	Point or Local fiducial

In addition to the position coordinates for the marks described above, it is necessary to specify various information items relating to fiducial points. All of this information is specified on the righthand screen following the screen shown above. The items determined necessary by the system machine configuration settings and the optional equipment conditions are displayed, so input data for the displayed items as requested. Fig. 4 -7 shows the flow of these specification screens.

NOTE **The distance between two marks must be set to less than 570.00 [mm].**

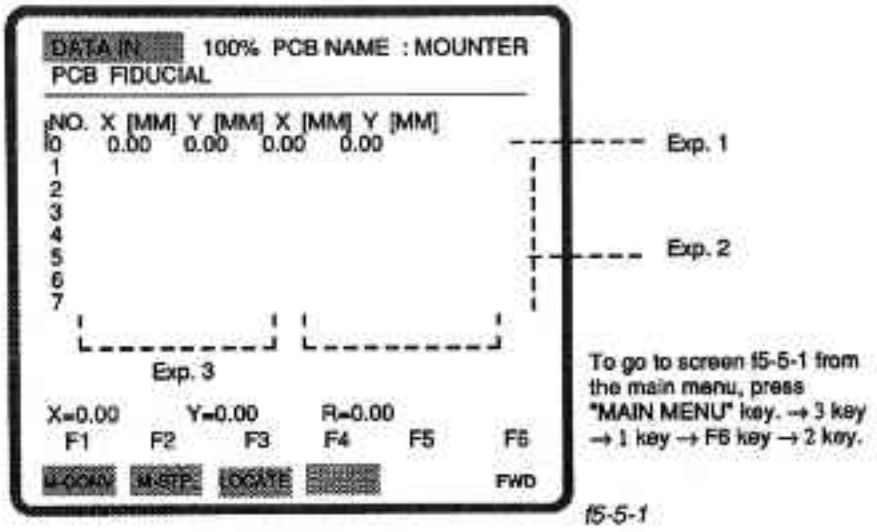
4-5-5 Fiducial

This is where information relating to fiducial marks is stored. Two fiducial marks form one pair. With the CSM, up to 16 pairs of data can be set.

NOTE

Fiducial Datum can only be input when in the RUNNING menu it is defined whether the datum of the fiducial is relative to the PCB or BLOCK origin. If this setting is not set, then the following error is displayed on the screen:

"66: SELECT DATUM POINT"



f5-5-1

[Exp. 1]
The No. 0 fiducial mark group is used as compensation in the two cases described below.

1) Entire PCB fiducial correction
2) Block fiducial correction

The type of No. 0 group is determined on the operation conditions screen (par. 2-2).

[Exp. 2]
Groups No. 1 to No. 7 are used for storing the XY data [X(f1-1), X(f1-2), Y(f1-1) and Y (f1-2)] of the point (or local) fiducials (f1-1 and f1-2) related to the centre of the PCB mount point (M1) see fig f5-5-1a.

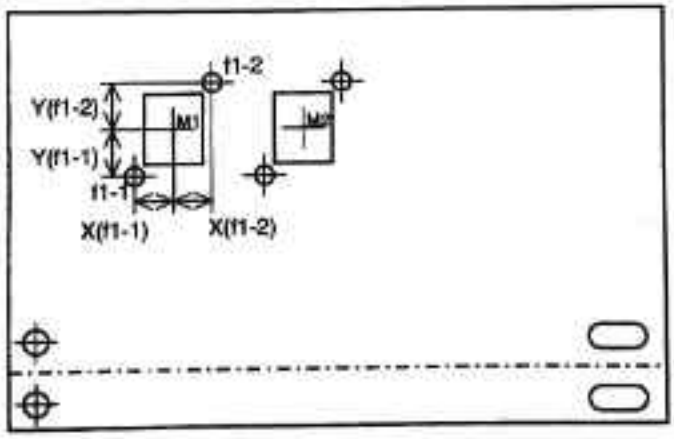
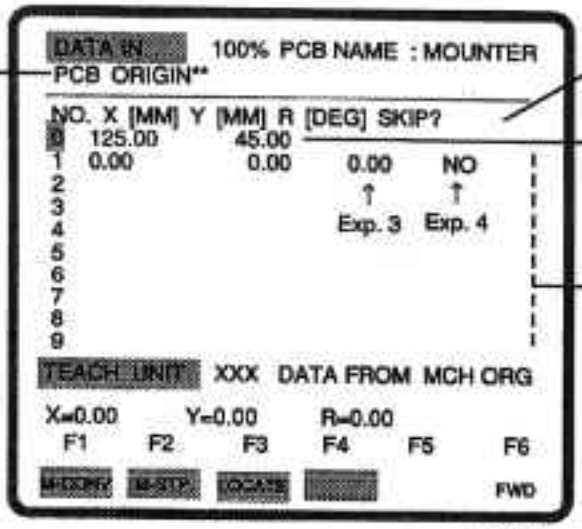


fig. f5-5-1a

4-5-4 Origin

This is where the origin point coordinate data is stored.

Note: *This screen should be called "ORIGIN" instead of "PCB ORIGIN" because it gives not only PCB but also BLOCK origins.*



f5-4-1

To go to screen f5-4-1 from the main menu, press "MAIN MENU" key. → 3 key → 1 key → F6 key → 1 key.

[Exp. 1] PCB origin coordinates
The No. 0 point is called the PCB origin. Only XY data can be input for this item. The coordinate origin at this point is related to the XY machine origin (machine origin = the head position when a return to origin is carried out after power is turned on).

[Exp. 2] Block origin coordinates
Points No. 1 and further are called "block origins". The origin for these is the PCB origin noted above.

[Exp. 3] R
This can only be input for block origin point data.

[Exp. 4] SKIP ?
"SKIP?" is set as shown below.

Display message	Relevant block operation	
NO	Run	(Don't mount chips on block)
YES	Not run	(mount chips on block)

SCREEN 1

The screen will only contain one line (line 0). In this screen the coordinates of the bad mark must be defined (the x and y coordinates as shown in figure 5-6-1). The coordinates can be teached and are shown relative to the block origin.

MARK POS. XY [mm] : Teach or define the X and Y coordinates of the Bad Mark

SCREEN 2

When, in the RUNNING menu,. the BAD MARK CHECK is set to MASTER MARK, then coordinates of the ***Master Bad Mark*** must be entered here. Especially in the case that a PCB exists of more than one block a master mark is usefull. The system, before a dispense or mount job is started, will check first all blocks to see if a bad mark exists on a block. After this cycle, the system will mount/dispense all blocks that were not marked. If, in most cases, all blocks are good, then it is usefull to only check for the bad marks when it is sure a PCB contains a bad block. This can be done with the Master Bad Mark. When the Master Bad Mark is 'true', then all blocks will be checked for the existance of a bad mark. Checking bad marks in this way saves machine cycle time and enhances the overall system performance.

1. The Master Bad Mark coordinates are relative to the **PCB origin**
2. The Master Bad Mark and Bad Mark(s) are read by the same reading equipment and must be of the same logic (see screen 3 and 4)

SCREEN 3 and 4

Screen 3 and 4 when Read Method is CAMERA

Screen 3 and 4 when Read Method is BEAM SENSOR

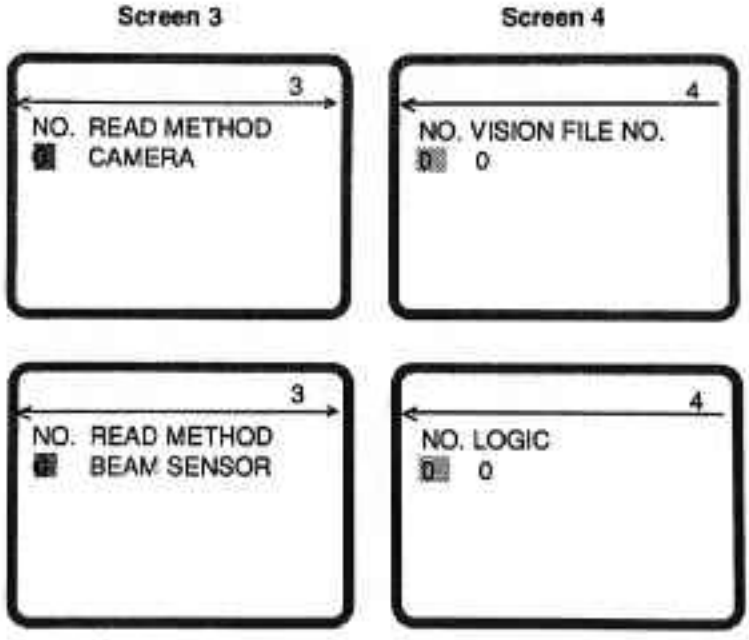


Figure 5-6-3

4-5-6
Bad marks

Bad mark lines are defined in the **DATA IN - PCB - [PCB NAME] - BAD MARK** menu. Layout of this screen is dependent on the setting of the parameter BAD MARK DATUM in the DATA IN - SYSTEM - MACHINE CONFIG menu. The two choices in this menu are:

Bad Mark Datum = BLOCK ORIGIN
Bad Mark Datum = PCB ORIGIN

Dependent on this choice, the DATA IN - PCB - BAD MARK menu have the following layout as is described in the next two sections.

4-5-6-1. Bad Mark Datum = BLOCK ORIGIN

Whether one or more blocks exist on a PCB, only one input line exists for defining the bad mark position. This is because the bad mark position is relative to the BLOCK ORIGIN. No matter howmany blocks exist, if it is defined that the coordinates of a Bad Mark are located a distance X and Y from the block origin, then these coordinates X and Y are the same for all blocks. See figure below.

EXAMPLE ONLY

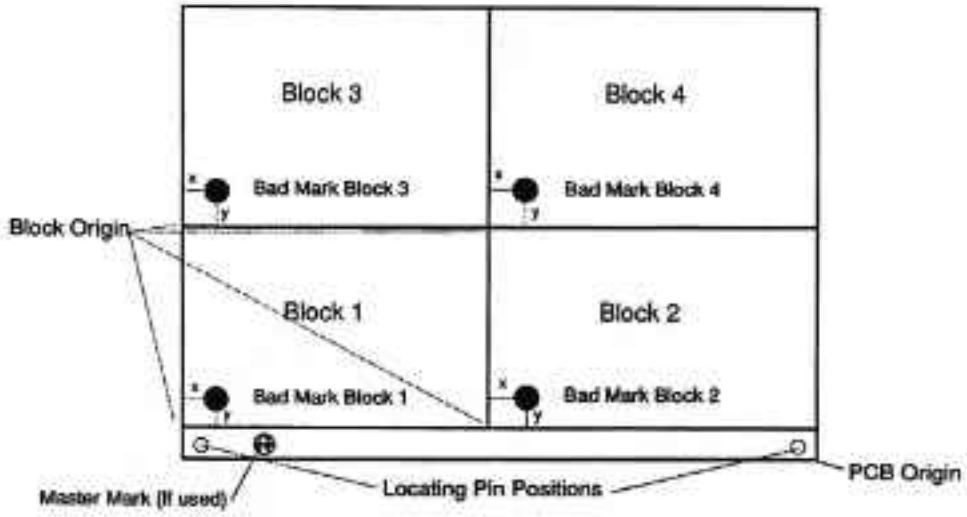


Figure 5-6-1

For every block the coordinates X and Y for the bad mark positionare the same. This coordinate is entered in the following four screens.

SCREEN 1 and 2

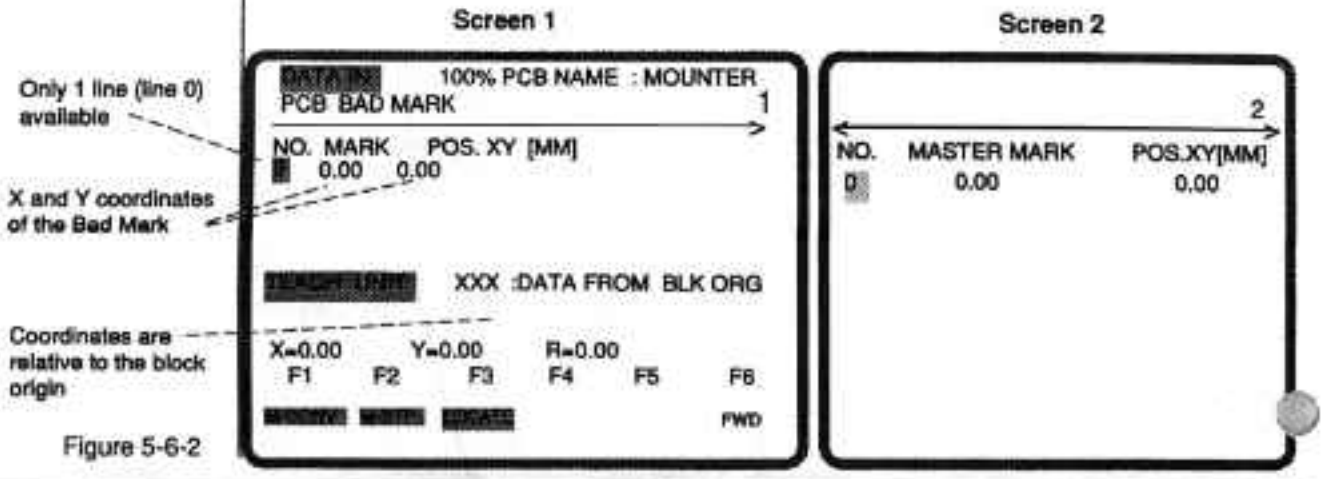
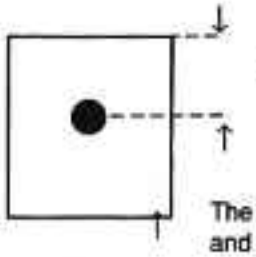


Figure 5-6-2

[Exp. 4] READ METHOD
This is displayed and can be selected only when the system is equipped with a vision board and the "BEAM SENSOR" selector of the machine configuration data is set to "YES".
[Exp. 5] MARK DIA
Input the size of the fiducial marks. For round marks: diameter in [mm] units.For square marks : length of one side in [mm]. Diamond shaped mark length of diagonal line in [mm].
[Exp. 6] AREA
Input the range to be scanned with the beam sensor when looking for marks. The XY coordinate value of the mark explained before is the center, while scanning is carried out in the ± directions of the input value over the specified range. The mark must always be contained within this range.



[Exp. 7] LOGIC
This specifies the dark/light relation between the fiducial mark and the PCB (background). If the mark is a reflective object and the PCB is a non-reflective object, the logic is set to:"ON".
If the mark is doughnut-shaped, while the center of the mark beiing non-reflective and the edge reflective, the logic is set to "OFF".

Display message	Mark type	Back-ground
ON	Reflective	Non-reflective
OFF	Non-reflective	Reflective

[Exp. 8] SCAN TYPE
This sets the method by which fiducial marks are read with the beam sensor.

Display message	Reading Sequence	Mark
XY	X → Y	Round, Diamond-shape
XYX	X → Y → X	Square

[Exp. 9] VISION FILE NO.
This is set when a vision camera is used to read fiducial marks. Input the vision file number set in the vision data relating to marks. (See the section on vision files.)

A) Reading with a camera

NO.	READ METHOD	← Exp. 4
0	CAMERA	
1		
2		
3		
4		
5		
6		
7		

Use the → key to go from screen f5-5-1to screen f5-5-2.

f5-5-2

NO.	VISION FILE NO.	← Exp. 9
0	0	
1		
2		
3		
4		
5		
6		
7		

Use the → key to go from screen f5-5-2to screen f5-5-3.

f5-5-2

B) Reading with a beam sensor

NO.	READ METHOD	← Exp. 4
0	BEAM SENSOR	
1		
2		
3		
4		
5		
6		
7		

Use the → key to go from screen f5-5-1 to screen f5-5-4.

f5-5-4

NO.	MARK.DIA	AREA	LOGIC	SCAN TYPE
0	1.60	5.00	OFF	XY
1	↑	↑	↑	↑
2	Exp. 5	Exp. 6	Exp.7	Exp. 8
3				
4				
5				
6				
7				

Use the → key to go from screen f5-5-4to screen f5-5-5.

f5-5-5

[Exp. 5] SKIP ?
"Skip?" is set as shown below.

Display message	Mounting of relevant no.
NO	Mount
YES	Do not mount

[Exp. 6] FIDU.
There are times when a special fiducial mark is set for a mounting point. This mark, as explained previously, is specified for fiducial point nos. 1 to 7. The "FIDU" item is used to specify whether or not these marks will be used and compensation carried out. If the marks are not to be used, set "Not used", while if they are to be used, specify the fiducial point number to be used.

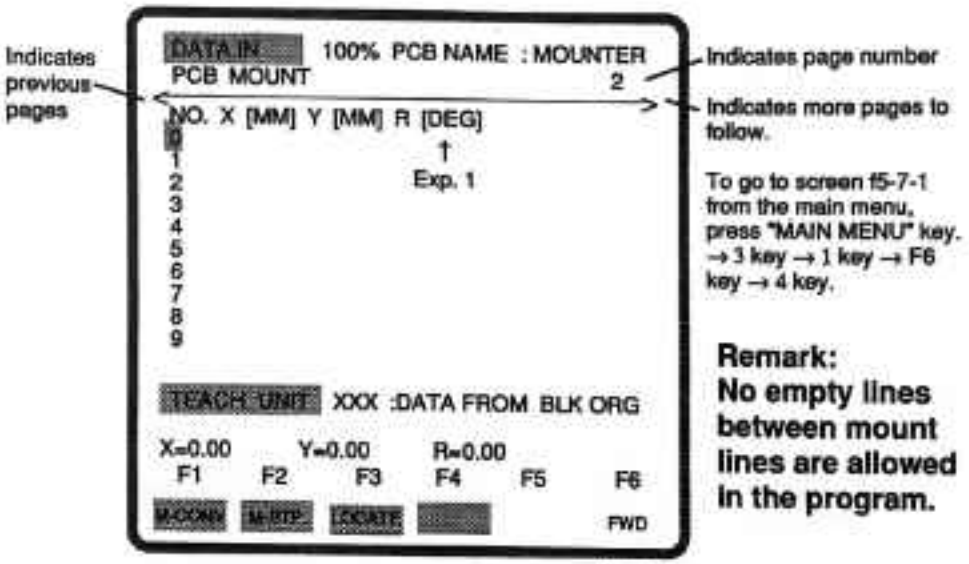
```
DATA IN      100%     PCB NAME:  MOUNTER
PCB MOUNT                                2
<-------------------------------------------
NO.  PART  HEAD  NZZL  SKIP?  FIDU
0     1     1           NO    NOT USED
1     2     1           NO    NOT USED
2     6     2           YES   NOT USED
3     55    3     1     NO    USED
4     ^     ^     ^     ^     ^
5   Exp.2 Exp.3 Exp.4 Exp.5 Exp.6
6
7
8

 TEACH UNIT  XXX: DATA FROM BLK ORG
  X:0.00      Y:0.00      R:0.00
  F1    F2    F3    F4    F5    F6
m-conv. m-stp. locate             fwd
```

f5-7-2

Use the → key to go from screen f5-7-1 to screen f5-7-2.

4-5-7
Mount

The information for the items indicated below, for each mounting point on the PCB, is stored here.



Remark:
No empty lines between mount lines are allowed in the program.

f5-7-1

[Exp. 1] R
This item sets how many times parts will be rotated when being mounted on the PCB, depending on the orientation of the part as it is supplied from the feeder. Seen from above, **counter-clockwise rotation is the + direction.**
Other necessary items may be displayed, depending on the system machine configuration settings and optional equipment conditions. Fill in these items as required. Fig. 4-9 shows the flow of the specifications screens.
For Exp. 2 until 6 see f5-7-2.

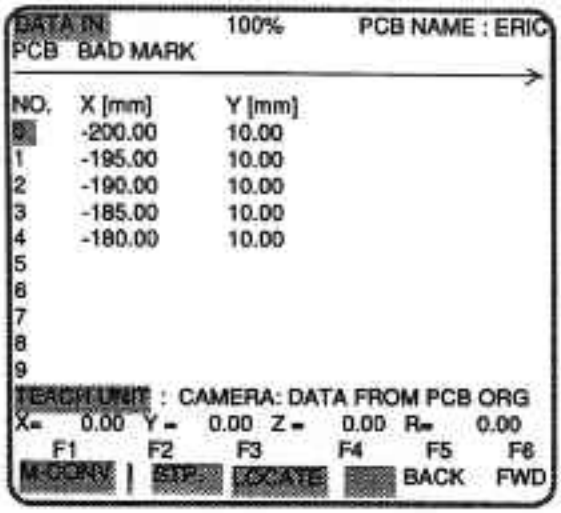
[Exp. 2] PART
Input the registration number used for parts registration (par. 4-6-1). A value between 1-120 can be specified.

[Exp. 3] HEAD
Input the head number used when mounting parts. The value may be between 1 and 3.

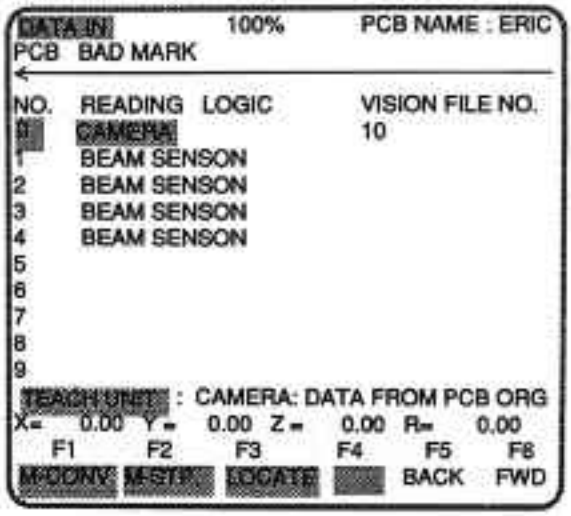
[Exp. 4] NOZZLE
This item is displayed if the "Nozzle Station" item of the system machine configuration data is set to "YES". Also, it is not displayed and cannot be input unless the head number is set to "AANC" or "SANC". Input the nozzle number to be used when mounting parts.

Entering Bad Mark data relative to the PCB Origin is done via two screens. These screens are the following:-

SCREEN 1



SCREEN 2



SCREEN 1

Since all bad marks are related to one point (the PCB origin), all positions must be teached. The lines contain the following information:

Line 0 : This line is ***ALWAYS*** reserved, whether it is used or not, for the **Master Bad Mark**. This line is being processed when, in the RUNNING menu, the option BAD MARK CHECK is set to MASTER MARK. This line, even if Master Bad Marks are not used, must ***always*** contain valid values.

Line 1 to 'n' : These lines contain the X and Y position data of the Bad Marks of Block 1 to Block 'n'. All values can be teached and the coordinates shown are relative to the PCB origin.

SCREEN 2

For each line (see screen 1) this screen determines the reading equipment, the logic in case the beam sensor is used and the vision file number in case the camera is used.

READING	LOGIC	VISION FILE No.	REMARKS
CAMERA	not used	Any valid vision file number.	Valid is, generally, any value between 1 and 29.
BEAM SENS	ON	not used	Area is more reflective than surrounding area. On the screen BEAM SENS ON is shown as BEAM SENSON.
BEAM SENS	OFF	not used	Area is less reflective than surrounding area or not reflective. On the screen BEAM SENS OFF is shown as BEAM SENSOFF.

SCREEN 3

During run mode this screen determines, when used, by what equipment the master bad mark and bad marks are read. Choices are:

Camera	:	The moving camera. A vision file must be present
Beam Sensor	:	Logic must be determined to be, or not to be, reflective.

SCREEN 4

Screen 4 determines the type of bad mark. If, in screen, 3 the reading equipment is CAMERA, then screen 4 contains a number of a vision file which contains the description of the master bad mark and bad marks (for both cases: Only when used).
If, in screen 3, the reading equipment is set to BEAM SENSOR, then screen 4 describes the bad mark logic (the 'true' condition of the bad mark(s))

LOGIC	=	ON	:	Bad mark(s) are more reflective than surrounding area.
LOGIC	=	OFF	:	Bad mark(s) are less reflective than surrounding area or bad mark(s) are **not** reflective.

4-5-6-2. BAD MARK DATUM = PCB ORIGIN

If use is made of bad marks and Bad Mark Datum was set to Block Origin, the head must travel to each block (see section 4-5-6-1) to find out if a bad mark is present or not. This travel distance can be made much sorterby creating bad marks that are relative to the PCB origin. Of course the bad marks can now be placed anywhere on the PCB, but to keep the travel distance of the head as short as possible it is recommended to set the locations of the bad marks as close *as possible* together. When use is made of a Master Bad Mark, then it is recommended to have this Mark near the group of Bad Marks. See figure below:

EXAMPLE ONLY

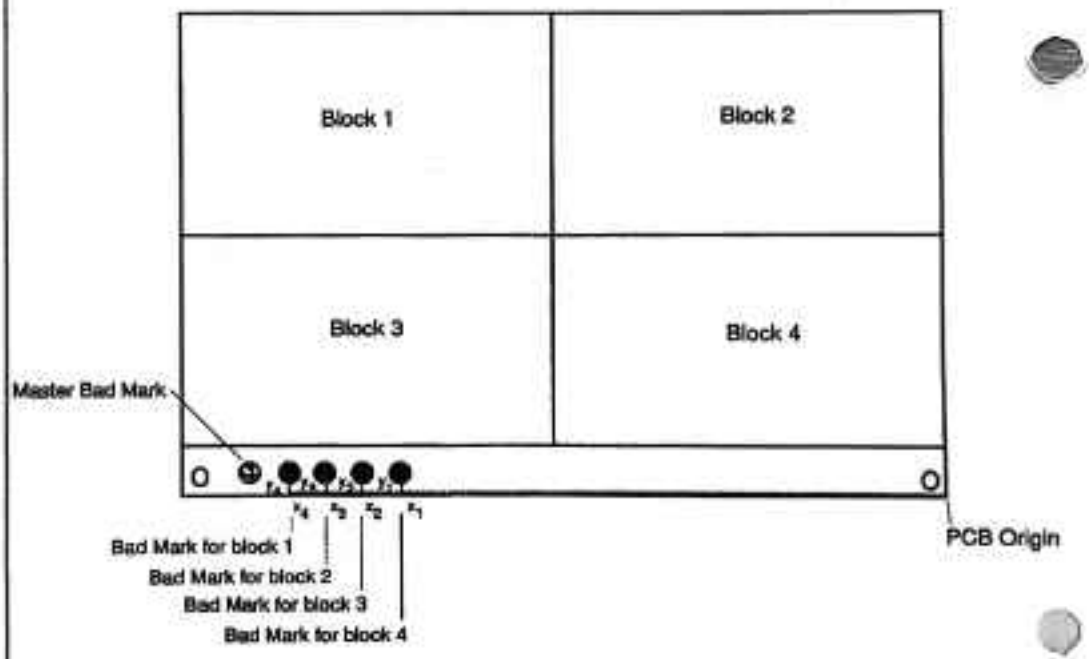


Figure 5-6-4