INSTRUCTION MANUAL

Placement Position Teach

4797 Series

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UNIVERSAL
INSTRUMENTS CORPORATION
A DOVER TECHNOLOGIES COMPANY

Before Use

INSTRUCTION MANUAL

Placement Position Teach

4797 Series

We are grateful to you for purchasing these special specified products.
Please keep in mind the following items before use.

1. Please read this instruction manual carefully for correct use of these special specified products.
   The following warning signs are classified into three categories according to the degree of danger.
   Please fully understand the meaning of each sign for safety precautions.

⚠ **DANGER**	This indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠**WARNING**	This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**	This indicates a potentially hazardous situation which, if not avoided, may result in injury or physical damage.

- Identifying Alert Icons

△ : This symbol mark represents danger or prompts warning.
⃠ : This symbol mark represents prohibited operations.
❗ : This symbol mark represents forced operations or instructions.

2. Explained in this manual are only the items different from those in the instruction manual of the main machine.
   Use the instruction manual of the main machine together with this manual.

3. The contents of this manual are subject to change without prior notice.
   Please contact our marketing department or sales agency for the detailed information on these special specifications.

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1. Scope

- **PCB Origin Offset Teach**
  When the placement position in the pattern program deviates in both X and Y directions, the deviation can be corrected by changing the values in "PCB Origin Offset (X, Y)" of the operation data.
  This function semi-automatically estimates the deviation by using the P.E.C. recognition camera and shows the resultant values in the "PCB Origin Offset (X, Y)" in order to correct any deviations in X and Y directions.

- **Placement Position Teach**
  The PCB pattern is displayed within the window size using the P.E.C. recognition camera to check that each placement position specified in the pattern program is correct.
  If not correct, this function corrects the pattern program data by using the manual alignment function (matching operation of component outline display and PCB pattern using the pointing device).

2. Data to be Taught

The following are data items to be taught.

(1) PCB Origin Offset Teach
- PCB Origin Offset (X, Y)
  This is on the operation data in the pattern program.

(2) Placement Position Teach
- PCB Placement Position P1 to Pn Step (X, Y) on Placement Data (P).
- Pattern Origin O1 to On Coordinates (X, Y) on the Placement Data (O).

3. Notes on Teaching Operation

Notes on Teaching Operation

- Before performing the placement position teach operation, always check that the PCB origin offset is correct on the "PCB Origin Offset Teach" tab sheet. If not correct, at first perform the PCB origin offset teach operation.

Notes on PCB Origin Offset Teach Operation

- As the PCB origin offset teach operation affects all coordinate data in the pattern program, this operation can be performed only when the machine operation status is shown as STOP.

Notes on Placement Teach Operation

- When the P.E.C. recognition is set to ON on the pattern program data, all the P.E.C. recognition processing should be completed before the placement position check in the placement position teach operation.
  If the P.E.C. recognition has been set to ON, when the teaching is started while the machine is stopped, the P.E.C. recognition will be performed at first.

Bad Mark Processing Operation

- When the UNIT P.C.B. B.B.R. function is set to ON on the pattern program data, the bad marks are not detected in the placement position teach operation. All unit PCBs are subject for the teaching.

4. PCB Origin Offset Teach

The PCB origin offset teaching operation is performed.
The PCB origin offset is the datum designating the reference for all coordinate data set on the pattern program.
This offset is used for the pattern data where the PCB on the mother board has an edge (ear) with no pattern, or when the actual pattern is not evenly dispersed.

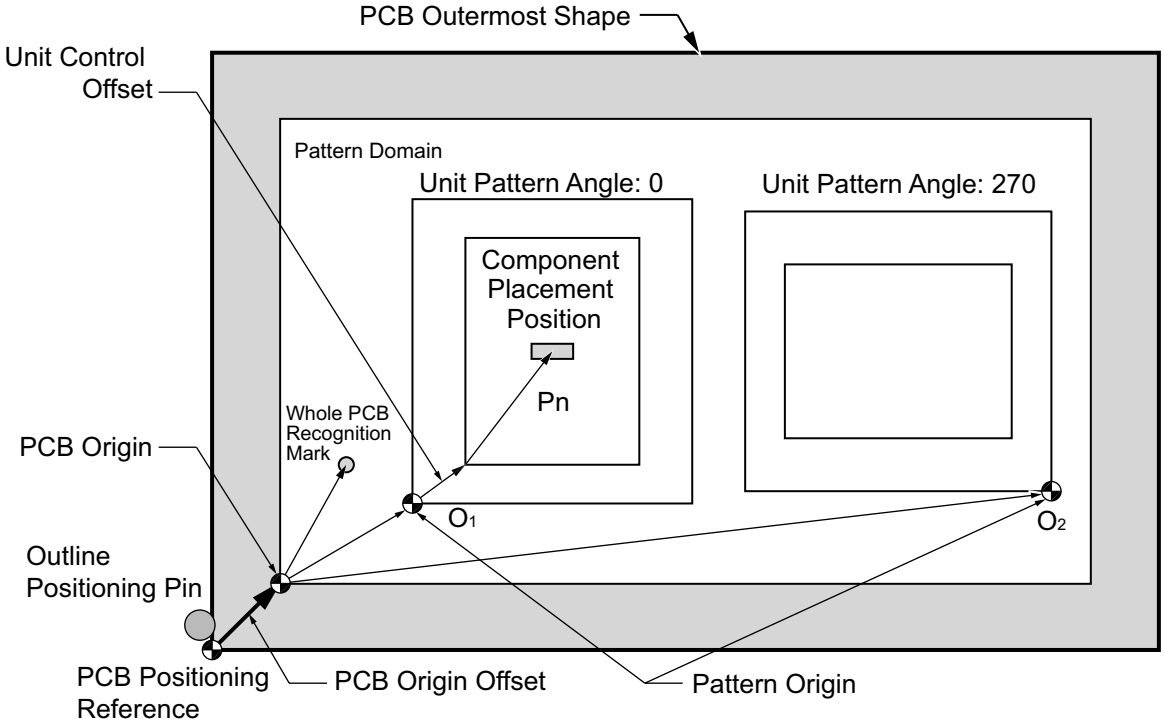


Fig. 1 Items to be Taught in PCB Origin Offset Teach Operation

4.1 "PCB Origin Offset Teach" Tab Sheet

- **Sheet Layout**

  When the [PCB Origin Offset Teach] tab is pressed on the "RECOVERY" window, the following window appears.

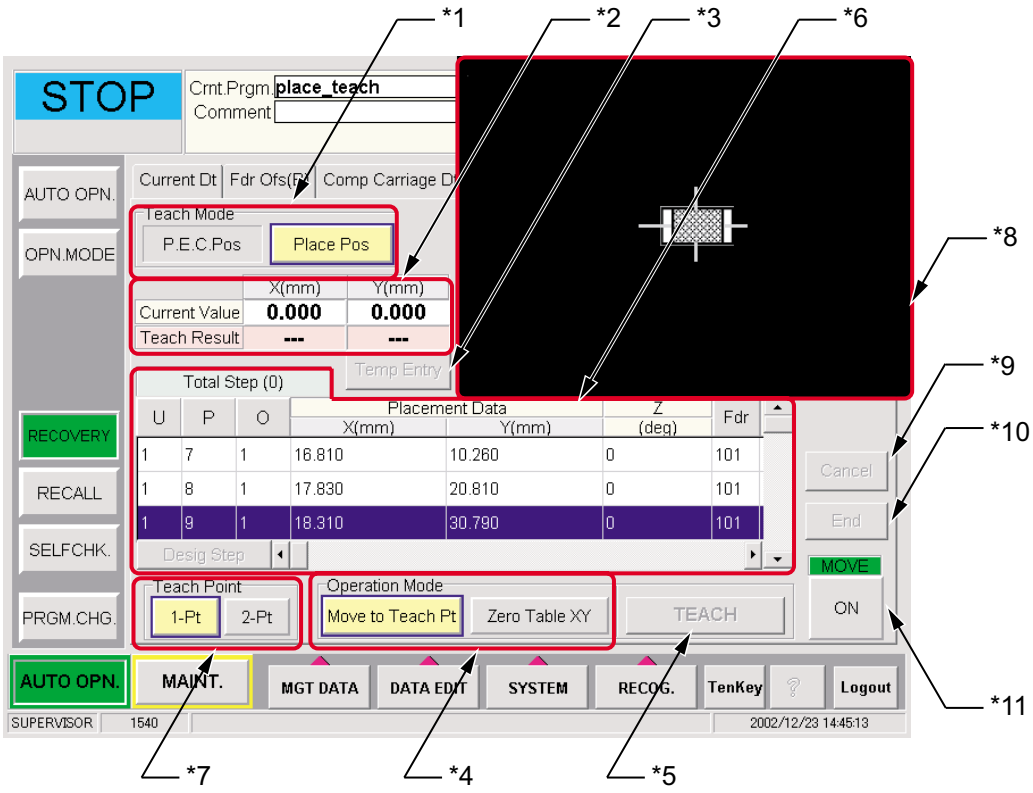


Fig. 2 "PCB Origin Offset Teach" Tab Sheet ("Designation of Placement" is selected)

- **Sheet Composition**

***1 Teach Mode**

The mode for P.E.C. recognition offset teach is selected.

P.E.C. Pos

When the P.E.C. recognition mode global is implemented, the PCB origin offset teach operation is performed (using the P.E.C. recognition mark #1). When the P.E.C. recognition mark is selected, items ***6** and ***7** are not displayed.

Place Pos
The PCB origin offset teach operation is performed using the placement position #1 or any other placement positions.

Note (a) The selection of the P.E.C. recognition mark or placement position will be automatically performed according to the pattern program setting.

TB01

Pattern Program Setting		Teaching Point
PEC Recognition Mode Global	Enable	Global Recognition Point #1 or Designated Placement Position (Initial Value : Placement Position #1)
	Disable	Designated Placement Position (Initial Value : Placement Position #1)

(b) When the P.E.C. recognition mode global function is used, the teaching point is at the global recognition point #1. However, if the teaching is not available because of the degradation of a P.E.C. recognition mark on the PCB for which the teaching is performed, then select the placement position for the teaching point.
(c) When the P.E.C. recognition mode global function is not used, the teaching point is at the placement position #1. If the teaching operation in this position is difficult, then select another placement position.

***2 Placement Data**
The pattern program position presently referred and when position resultant from the teaching are indicated.

***3 [Temp Entry] Button**
The position which is being taught is temporarily entered.

***4 Operation Mode**
When the operation mode is selected and the "Move" [ON] button is pressed, the X/Y table is moved to the designated position.

Move to Teach Pt
The X/Y table is moved to the position set in the P.E.C. recognition offset operation.
Zero Table XY
The X/Y table is returned to the origin.

***5 [TEACH] Button**

The teaching operation is performed at the present position.

***6 Pattern Program Window**

It consists of the following items.

Total Step

The number of total steps in the pattern program is indicated.

U, P, O

The presently referred step in the pattern program is indicated.

Placement Data X[mm], Y[mm], Z (deg), Fdr, Component ID

The current placement data is indicated.

The temporarily entered step is shown with a blue background.

[Desig Step] Button

Any step can be indicated.

***7 Teach Point**

The teaching mode for the step to be taught is selected.

1-Pt

This is selected when the teaching operation is performed at the center of the component.

2-Pt

This is selected when the teaching operation is performed for a component larger than the P.E.C. recognition camera view limit.

***8 Recognition Area**

The image taken by the P.E.C. recognition camera is displayed.

***9 [Cancel] Button**

The temporarily entered teach data is cancelled.

***10 [End] Button**

The placement position teach operation is ended.

Whether or not the teach results are saved can be selected.

***11 Control Switch**

When the [ENABLE] button is pressed on the operation panel within two seconds after the "Move" [ON] button is pressed, the device is activated.

4.2 PCB Origin Offset Teach Operation Procedure

• Operation Procedure

(1) Select the [Move to Teach Pt] button ***4** and then press the "Move" [ON] button ***11**. Then, within two seconds, press the [ENABLE] button on the operation panel.
The X/Y table will move to the teach point where automatically judged in the pattern program, the P.E.C. recognition mark or component outer shape display and land are displayed within the window size.

(2) Check the view of the P.E.C. recognition mark or component outer shape display and land displayed within the window size.

(3) When the teach point is the P.E.C. recognition mark, press the [TEACH] button ***5** and then, within two seconds, press the [ENABLE] button on the operation panel. The P.E.C. recognition will be performed. When the recognition is completed normally, the new PCB origin offset (X, Y) is displayed in the teach result box.

(4) When the teach point is the placement position, select [1-Pt] or [2-Pt] button in the "Teach Point" box ***7**.

When the entire component's outer shape is within the window size:
Select [1-Pt] button (Component Center) for the Teach Point

When the entire component's outer shape is not within the window size:
Select [2-Pt] button (Opposite Angles in Component) for the Teach Point. When [2-Pt] button is selected, the PCB pattern moves to the second point after completing the teaching of first point.

(5) Check the setting of Teach Point. Press the [TEACH] button ***5** and then within two seconds, press the [ENABLE] button on the operation panel. The teaching operation will be performed.

(6) Manipulate the pointing device to accommodate the component outer shape image within the window size to the PCB pattern entered in the recognition memory image.

Operation of Pointing Device

Joy Stick	:	Movement of the X/Y table (PCB Pattern)
Right Click	:	Enlargement of Image
Left Click	:	Reduction of Image
Click on the Right and Left at the same time	:	Positioning Completion

When the positioning is completed, the new PCB origin offset is displayed in the "Teach Result (X, Y)" box ***2**.

(7) When the new PCB origin offset is temporarily entered, press the [Temp Entry] button ***3**.
The new PCB origin offset is temporarily written in the temporary file.

Note

(a) Temporarily entering new PCB Origin Offset saves the temporary file in the data for the operation and pattern program file, but does not overwrite the original file.

(b) Cancellation of temporarily entered data is available during the temporary enter operation. To cancel, press the [Cancel] button ***9**.

(8) Check the temporarily entered data using the placement step operation.
Press the [Place Pos] button ***1**.

(9) Indicate the step to be checked using the vertical scroll bar on the step data display section and select the step.

Note When the [Desig Step] button ***6** is pressed on the lower left of the step display, the step can be entered directly using the ten-key.

(10) Select the [Move to Teach Pt] button ***4** and then the "Move" [ON] button ***11**. Within two seconds, press the [ENABLE] button on the operation panel.
The X/Y table will move to the selected step position.

(11) When the new PCB origin offset is entered formally, press the [End] button ***10**.
The "Is data saved temporarily ?" window is displayed.

Changing the Current Pattern Program Data (Save)
When the [YES] button is pressed in the "Is data saved temporarily ?" window, the "Overwrite data. Is it OK ?" window is displayed.
Press the [YES] button, then the temporarily entered data about the PCB origin offset will be overwritten.

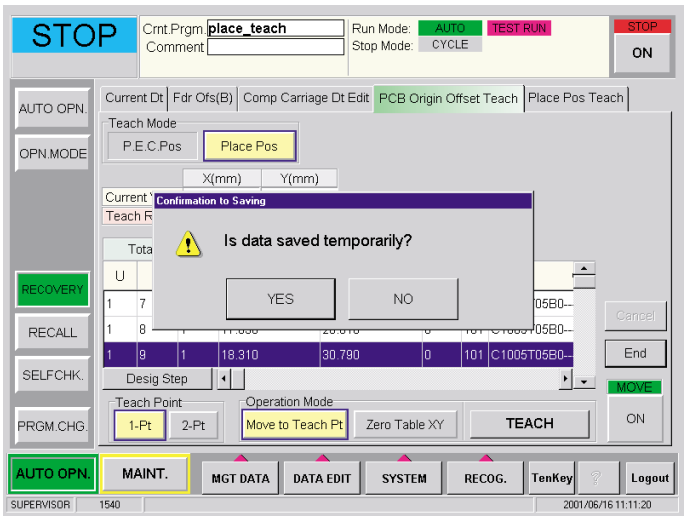


Fig. 3 "Confirmation to Saving" Window

Maintaining the Current Pattern Program Data (Save As)

When the [NO] button is pressed in the "Is data saved temporarily ?" window, the "File Name Entry" window is indicated.

Enter the new file name and press the [SET] button.

The temporarily saved PCB origin offset data is saved with a newly entered file name.

Deleting the Teach Data (All Teach Data Delete)

Press the [NO] button in the "Is data saved temporarily ?" window.

5. Placement Position Teach

Pn and On are taught as follows.

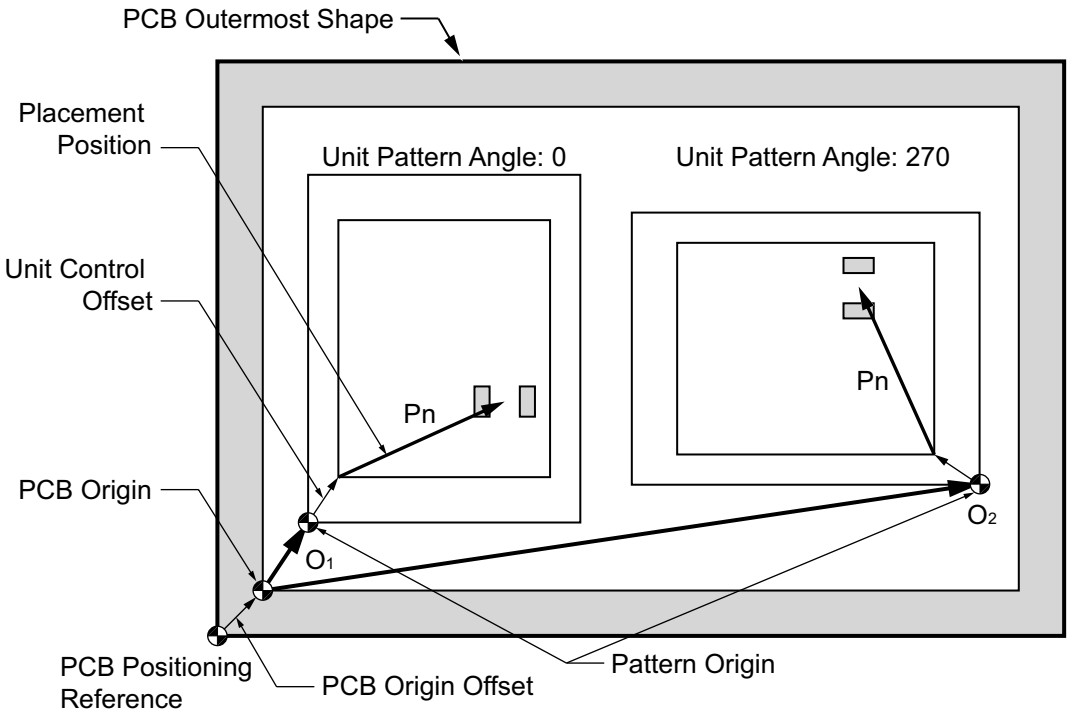


Fig. 4 Items to be Taught in Placement Position Teach

5.1 "Placement Position Teach" Tab Sheet

- **Sheet Layout**

  When the [Place Pos Teach] tab is pressed on the "RECOVERY" window, the following window appears.

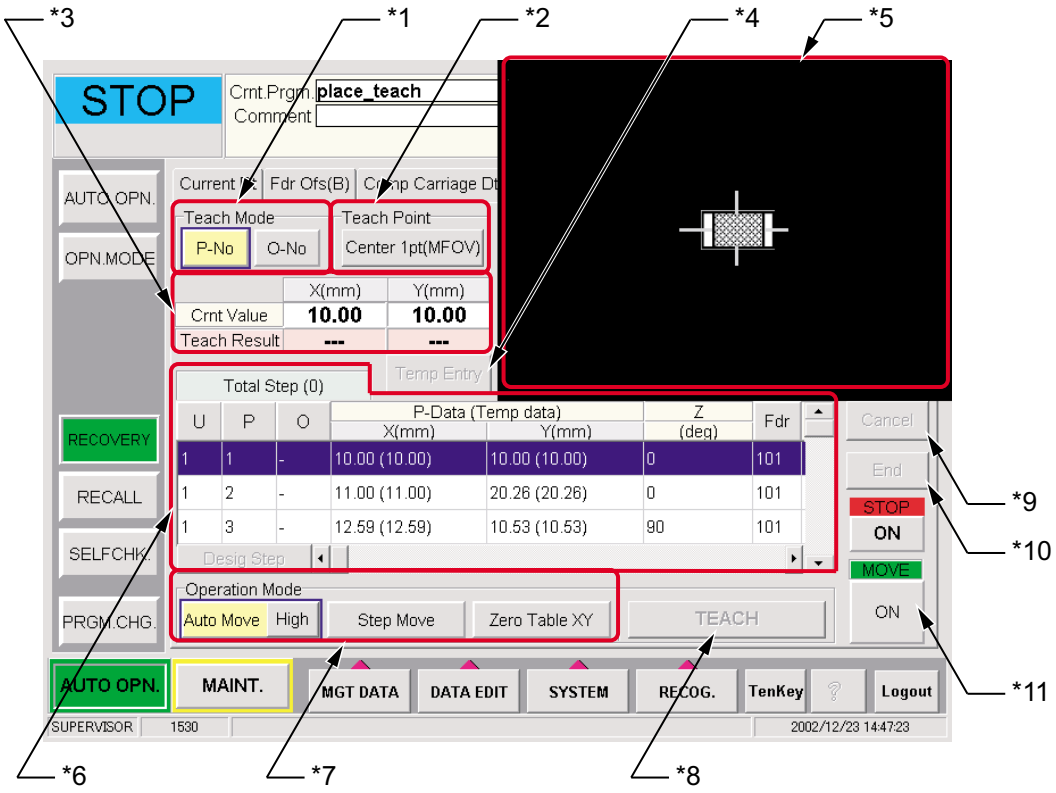


Fig. 5 "Place Pos Teach" Tab Sheet

- **Sheet Composition**

***1 Teach Mode**

[P-No] or [O-No] button is selected for the placement position teach operation.

***2 Teach Point**

The "Teach Point" window is opened to designate the teaching method.

In the "Teach Point" window, designate "Center 1pt (MFOV)", "Diagonal 2pt" or "Center 1pt (SFOV)".

***3 Placement Data**

The pattern program position presently referred and the position resultant from the teaching are indicated.

***4 [Temp Entry] Button**

The coordinates currently indicated in the placement position teach operation are temporarily entered.

***5 Recognition Area**

The image taken by the recognition camera is indicated.

***6 Pattern Program Indication**

It consists of the following items.

Total Steps

The total number of steps in the pattern program is indicated.

U, P, O

The steps in the currently referred pattern program are indicated.

P-Data (Temp Data) X [mm] Y[mm], Z (deg), Fdr, Component ID

The current placement position is indicated.

The temporarily entered data is indicated with a blue background.

[Desig Step] Button

Any step can be indicated.

***7 Operation Mode**

When the operation mode is selected and the "Move" [ON] button is pressed, the X/Y table is moved to the designated position.

Auto Move

The automatic operation is performed.

Each pressing of the [Auto Move] button changes the speed to high, middle and low in that order.

Step Move

The step movement is performed.

Zero Table XY

The X/Y table is returned to the origin.

***8 [TEACH] Button**

The teaching operation is performed at the present position.

***9 [Cancel] Button**

The temporarily saved teach data is cancelled.

***10 [End] Button**

The new placement position teach result is saved and the teaching operation is ended.

***11 Control Switch**

When the [ENABLE] button is pressed on the operation panel within two seconds after the "Move" [ON] button is pressed, the device is activated.

5.2 Placement Position Teach Operation Procedure

(1) In order to obtain the deviation tendency of PCB pattern, Select the [Auto Move] button ***7** and then "Move" [ON] button ***11**. Then press the [ENABLE] button on the operation panel within two seconds. Otherwise, press the [Step Move] button ***7** and then "Move" [ON] button ***11**. Then press the [ENABLE] button on the operation panel within two seconds. The X/Y table is moved.

(2) During the X/Y table movement, check the component outer shape indicated within the window size and pattern condition. If there is any deviation particular to a certain step, perform the P-data teaching operation. If the pattern on the unit PCB is entirely deviated, perform the O-data teaching operation.

(3) Move to the Teach Position
The two ways to move to the Teach Position are as follows:

- Move the X/Y table to the step to be taught using the Auto Move operation and stop it by using the [STOP] button on the operation panel.
  When step moving, the step is normally scanned for the components in order of the placement. The scanning can be fixed by using U-No., P-No., O-No., and Fdr-No.

When ***6*** Step is pressed, a key icon is displayed and the step (consistent with the description displayed by the key icon) is scanned. Two or more key icons can be selected.

Example

When the step is set to 101 for Fdr-No. and Fdr-No. is fixed, only the steps with the Fdr. No. of 101 are scanned, regardless of the U-No., P-No., and O-No. Moreover, if the U-No.1 is fixed additionally, only the steps with U-No. 1 and Fdr. No. 101 are scanned.

Note To designate the speed of the Auto Move, each pressing of the [Auto Move] button changes the speed to high, middle and low in that order.

- Indicate the step to be taught by using the vertical scroll bar in the pattern program indication and select the step. Select the [Step Move] button ***7*** and "Move" [ON] button ***11***. Then, within two seconds, press the [ENABLE] button on the operation panel.

Note
(a) When the [Desig Step] button ***6*** is selected on the lower left of the pattern program indication, the step can be entered using the ten-key.
(b) The order of step indication on the pattern program indication is not the same as the order of component placement, but U1, P1, 01 → U1, P2, 01 → ... → U1, P1, 02 → ... → U2, P1, 01 → ... → Un, Pn, On, in this order.

(4) Check the component outer shape indicated within the window size and the view of the land pattern or component, and select 1-Pt or 2-Pt in the "Teach Point" ***1***.

Teaching at the Center of the Component

Select [Center 1pt (MFOV)] for the teach point setting.

Note If the component size is too large to include its outline in the camera view, the shooting is automatically divided and the image taken is synthesized. Image taken is divided into max. 25 pieces.

Teaching at 1 point in the center without dividing the image.

Select Center 1pt (SFOV).

Teaching at diagonal 2 point of component
Select "Diagonal 2pt" (Opposite Angles of Component) in the "Teach Point" box.
In 2-point teaching, when teaching of the first point is completed, the cursor shifts to the second point automatically.

(5) Check that there is a cursor on the step to be taught.

(6) Check the Teach Point setting and press the [TEACH] button ***8**. Then, within 2 seconds, press the [ENABLE] button on the operation panel. The "Operation Guidance" window is indicated.

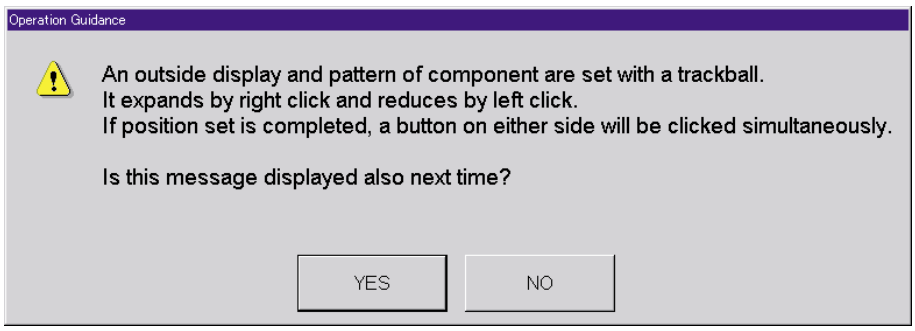


Fig. 6 "Operation Guidance" Window

(7) Press the [YES] button in the "Operation Guidance" window. If the "Operation Guide" is not to be displayed a second time, press [NO].

(8) Match the component outer shape image within the recognition area and the PCB pattern entered in the recognition memory image using the pointing device.
When the position is set, press the left and right buttons at the same time on the pointing device to define the position.
Operation of the Pointing Device

Joy Stick	:	Movement of the X/Y table (PCB Pattern)
Right Click	:	Enlargement of Image
Left Click	:	Reduction of Image
Click on the Right and Left at the Same Time	:	Positioning Completion

Teaching Operation for 1 Point

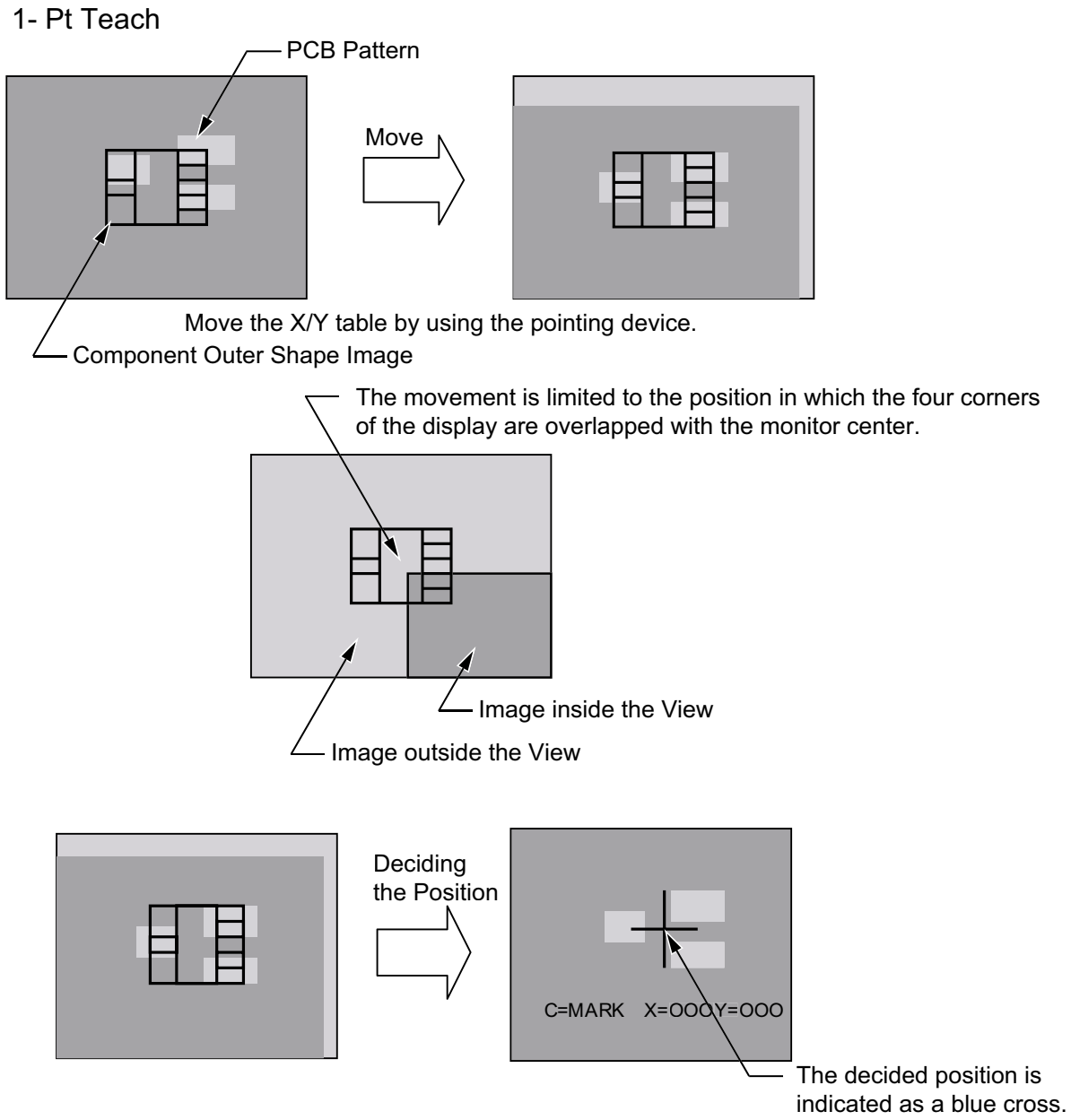


Fig. 7 Teach Operation in the case of 1-Pt

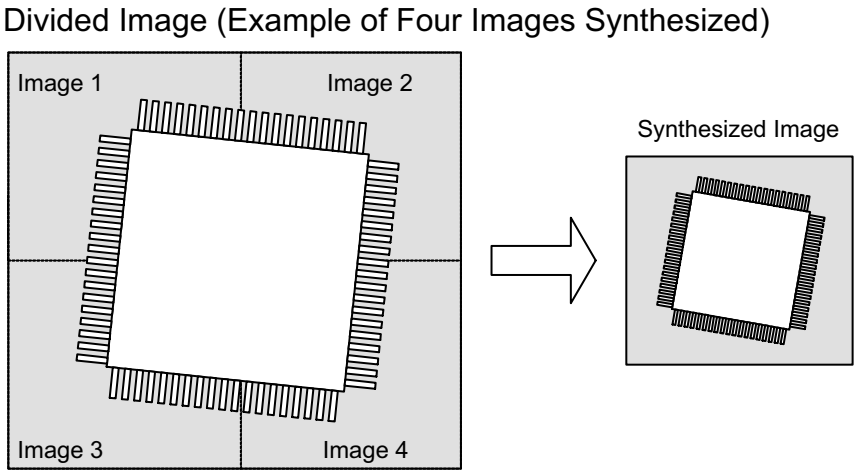


Fig. 7-1 Example of Image Synthesis in Divided Image Shooting

Teach Operation for Diagonal 2 Points

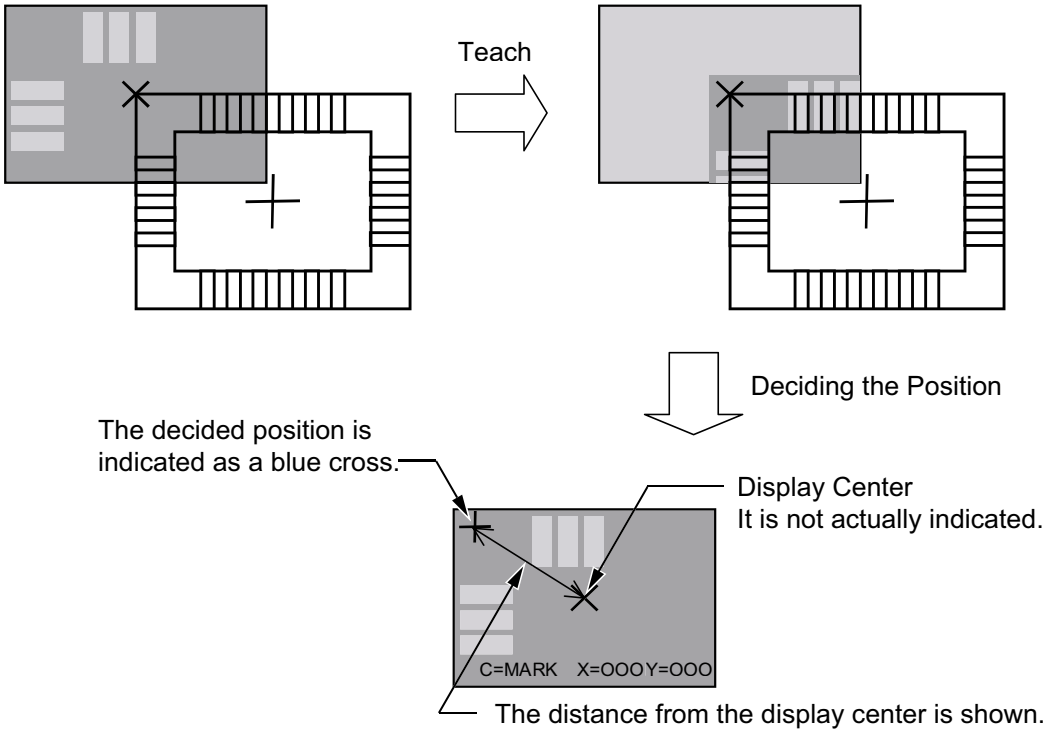


Fig. 8 Teach Operation in the case of Diagonal 2-Pt

(9) When the Teach Operation is completed, the new placement position is indicated in the Teach Result (X, Y) ***3**.

(10) When the new placement position is entered temporarily, press the [Temp Entry] button ***4**.
The new placement position is saved in the temporary file.
When the temporarily registered data is to be cancelled, move the cursor to the step to be cancelled, and press the [Cancel] button. When all data items are to be cancelled, refer to (11).

Note

(a) The Temp Entry function of the new placement position saves the temporary file for the data for operation and pattern program file, but does not overwrite the data on the original file.

(b) The temporarily entered step data can be cancelled. When it is to be cancelled, select the step to be cancelled and press the [Cancel] button ***9**.

(c) The temporarily entered step data is indicated with a blue background.

(d) The temporarily entered data is immediately reflected on the Auto Move and Step Move operations.

(11) When the new placement data is formally entered, press the [End] button ***10**.
The window indicating the message "Is data saved temporarily?" will appear.

When the new data is overwritten on the Current Pattern Program Data (Save)
When the [YES] button is pressed in the window indicating the message "Is data saved temporarily?", the "Confirmation to Saving" window appears. Press the [YES] button.
The temporarily entered data is overwritten on the current pattern program data.

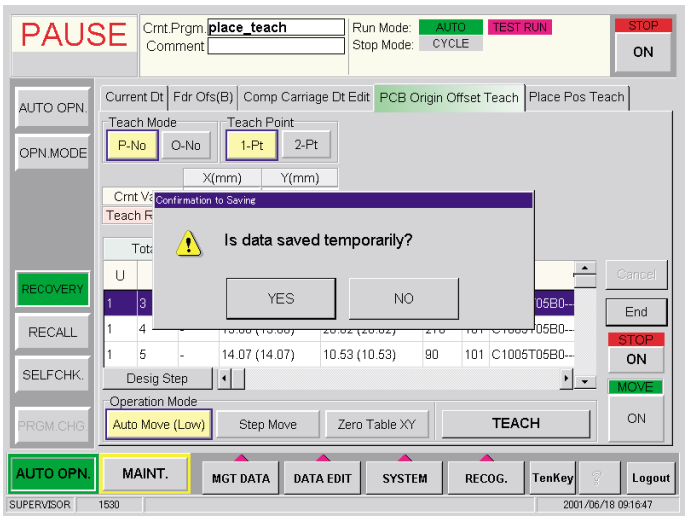


Fig. 9 "Confirmation to Saving" Window

Maintaining the Current Pattern Program Data (Save As)
When the [NO] button is pressed in the window indicating the message "Is data saved temporarily?", the File Name window appears.
Enter the new file name and press the [Set] button.
The temporarily entered pattern program will be saved with the newly entered file name.

Deleting the Teach Data (All Teach Data Delete)
Press the [NO] button in the window indicating the message "Is data saved temporarily?".

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