

CHAPTER 8

WORK FLOW AND CHANGING SETUPS

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8-2-3 "Explanation 3": Turning on the power supply

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Turn on the main power supply switch on the front of the main unit. 2. Press the READY switch next to the main power supply switch. 	<ul style="list-style-type: none"> • After the program is loaded from the Eproms, check to see if the message [--32: ORIGIN INCOMPLETE--] is displayed on the upper part of the CRT screen. • If the message [--29: EMG. STOP ON --] is displayed, either the Emergency Stop button on the front or back of the main unit, or the Emergency Stop button on the hand-held keyboard has been pressed. Cancel this status and press the READY switch once again.

Fig.8-4
Turning On the
Power Supply

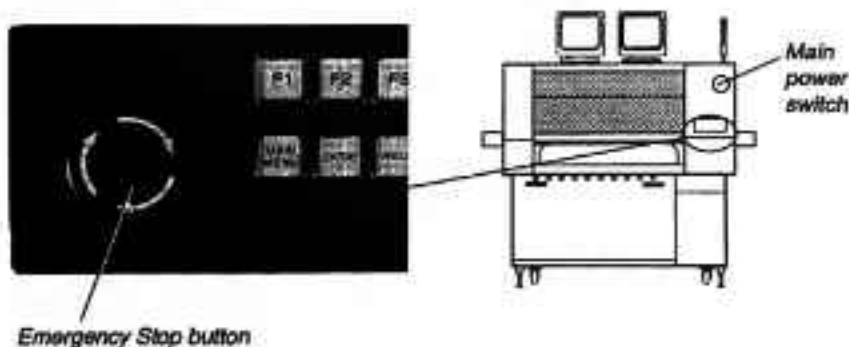
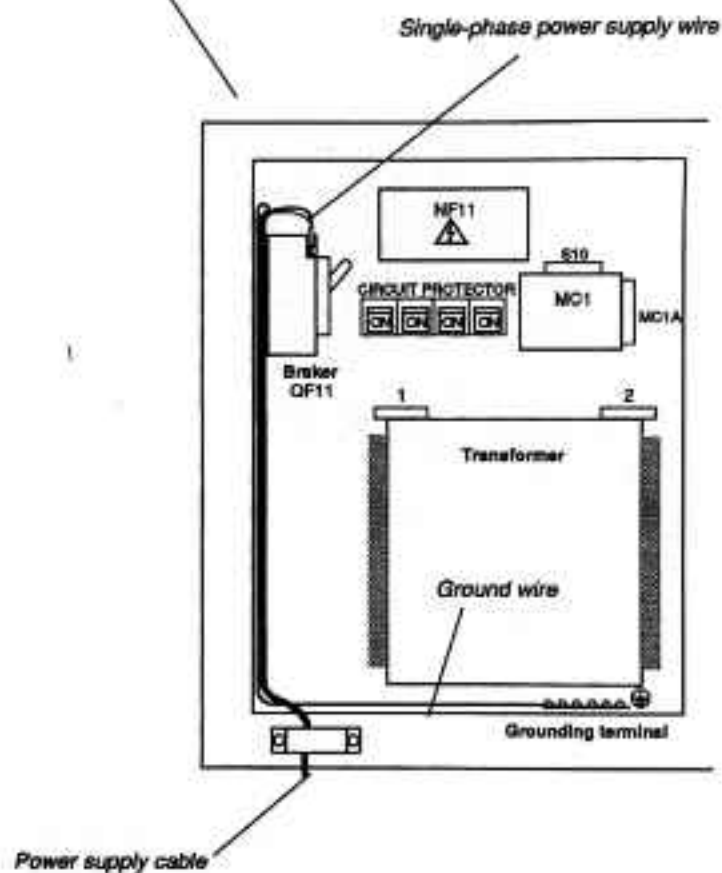


Fig.8-3
Connecting the
Power Supply

(Located at Rear side of
main unit)



8-2

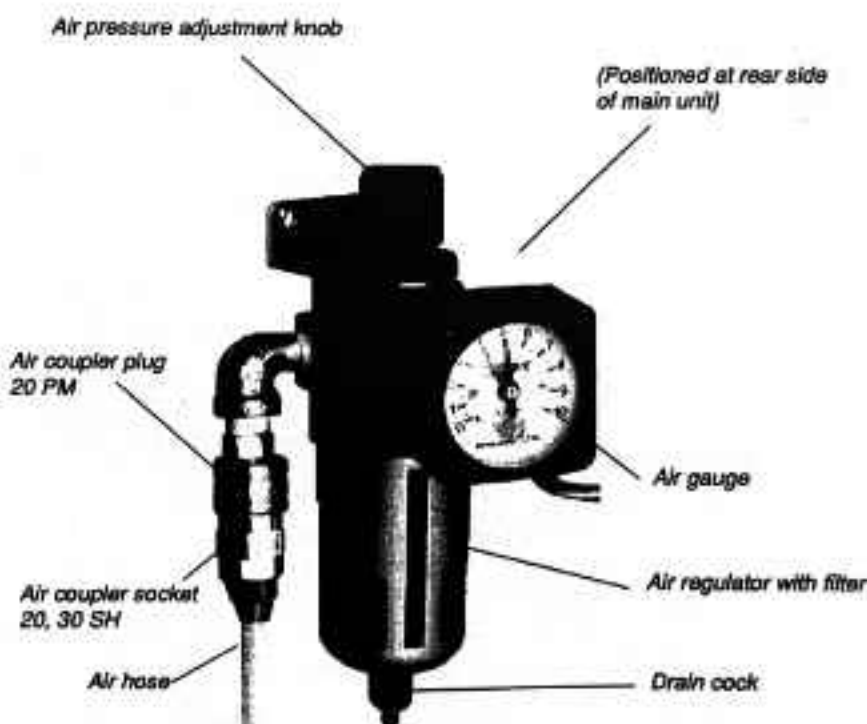
Explanations of Work Contents

The specific contents for the "Explanations 1 to 14" appearing in the flowchart in Section 1 are listed below.

8-2-1 "Explanation 1": Connecting the air supply and power supply

Work Content	Confirmation and Reference
Connecting the Air Supply <ol style="list-style-type: none"> 1. Connect the air hose to the opening on the back of the main unit (using the 20 PM plug of the air coupler made by Nittoh Koki). 2. Turn on the cock at the base of the air supply, to start air flowing. 	<ul style="list-style-type: none"> • Make sure the air supply pressure is 5.5 to 10.0 kgf/cm², and the flow volume is 40 NI/min. or more. • The accessory air gauge at the air connection opening on the back of the main unit must read 5.0 kgf/cm².
Connecting the Power Supply <ol style="list-style-type: none"> 1. The power supply box at the rear of the main unit contains a breaker. Connect the power supply cable to the primary-side terminal of this breaker. 	<ul style="list-style-type: none"> • Make sure the unit is grounded. • Check to see that the power supply voltage meets the specifications.

Fig.8-2
Connecting the
Air Supply

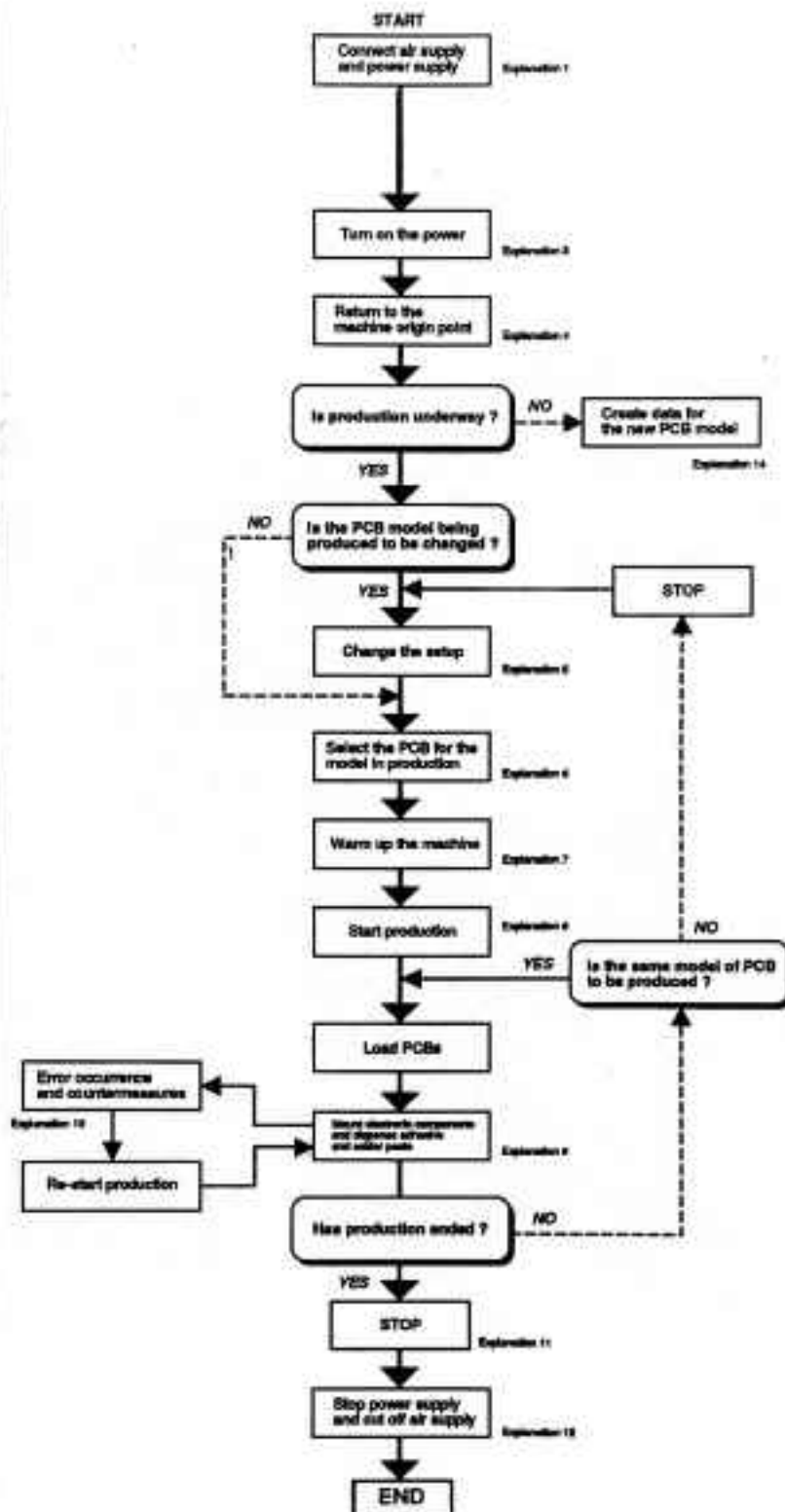


8-1

Diagram of
Work Flow

The flowchart below shows the general flow of the operations which the user carries out on a daily basis. The specific contents of "Explanations 1 to 12" noted in the diagram are contained in Section 8-2, which follows after this section.

Fig.8-1
Diagram of
Work Flow



2) Adjusting the locate pin (PCB positioning pin) (when using a pin-positioning system)

A. Adjusting the position of the movable locate pin

For each type of PCB being used, attaching marks (seals, magic marker, etc.) on the conveyor plate to indicate the positions of movable locate pins can make subsequent operations much easier.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Loosen the bolts securing the holder of the movable locate pin (the fixed locate pin leans up against the main stopper). 2. Press the F2 (M-STP.) key on page 1 to raise the main stopper. 3. Set a PCB on the conveyor and bring it up against the main stopper. 4. Slide the movable locate pin right and left until, looking down from directly above the PCB, the center of the positioning hole is lined up with the center of the pin. 5. Tighten the bolts to secure the movable locate pin in place. 	<ul style="list-style-type: none"> • Press the F3 (LOCATE) key on page 1 to raise the locate pin. When doing this, check to make sure the pin of the locate pin fits securely into the positioning hole in the PCB. • If the bolts securing the holder are loosened too much, they will come out entirely. Be careful not to lose them.

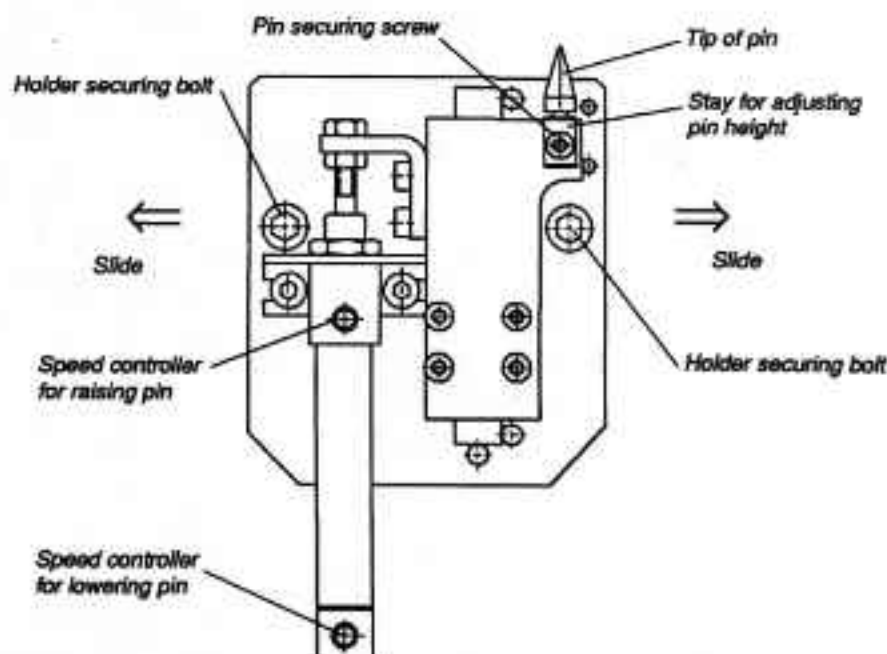


Fig. 8-8
Front View of
Locate Pin



In Table 8-1, if the F2 key on page 1 is pressed, for example, the main stopper ascends.

(1) Changing the conveyor setup

If all of the PCBs to be used are designed to be the same size, or if the same mother board is to be used, the setup will only have to be changed at the beginning.

WHEN CHANGING THE CONVEYOR SETUP, NEVER PUT ANY PART OF YOUR BODY WITHIN THE MOVABLE RANGE OF THE X/Y ARMS UNTIL YOU HAVE FIRST TURNED OFF THE POWER SUPPLY OR PRESSED THE EMERGENCY STOP BUTTON.

1) Adjusting the conveyor width

Work Content	Confirmation and Reference
1. Turning the conveyor width adjustment handle at the left front of the main unit left and right, move the movable side of the conveyor back and forth until the PCB is caught between the sides of the conveyor.	<ul style="list-style-type: none"> Press the F1 (M-CONV.) key on page 1 to move the conveyor belt. Check to make sure the PCBs move smoothly from the head of the conveyor to the foot.
2. Once the PCB is firmly caught, return the handle a quarter turn and adjust until the clearance between the conveyor plate and the PCB is 0.5 to 1.0 mm.	<ul style="list-style-type: none"> After adjusting the conveyor width, remove the handle from the machine. (Pull it forward to remove it.)

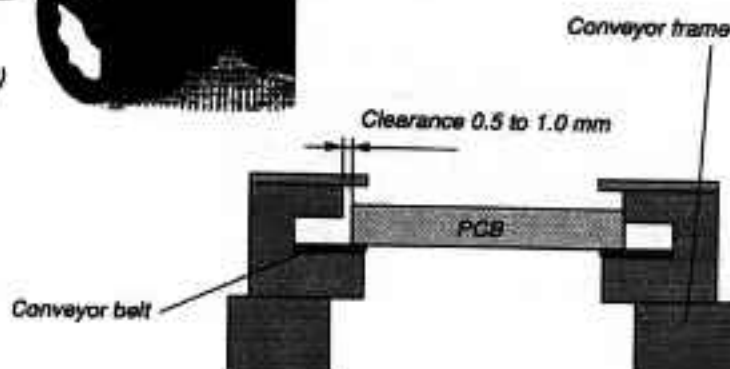


If the conveyor is too wide for the PCB, the PCB will be off from its correct positioning, and the head may bump against the PCB during mounting. Make sure the conveyor width is adjusted appropriately.

Fig. 8-6
Conveyor
Width
Adjustment
Handle



Fig. 8-7
Clearance
Between PCB
and Conveyor
Plate



8-2-5 "Explanation 5": Changing Setups

If the type of PCB being produced changes, setup changes (1) to (3) below must be carried out along with the change.

- (1) Conveyor setup change
- (2) Feeder setup change
- (3) Head setup change

Moreover, when changing setups, various adjustments have to be made. These adjustments are much easier if they can be handled through manual operations, using the function keys. Various units of equipment can be moved using the function keys on the "MANUAL" screen (although this is not the only screen on which function keys are effective).

On the screen shown in Fig. 8-5, when the return to the origin point has been completed, select "2. MANUAL". (The F2 and F2 keys or the ↑ and ↓ arrow keys can be used to move the highlighted display.) When the desired item has been highlighted, press the F6 (NEXT) key to change the screen to the "MANUAL" screen. The MANUAL operations that can be carried out using the function keys are shown in the table below.

Screen	Function Key	CRT Display	Movement
0	F1	ORIGIN	Return to origin
1	F1 F2 F3	M-CONV M-STP. LOCATE	Conveyor drive ON/OFF Main stopper ascent/descent Locate pin ascent/descent
2	F1 F2 F3 F4	REVERS S-STP. PUSHUP CLAMP	Conveyor reversal ON/OFF Sub-stopper ascent/descent PCB push-up plate ascent/descent Edge clamp ON/OFF
3	F1 F2 F3 F4	C-SPD. PUSH IN DO(36) COUNT	Conveyor low-speed operation ON/OFF PCB push-in ON/OFF Head 3 Back-Light ON/OFF PCB counter
4	F1 F2 F3	H1DOWN H1TURN H1VAC H1DISP	Head 1 descent (momentary) Head 1 rotation ON/OFF Head 1 pickup ON/OFF Head 1 discharge ON/OFF
5	F1 F2 F3	H2DOWN H2TURN H2VAC H2DISP	Head 2 descent (momentary) Head 2 rotation ON/OFF Head 2 pickup ON/OFF Head 2 discharge ON/OFF
6	F1 F2 F3 F4	H3DOWN H3TURN H3VAC H3DISP H3VCHG	Head 3 descent (momentary) Head 3 rotation ON/OFF Head 3 pickup ON/OFF Head 3 discharge ON/OFF Head 3 vacuum pressure change ON/OFF

Table 8-1
Manual
Operations
Using Function
Keys

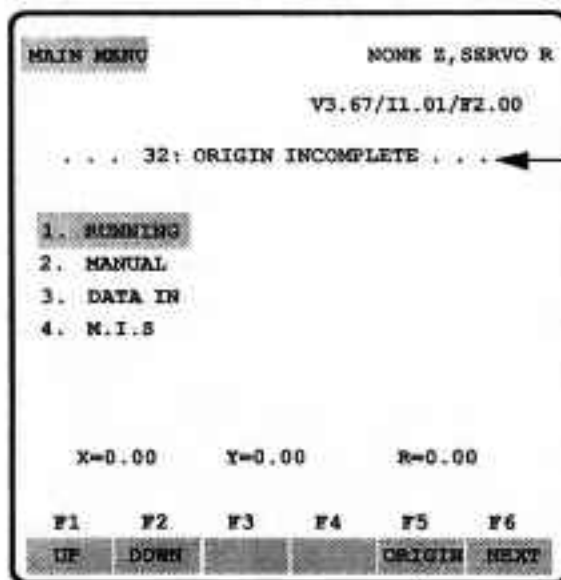
8-2-4 "Explanation 4": Returning to the machine origin point

Work Content	Confirmation and Reference
<ul style="list-style-type: none"> On the CRT screen shown in "Explanation 2" (Main Menu screen), press the F5 (ORIGIN) key. 	<ul style="list-style-type: none"> Check to make sure that each of the axes begins to move at low speed in the sequence of Y axis → X axis → R axis. (The head moves to the left front of the machine.) After each axis has returned to its origin point, make sure the message [---32:ORIGIN INCOMPLETE---] has disappeared from the screen.



WHEN THE [ORIGIN] IS DISPLAYED AT THE BOTTOM OF THE SCREEN, PRESSING THE KEY CAUSES EACH OF THE AXES TO START MOVING. (THE RETURN TO ORIGIN MAY BE CARRIED OUT ANY NUMBER OF TIMES.) IT CAN BE VERY DANGEROUS IF ANY PART OF THE OPERATOR'S BODY ENTERS THE WORK AREA OF THE X/Y/Z ROBOT ARMS OF THE MACHINE DURING A RETURN TO ORIGIN, SO BE SURE TO STAY WELL OUT OF THE WORK AREA WHEN THE SAFETY COVERS ARE OPEN.

Fig.8-5
Main Menu
Screen



Return to Origin key

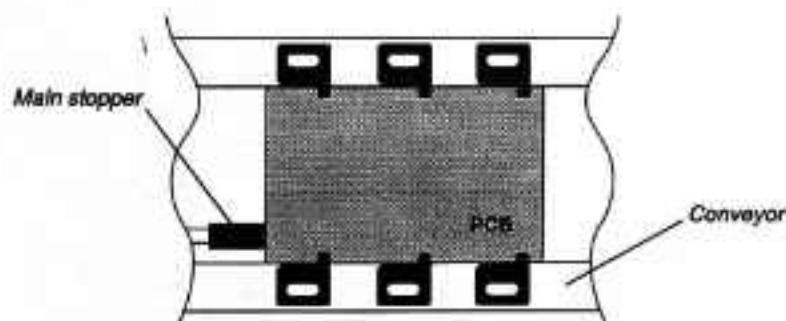
5) Adjusting the position of the PCB support plate (when using a pin-positioning system or edge-positioning system)

The PCB support plate supports the rim of the PCB from above, when the PCB is being positioned. The plates come in two different shapes (see Fig. 8-14). Plate B is used when the PCB has a particularly strong warp or is very thin. The PCB support plate is held in place with M3 screws, and one especially appealing feature is that the plates can be distributed evenly along the front and back sides of the PCB in accordance with the size of the board, thus providing even support.

Fig. 8-14
PCB Support
Plate



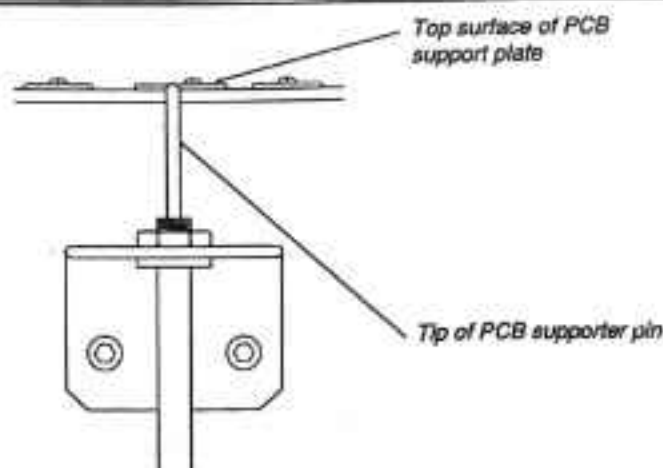
Fig. 8-15
PCB Support
Plate Layout



6) Adjusting the position and height of the PCB push-up pins (when using a pin-positioning system or edge-positioning system)

The PCB push-up serves to correct the downward warp of the PCB. For each type of PCB being used, attaching marks (seals, magic marker, etc.) on the push-up plate to indicate the positions of the push-up pins can make subsequent operations much easier.

Fig. 8-12
PCB Supporter
Height Position



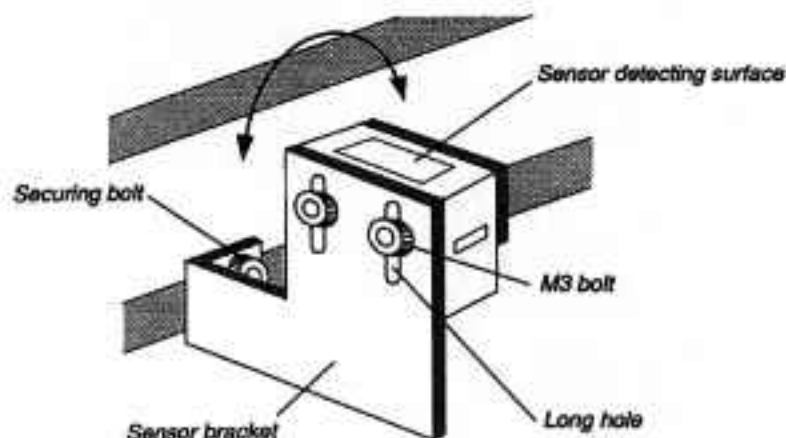
4) Adjusting the PCB detection sensors

These sensors are located at the conveyor entrance and exit, the work position, and the standby position (when using a pin-positioning or edge-positioning system)

The sensitivity of the PCB detection sensor attached to the conveyor varies depending on the material, color, and thickness of the PCB.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Loosen the bolt securing the sensor bracket in Fig.8-13. Then loosen the M3 bolt holding the sensor to the bracket. 2. Move the sensor bracket itself up and down, tilting the sensor this way and that way with the bolt at the center, or move the sensor up and down along the long hole in the bracket, as if detecting the PCB. Tighten the bolts. 	<ul style="list-style-type: none"> • Make sure the detecting surface (the top surface) of the sensor is kept clean. • If the PCB is particularly hard to detect, use a magic marker to color the bottom of it, or affix seals to the board to make it easier to detect.

Fig. 8-13
PCB Detection
Sensor



3) Adjusting the position and height of the PCB supporter (when using a pin-positioning system)

For each type of PCB being used, attaching marks (seals, magic marker, etc.) on the conveyor plate to indicate the positions of the supporters can make subsequent operations much easier.
There are two PCB supporters attached on the back of the conveyor frame (on the movable side). These serve to support the back end of the PCB from underneath. Their operation is synchronized to that of the locate pins.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Loosen the two bolts holding the PCB supporters in place. (see Fig. 8-10) 2. Slide each of the PCB supporters left and right until they are positioned approx. "the length of the PCB (L dimension) x 0.2" from the end of the PCB, and secure them at that position. (see Fig. 8-11) 3. Press the F3 key(LOCATE), and raise the supporter. 4. Adjust the height of the PCB supporters by raising the supporter and aligning the tip of the pin with the top surface of the topmost plate on the conveyor. (see Fig. 8-12) 	<ul style="list-style-type: none"> • If the magnet of the push-up pin is on the underside of the PCB supporter, it may cause interference. Make sure the magnet is not positioned under the PCB supporter.

Fig. 8-10
PCB
Supporter

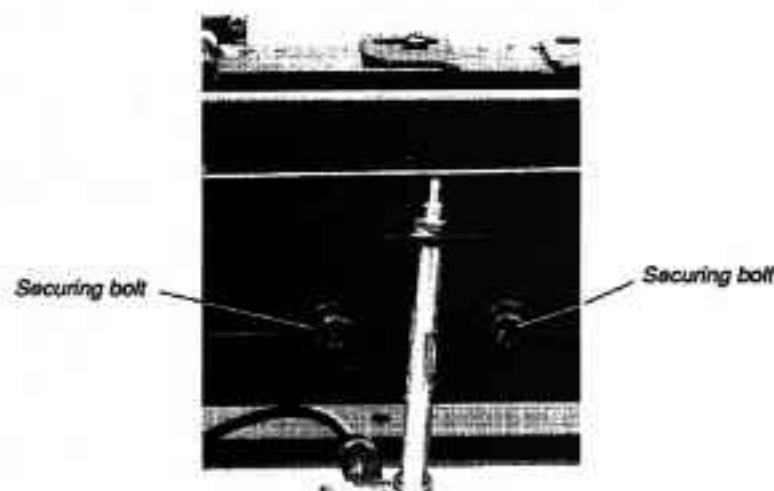
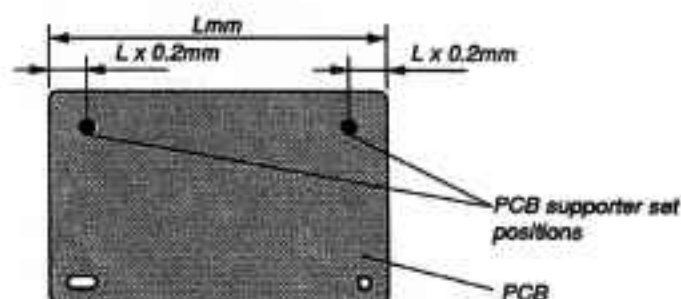


Fig. 8-11
View of PCB
From Above

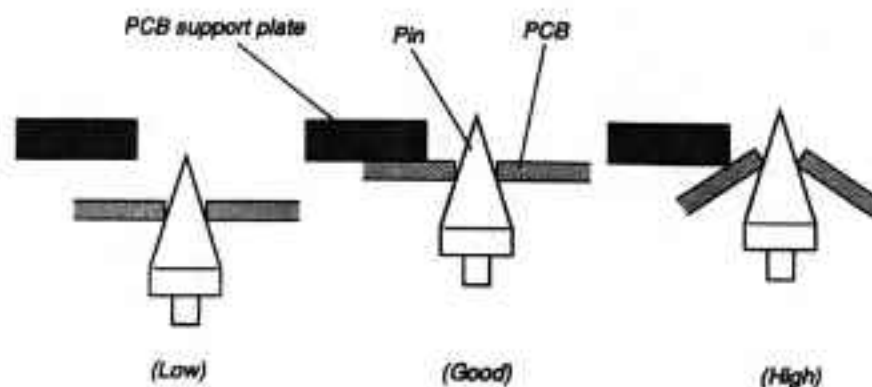


B. Adjusting the height of the locate pin

The height of the locate pin is adjusted to fit a PCB with a thickness of 1.6 mm when the machine is shipped from the factory. If the PCBs being used are thinner or thicker than this value, use the procedure below to adjust the height of the pin.

Work Content	Confirmation and Reference
1. Loosen the screws securing both the movable and fixed locate pins (see Fig. 8-8).	<ul style="list-style-type: none"> Press the F3 (LOCATE) key on page 1 several times, making sure each time that the pin of the locate pin fits into the positioning hole in the PCB, and that the PCB is held securely in position. If the pins are too low, it will be impossible to position the PCB correctly, resulting in mounting defects. If the pins are too high, the PCB could be damaged, or could warp.
2. Press the F2 (M-STP.) key on page 1 to raise the main stopper.	
3. Set a PCB on the conveyor and bring it up against the main stopper.	
4. Press the F3 (LOCATE) key on page 1 to raise the locate pin.	
5. Pull both pins (by the crown-shaped part) upwards by hand, and fit them into the positioning hole in the PCB. Then lift up both pins again, until the top surface of the PCB is in contact with the bottom of the PCB support plate (explained later), and tighten the securing screws.	

Fig. 8-9
Height of the
Locate Pin



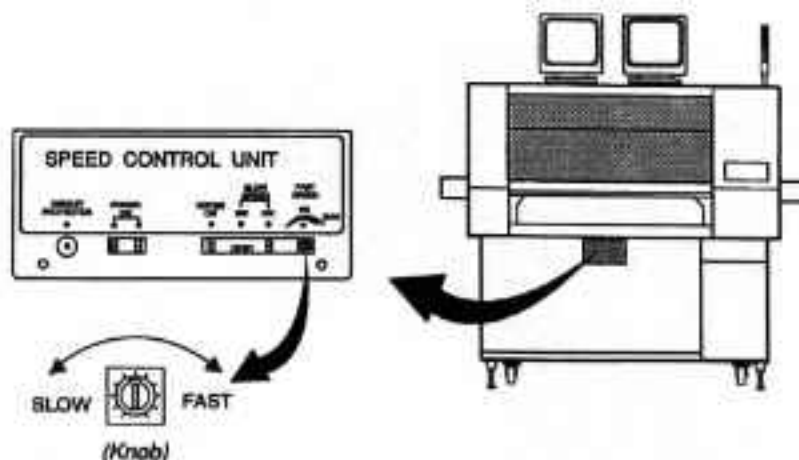
2) High-speed soft stop conveyor

If there are parts which have not yet been secured in place resting on the PCB as it comes down the conveyor, these electronic components may be shaken out of position or fall over when the PCB hits the main stopper.

Using a soft stop conveyor brings the PCB gently up against the main stopper, avoiding the impact that can disturb the positioning of the components. The transport speed can also be increased to almost twice the usual speed.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. In "Explanation 5" the method for selecting the PCB to be produced was described. The same method is used to load the "CONVEYOR" data. 2. Set a PCB at the conveyor entrance. 3. On the "RUNNING" screen, press the RUN key. Using the knob shown in Fig. 8-20, adjust the speed at which the PCB is transported, so that it slows down once it has passed the work position PCB detection sensor, and bring it to a gentle stop against the stopper. Turning the knob in the clockwise direction increases the transport speed, while turning it counterclockwise slows down the transport speed. 	<ul style="list-style-type: none"> • If it does not matter that the PCB sustains a jolt when it hits the stopper, turn the knob all the way in the clockwise direction. • When the knob is turned counterclockwise to slow the speed, there may be times when the locate pin does not fit smoothly into the positioning hole in the PCB. Adjust the speed carefully to prevent this situation. • A distance of about 45 mm is necessary from the main stopper to the sensor. • The usual position of the knob varies depending on the AC power supply frequency (50 Hz or 60 Hz). (See Fig. 8-21.)

Fig. 8-20
High-speed Soft
Stop Conveyor

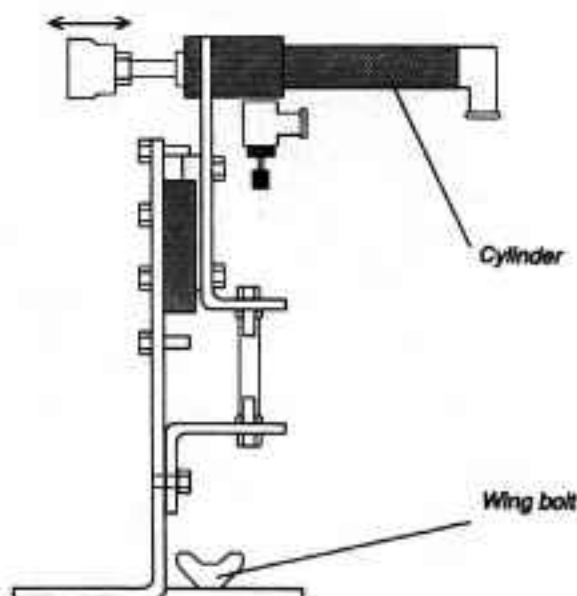


8) Adjusting the PCB push-in (when using an edge-positioning system)

The PCB push-in presses the PCB, supported by the push-up, against the main stopper and positions it in the left and right directions.

Work Content	Confirmation and Reference
1. Press the F2 (M-STP.) key on page 1, and raise the main stopper.	<ul style="list-style-type: none"> • If the PCB push-in is brought too close to the main stopper, the PCB will warp. • If the PCB push-in is not pressing against the PCB with the proper amount of force, the PCB will not be positioned correctly. Make sure the amount of pressure is appropriate.
2. Set a PCB on the conveyor belt and bring it up against the main stopper.	
3. Press the F3 (PUSH UP) key on page 2, and raise the PCB push-up.	
4. On the PCB push-up plate there is one wing bolt holding the PCB push-in in place. Remove this bolt.	
5. Press the F2 (PUSH IN) key on page 3 to make the PCB push-in protrude.	
6. With the PCB held by the main stopper, press on it and tighten the wing bolt.	

Fig. 8-19
PCB Push-In



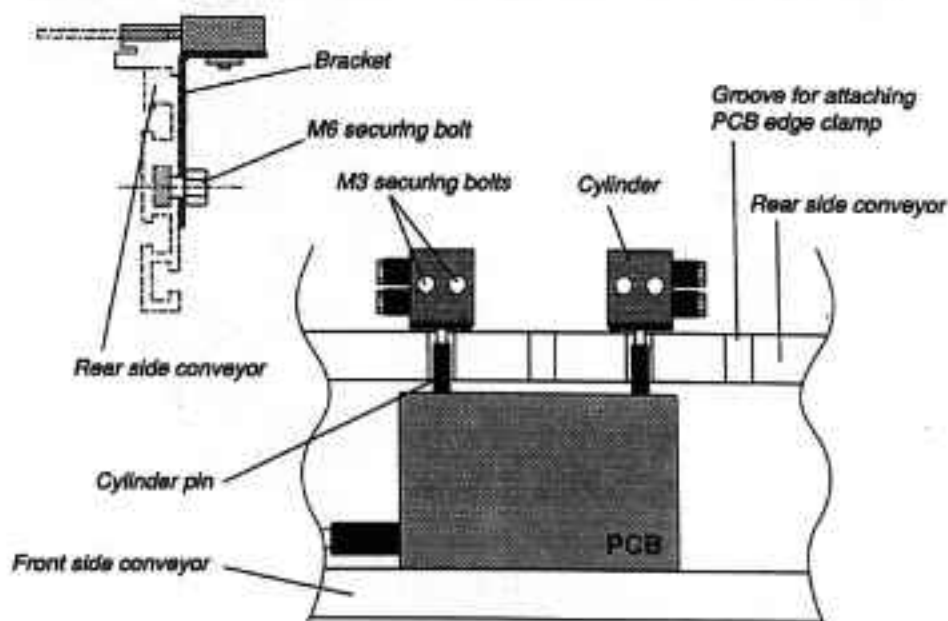
7) Adjusting the PCB edge clamps (when using an edge-positioning system)

The PCB edge clamp is pressed onto the front edge of a PCB which is supported by a push-up, and is used to position the PCB in the front/back direction. Two clamps make up one set.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Remove the M6 bolt holding the PCB edge clamp in place (Fig. 8-17). 2. There are several places where the clamps are attached. The clamps should be matched to the size of the PCB and then attached at positions which support both ends of the board (Fig. 8-18). 3. Tighten the M6 bolt. 4. The PCB edge clamp cylinder is secured to the bracket by two M3 bolts. If these two M3 bolts are loosened, the position of the cylinder can be adjusted slightly in the front/back direction. As a guide, the position of the projecting ends of the pins at the tips of the cylinder should match the positions of the two PCB edge clamps. 	<ul style="list-style-type: none"> • Press the F4 (CLAMP) key on page 2 several times, and make sure the clamp moves smoothly, without catching partway through its stroke. • Press the F2 (M-STP) key on page 1 to raise the main stopper and bring it into contact with the PCB. Then press the F4 (CLAMP) key on page 2, and make sure the PCB is pressing evenly against the conveyor at the front (the fixed side). If one side is pressed more strongly than the other, the PCB will be slanted instead of straight on the conveyor. Then make sure the conveyor on the back side (the movable side) is not bent excessively or slanted. The amount of slanting should be reduced even if the conveyor width is widened slightly.

Fig. 8-17
PCB Edge
Clamp

Fig. 8-18
PCB Edge
Clamp
Position



Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Press the F2 (M-STP.) key on page 1 to raise the main stopper. 2. Set a PCB on the conveyor belt, and bring it up against the main stopper. 3. The pins are held against the plate by means of magnets. They can be moved to provide the appropriate support in terms of the shape and size of the PCB being used. 4. Press the F3 (PUSH UP) key on page 2, and raise the push-up. 5. Loosen the wing nuts attached to the push-up, and rotate the pin shaft to adjust the height. Set the pin shaft rather low at first, and then rotate it to gradually increase the height. When the top surface of the PCB comes in contact with the underside of the PCB support plate, tighten the wing nuts to secure the position. 	<ul style="list-style-type: none"> • There is very little downward warp with thick, strong PCBs or small PCBs, so it is not particularly necessary to use push-ups (when using a pin-positioning system). • After adjustment is finished, tap lightly on the PCB from above, and check from the side to see how much the PCB flexes. If there is very little warp, and support is being provided evenly, press the F3 (PUSH UP) key on page 2 several times, and see if any pins fall over or if any other problems develop. • The push-up plate is designed to be removable (it is held in place by the two wing nuts), so the plate can be replaced as a single unit. If several plates are kept ready, and adhesive is used to secure the plate with pins that match the PCB, all of the plates can be replaced when the setup is done. This makes the operation much more efficient.

 NOTE

If the magnet of the push-up pin is on the underside of the PCB supporter, it may cause interference. Make sure the magnet is not positioned under the PCB supporter.

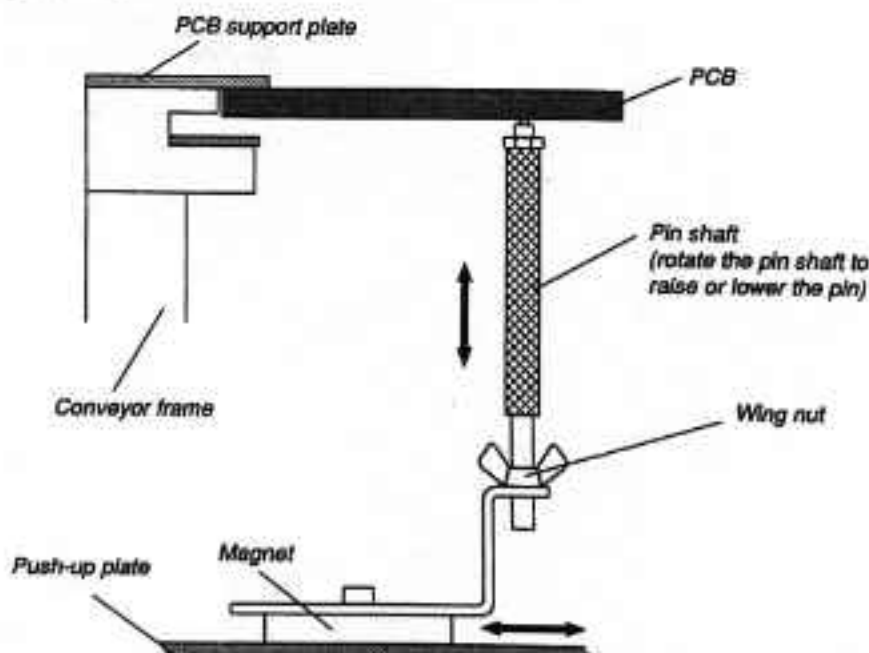


Fig. 8-16
Push-up Pins

Fig. 8-25
Tape Channel
for 12 mm,
16 mm, and
24 mm
Air-driven
Feeders

*Fold down top
tapes of this
area. (Except
12mm feeder)*

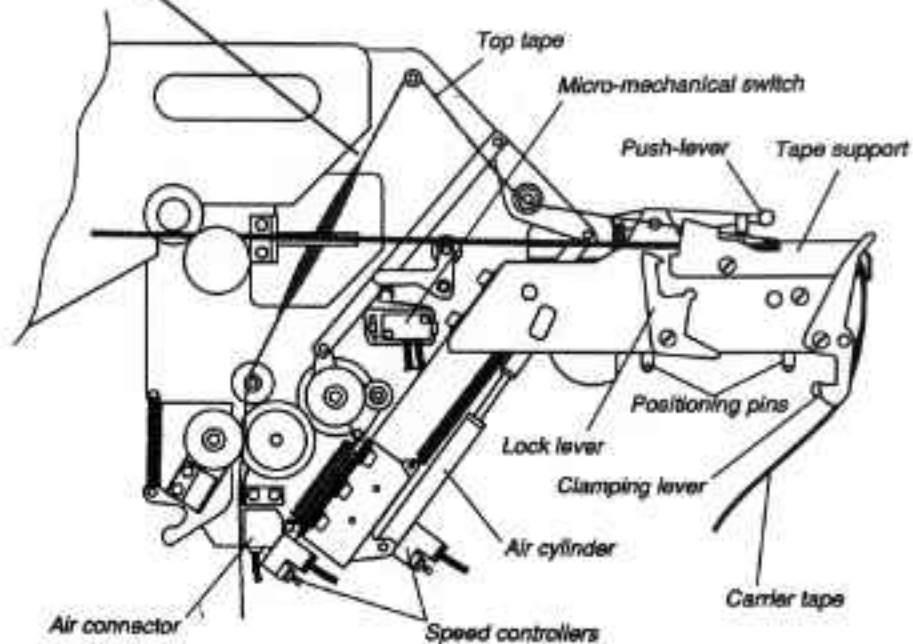
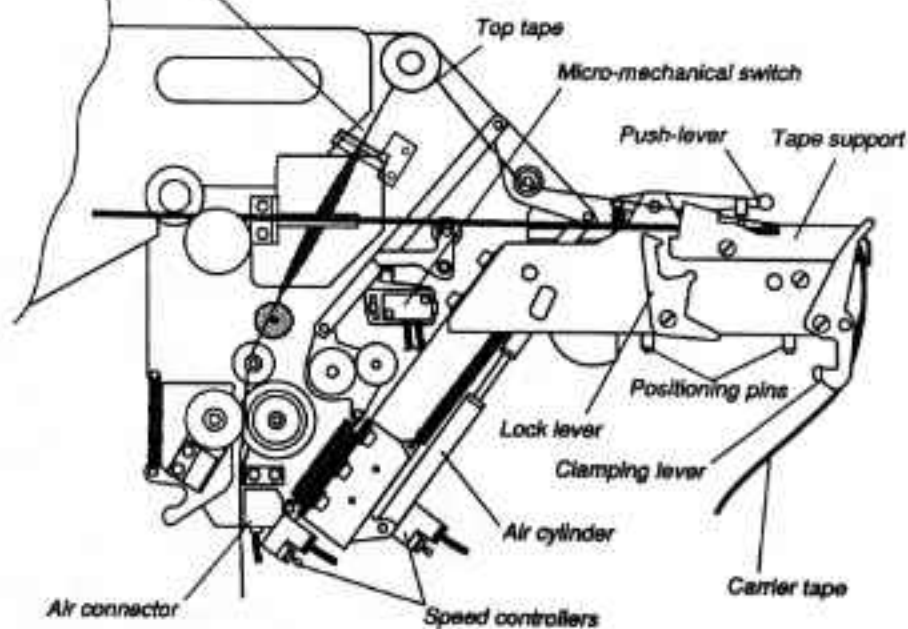


Fig. 8-26
Tape Channel
for 32 mm
and 44 mm
Embossed
Air-driven
Feeders

*Fold down top
tapes of this
area.*



The feeders shown below are the /SF feeders.

Fig. 8-23
Mounting and
Removing
Feeders

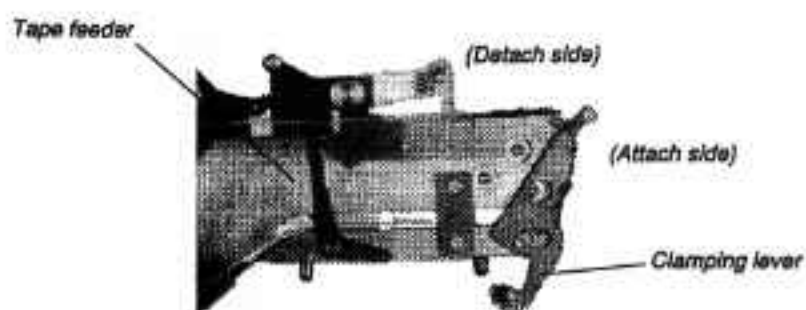
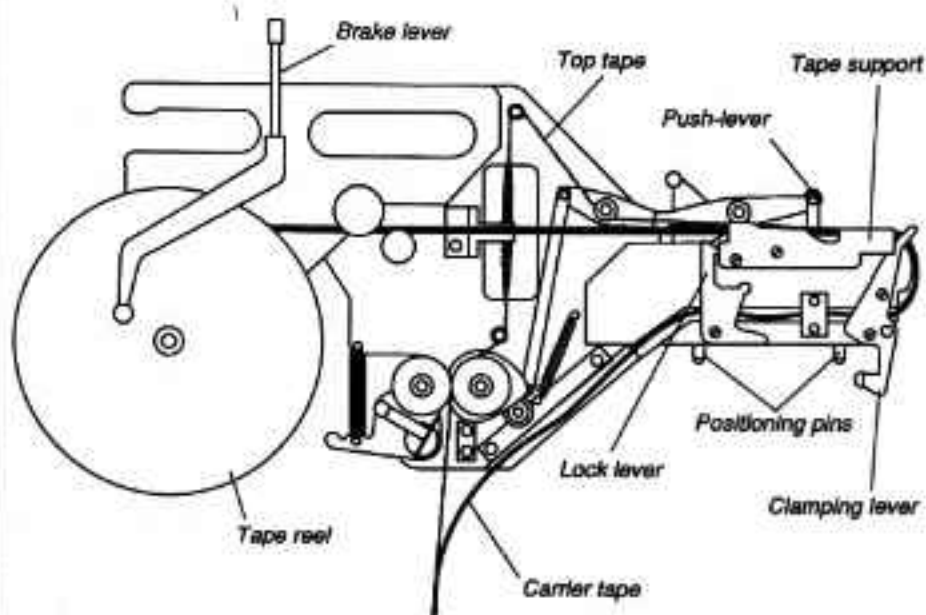


Fig. 8-24
Tape feeder for
8mm and
12mm
Mechanically-
driven Feeders





(2) Changing the feeder setup

The feeder plate on which feeders are mounted is designed as a replaceable unit (a feeder-set exchange trolley is also available for even greater convenience). If a separate feeder plate is prepared in advance, and feeders with tape reels already attached are mounted on the plate, the time required for changing setups can be greatly reduced. It is also recommended that a chart be drawn up, showing what kinds of feeders are attached to what PCBs, at what positions, for easy reference.

WHEN CHANGING THE FEEDER SETUP, ALWAYS TURN OFF THE POWER SUPPLY OR PRESS THE EMERGENCY STOP BUTTON FIRST.

1) 8/12 mm mechanically-driven, 12/16/24 mm air-driven, and 32/44 mm embossed air-driven tape feeders

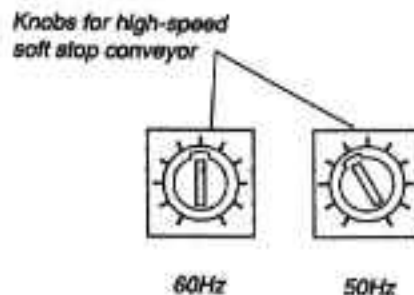
A. Replacing tape reels

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Tape feeders are attached to and removed from the feeder plate by moving the clamping lever in Fig. 8-23. 2. When mounting a tape reel on a tape feeder, follow the tape channels shown in Figs. 8-24 to 8-26. Have the tape support raised up ahead of time (release the lock lever), and peel off the carrier tape with the top tape that has the electronic components on it (the transparent tape) for easier exchanges. 3. 16-44 mm tape feeders have a line indicating the pickup position, shown in Fig. 8-27. Set the tape so that the centers of the electronic parts are lined up with this line, lower the tape support, and hook it. 	<ul style="list-style-type: none"> • Before mounting the tape reel on the tape feeder, check all of the mechanical parts of the tape feeder to make sure there are no electronic components adhering to it, or any dirt or grime. • When the tape reel has been mounted, press the push-lever several times to make sure the electronic components are fed precisely and regularly each time. (8 mm and 12 mm mechanically-driven tape feeders) • Before mounting tape feeders on the feeder plate, check to make sure there are no electronic components or dirt and grime on the feeder plate. • It is important that the feeder sprockets (gears with sharply-angled teeth) fit securely into the feed holes in the carrier tape.



Make sure feeders are attached securely to the feeder plate. If they come off, they could impact against the head.
Check to see that the tape support is securely hooked on the feeder plate. If it comes off, it could impact against the head.

Fig. 8-21
Usual Knob
Positions



10) Adjusting the position of the sub-stopper (standby stopper) (option)

The sub-stopper is positioned partway down the conveyor to hold one PCB in standby status while another is being mounted. This serves to shorten the cycle time for transporting PCBs.

With small PCBs, positioning the sub-stopper closer to the main stopper reduces the cycle time even further. The sub-stopper is secured to the conveyor with two M6 bolts, and can be moved by loosening these bolts. The standby sensor moves along with the sub-stopper. Do not position the sensor too far away from sub-stopper ($\approx 30-40$ mm).

Fig. 8-22
Sub-stopper

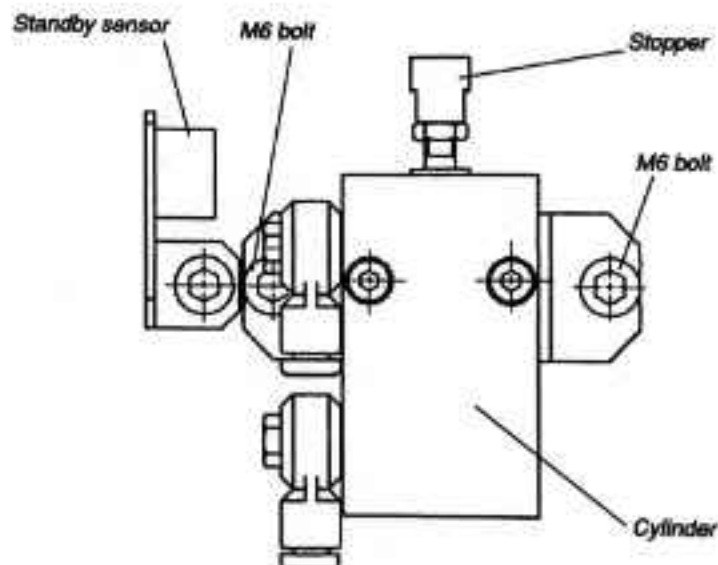


Fig. 8-32
Air Piping

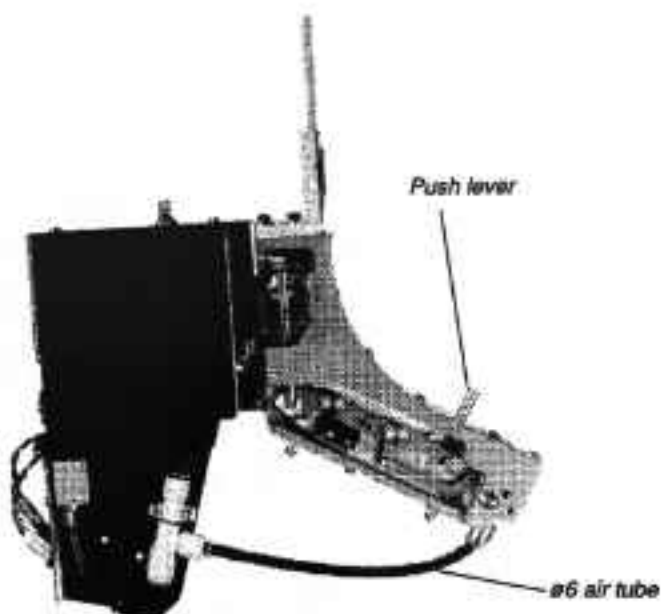
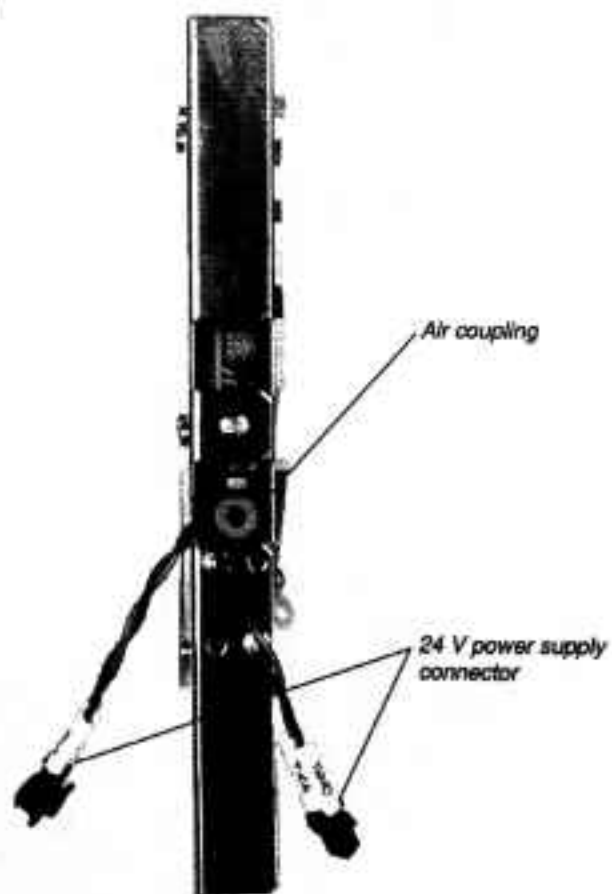


Fig. 8-33
Air and Power
Supplies



(Back of stick feeder)

3) Air driven stick feeders

A. Mounting stick feeders

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Stick feeders are attached to and removed from the feeder plate by moving the clamping lever shown in Fig. 8-23. 2. As shown in Fig. 8-32, pass a $\varnothing 6$ air tube under the bottom of the feeder plate and connect it to the attached stick feeder. 3. There is an air tube with an air coupling (on the plug side) coming from the back of the stick feeder, as shown in Fig. 8-33. Join this coupling with the socket shown in Fig. 8-29 to supply air. 4. To supply power, there is a 24 V power supply connector coming from the back of the stick feeder, as shown in Fig. 8-33. Connect this to the 24 V power supply connector coming from the bottom of the feeder plate on the main unit of the machine. 	<ul style="list-style-type: none"> • Before mounting stick feeders on the feeder plate, check to make sure there are no electrical components or dirt on the feeder plate.

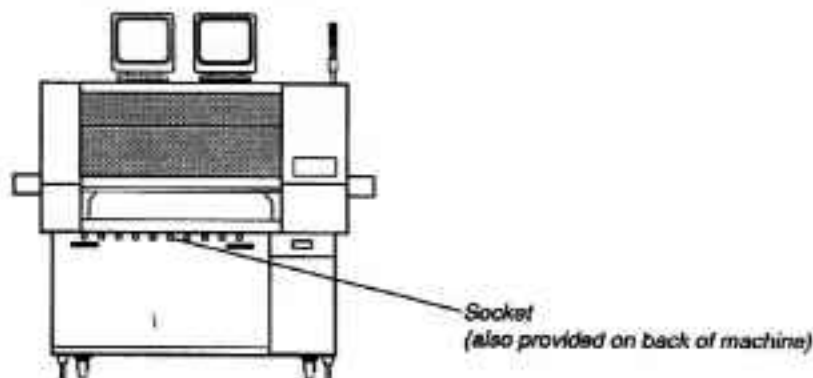


Make sure feeders are attached securely to the feeder plate. If they come off, they could impact against the head.

C. Supplying air to air-driven feeders

Work Content	Confirmation and Reference
1. There is an air tube with an air coupling on the tip (plug side) coming from the air-driven feeder. Join this plug with the socket on the main unit of the machine, as shown in Fig. 8-29, to supply air.	<ul style="list-style-type: none">Press the push-lever of the air-driven tape feeder several times, to make sure the electronic components are fed correctly each time, to the correct position.

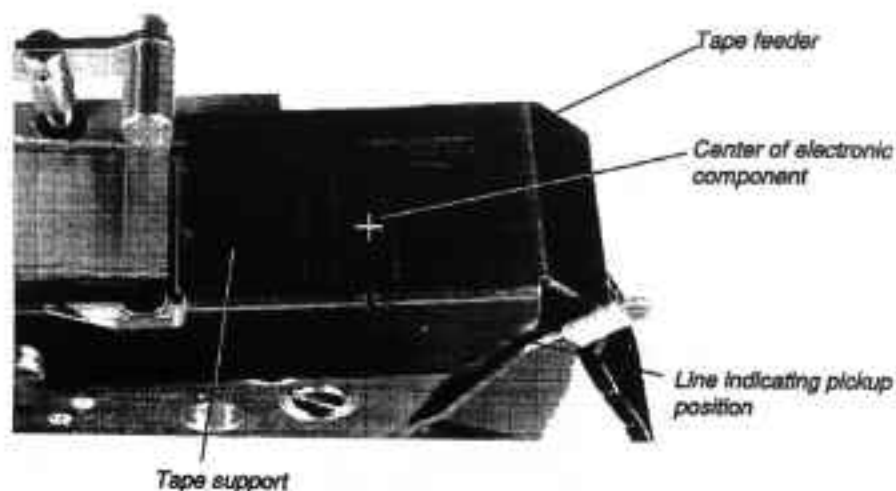
Fig. 8-29
Air Coupling



2) Gravity stick feeders

Please use as reference the FCO 1073 which explains the adjustments of the GSF.

Fig. 8-27
Pickup Position
and Center of
Electronic
Components



B. Adjusting the tape feed pitch for air-driven feeders

Depending on the type of tape, there are various pitches at which electronic components are fed. With air-driven feeders, changing the position at which the cylinder is attached will change the pitch at which the electronic components are supplied.

Work Content	Confirmation and Reference
1. Loosen the two screws indicated in Fig. 8-28.	<ul style="list-style-type: none"> Before changing the feed pitch, check the pitch of the tape reel.
2. Align the section showing the number of pitches with the desired pitch.	
3. Tighten the two screws which were loosened.	

Fig. 8-28
Feed Pitch
Adjustment
Section

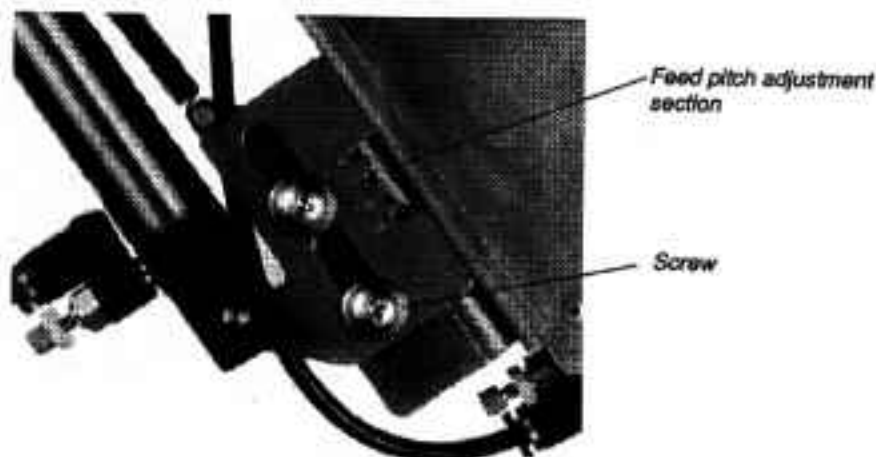


Fig. 8-40
Tray Layout

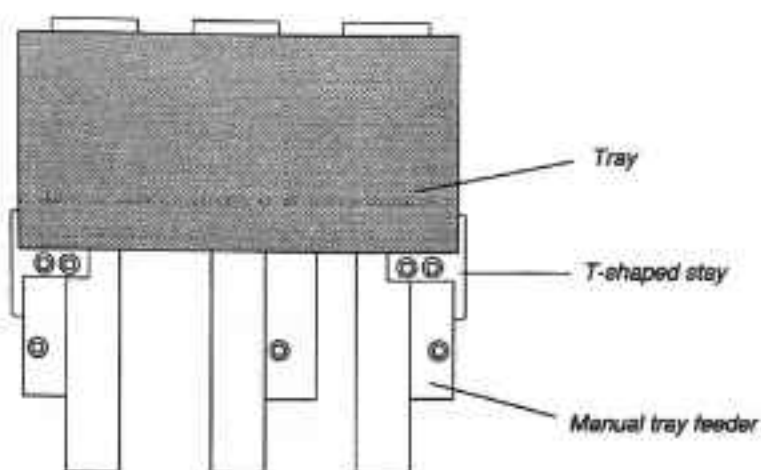


Fig. 8-41
Securing the Attachment

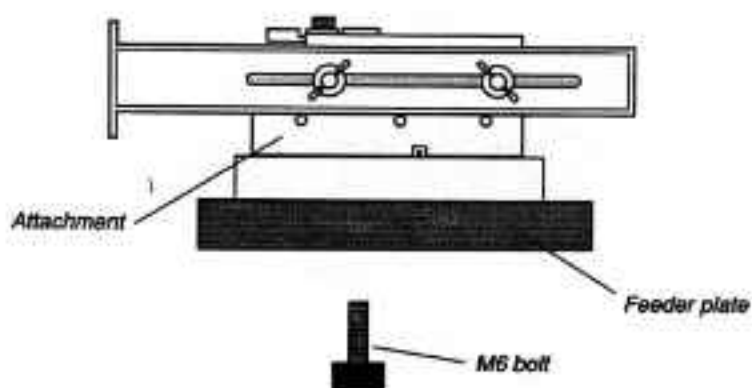


Fig. 8-42
Securing the Tray in the Front/Back Direction

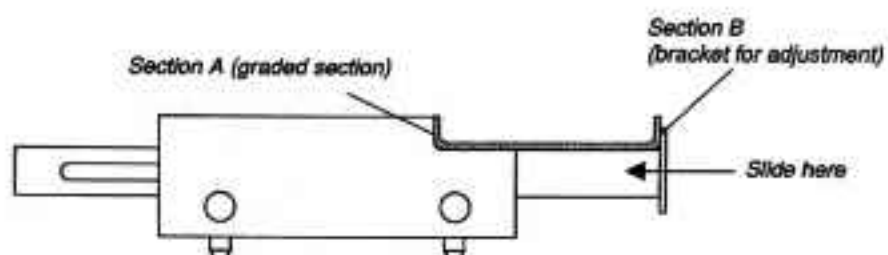
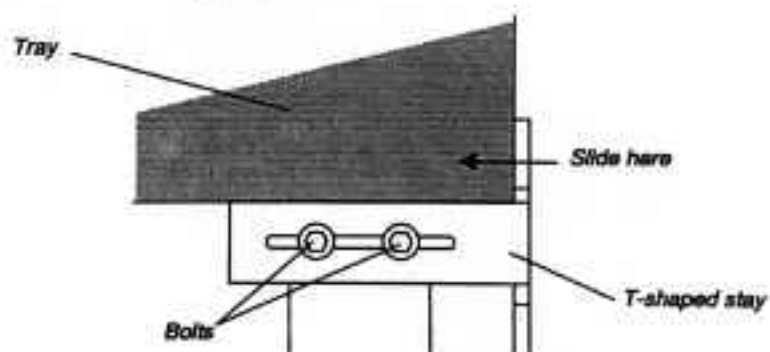


Fig. 8-43
Securing the Tray in the Left/Right Direction



4) Mounting manual tray feeders

Mount the attachment for securing the manual tray feeder on the feeder plate at the back of the main unit of the machine. Then set a tray containing electronic components in position and secure it so that the components can be supplied.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Align the knockpins for positioning the manual tray feeder with the holes in the feeder plate, and fit the manual tray feeder into position. 2. As shown in Fig. 8-40, arrange the left end, center, and right end of the tray on a feeder plate which is the appropriate size for the tray. 3. Secure the attachment from the underside of the feeder plate, by tightening the M6 bolt. (See Fig. 8-41.) 4. To secure the front and back ends of the tray, leave Section A (the graded section) up against the tray, as shown in Fig. 8-42, and slide Section B (the bracket for adjustment) along the long hole to position the tray accurately. 5. To secure the left and right directions of the tray, slide the T-shaped stay shown in Fig. 8-43, so that the tray is caught between the stay and the bracket. 	<ul style="list-style-type: none"> • Tapping the tray lightly, look at it from the side and adjust it so there is no looseness or bending.

Fig. 8-39
External
Diagram of
Manual Tray
Feeder

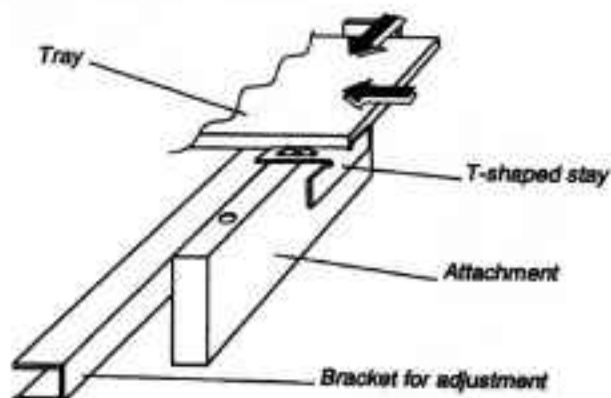
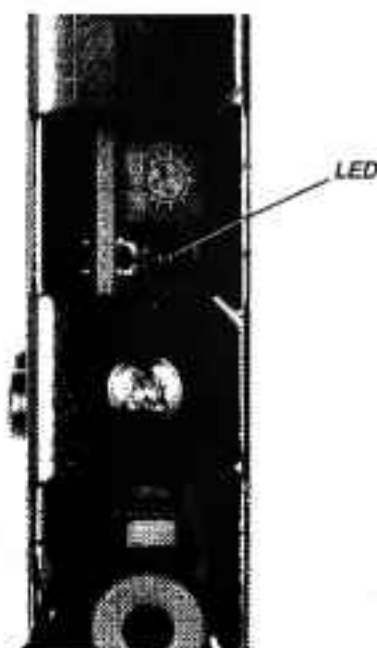


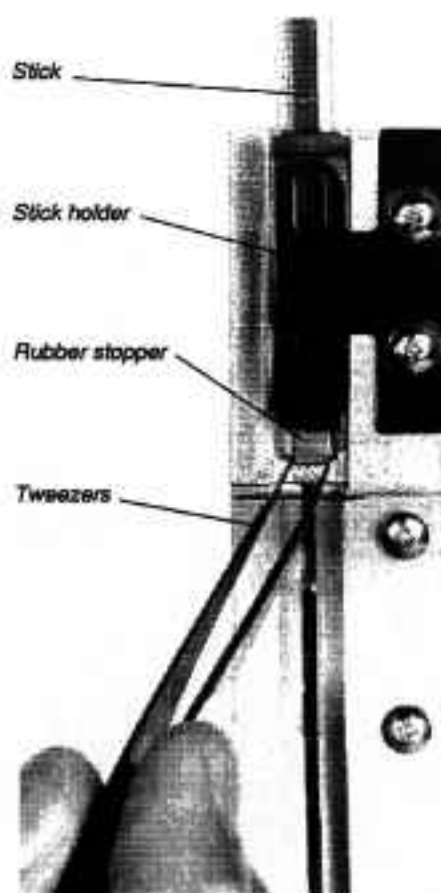
Fig. 8-35
Diagram of
Back of Stick
Feeder



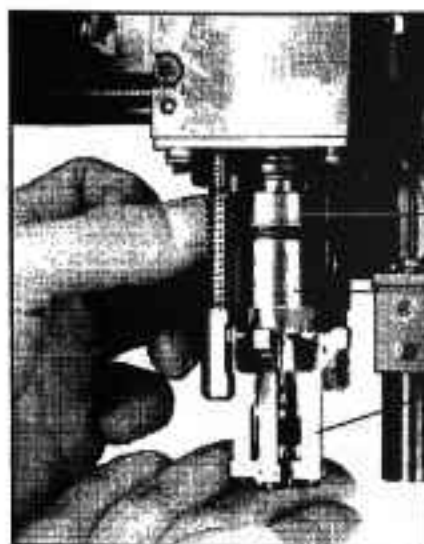
B. Mounting sticks

Work Content	Confirmation and Reference
1. Insert the stick into the stick holder at the top of the stick feeder.	<ul style="list-style-type: none">• Turn on the main power supply to the mounter. Press the push-lever and check to make sure that electronic components flow smoothly from the stick to the pickup position.
2. When the stick has been inserted all the way into the holder, return it about 5 mm. Then, using tweezers, remove the rubber stopper that keeps the electronic components in the stick.	<ul style="list-style-type: none">• Make sure that the LED shown in Fig. 8-35 lights when the push-lever is pressed.
3. Insert the stick all the way into the holder.	

Fig. 8-34
Stick Mounting



Lower the
ring chuck



Ring chuck

Chuck assembly

Arm

Pull down
to remove



Shaft



Fig. 8-46

Attaching
and
Removing
the Chuck
Assembly

A. Replacing the chuck assembly (with jaws)

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. With the ring chuck shown in Fig. 8-46 lowered, spread the four arms slightly apart. 2. With the unit positioned as in Step 1, pull the chuck assembly slowly downwards to remove it. 3. Slide the new chuck assembly onto the shaft of the head unit. If the assembly catches partway along the shaft, trying spreading all four of the arms open a little wider. 4. Line up the positioning key of the chuck assembly with the Key way section of the head, and press the chuck assembly all the way to the back to attach it. (The Key way section with which the key is aligned should be positioned so that, when the rotation angle of the R axis is 0, the Key way section is at the back when viewed from the front of the machine.) 	<ul style="list-style-type: none"> • When attaching the chuck assembly to the head, always make sure there is a wave washer in the center of the chuck assembly. • After attaching the assembly, pull it downwards to make sure it will not come off. • Check whether or not the inner sleeve of the chuck assembly is positioned correctly in relation to the outer sleeve, allowing the arms to move (Fig. 8-47). • Press the F1 (H1, 2, 3 DOWN) keys on screen 4, 5, and 6 several times, to make sure the four arms open and close properly.



There are three different types of chuck assemblies, grouped as Types AA, AB and HI; Types FG c.d. and Type GJ d. The shape of the arms is different for each group.



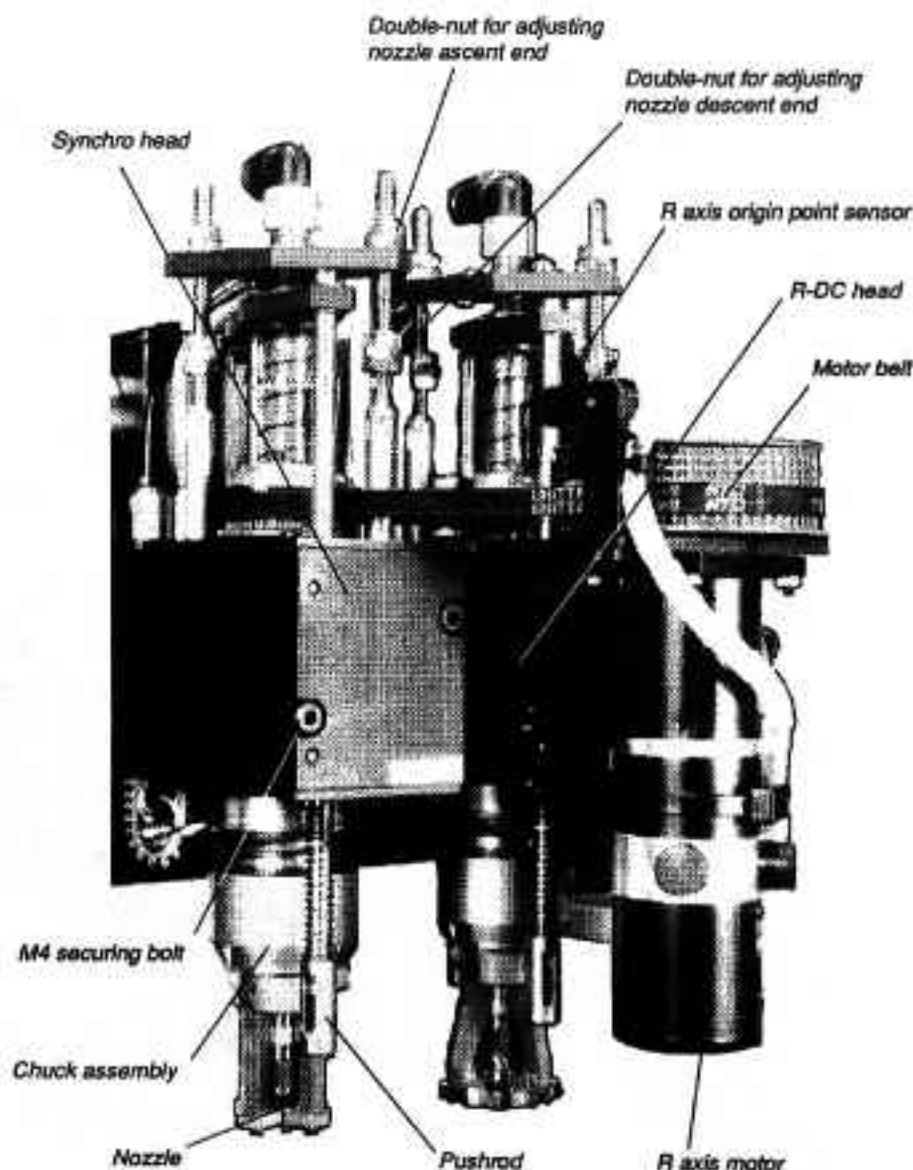
(3) Changing the setup of the heads

WHEN CHANGING THE SETUP OF THE HEADS, ALWAYS TURN OFF THE POWER SUPPLY OR PRESS THE EMERGENCY STOP BUTTON FIRST.

1) R-DC and synchro heads

The nozzle and chuck assembly (with jaws) of the R-DC and synchro heads is designed to be attached and removed at a single touch. Consequently, by substituting different models (Types AA-GJ), completely different electronic components can be mounted simply by carrying out a few adjustments.

Fig. 8-45
External
Diagram of
R-DC and
Synchro
Heads

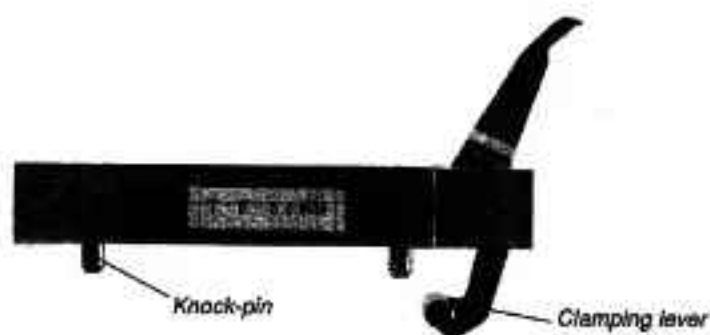


5) Feeder raising plate

The feeder raising plate can be attached to the bottom (tape feeders, stick feeders, and manual tray feeders) of the CSM46/60/60V feeders, in order to use them on the CSM66/84/84V/84VZ systems.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Attach the feeders of the CSM 60/60V Series to the raising plate. This is done by lining up the knockpins in the feeders with the knock holes in the raising plate. Then insert a hex screwdriver in the head of the one-touch securing pin and, while pressing downwards with the screwdriver, turn it 90° to lock the feeder in position. 2. Align the knockpins in the raising plate with the knock holes in the feeder plate, and hook the clamping lever over the feeder plate. 	<ul style="list-style-type: none"> • There are different types of feeder raising plates for the different kinds of feeders. • The raising feeder has a seal affixed to its side, which indicates the type of feeder for which the plate is designed.

Fig. 8-44
Feeder
Raising Plate



C. Changing to the desired type (nozzle and jaw type)

To change the R-DC and synchro heads to the desired type, first replace the nozzle and chuck assembly with the desired type, following the procedures outlined in Sections A and B above. When changing between Type ABb and ABc, only the nozzle is changed, while when changing between Type FGd and GJd, only the chuck is changed. For other types, both the nozzle and chuck assembly are changed. Following that, make the adjustments described below.

- a. Jaw adjustment
- b. Adjusting the nozzle ascent end

When changing within Types AAa, ABb, ABc and Hlg (for example, changing from Type ABb to Type AAa), and when changing within Types Hlg, FGc, FGd, and GJd (for example, changing from Type FGc to Type Hlg), the adjustments listed under "a. Jaw adjustment" are required.

When changing between Types AAa, ABb, and ABc, and Types FGc, FGd, and GJd (for example, changing from Type FGc to Type ABb), the adjustments listed under "b. Adjusting the nozzle ascent end" must first be carried out, and then the adjustments listed under "a. Jaw adjustment" should be made.



NOTE

1. A variety of different types of jaws can be purchased, and the jaws adjusted each time the setup is changed, but this results in a significant amount of time being wasted. It is much more convenient and efficient to purchase one or two separate chuck assemblies, and adjust the jaws only once, the first time the assembly is used. Following that, the chuck assembly itself can be replaced when necessary.
2. Changing between Types AAa, ABb, and ABc, and Types FGc, FGd, and GJd is not highly recommended. This is because the ascent end of the nozzle must be adjusted each time the setup is changed. The adjustment of the nozzle ascent end is particularly difficult when changing from Types FGc, FGd, and GJd to Types AAa, ABb, and ABc, and the process is very time-consuming.
3. The adjustment allowance for each part of the R-DC and synchro heads is designed as an analog configuration. In this way, the system can handle all kinds of electronic components from all over the world.

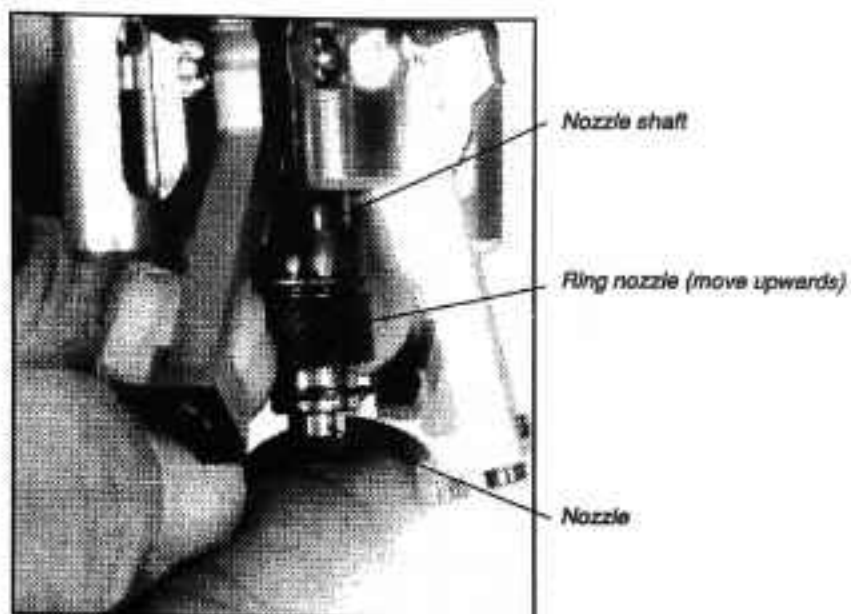
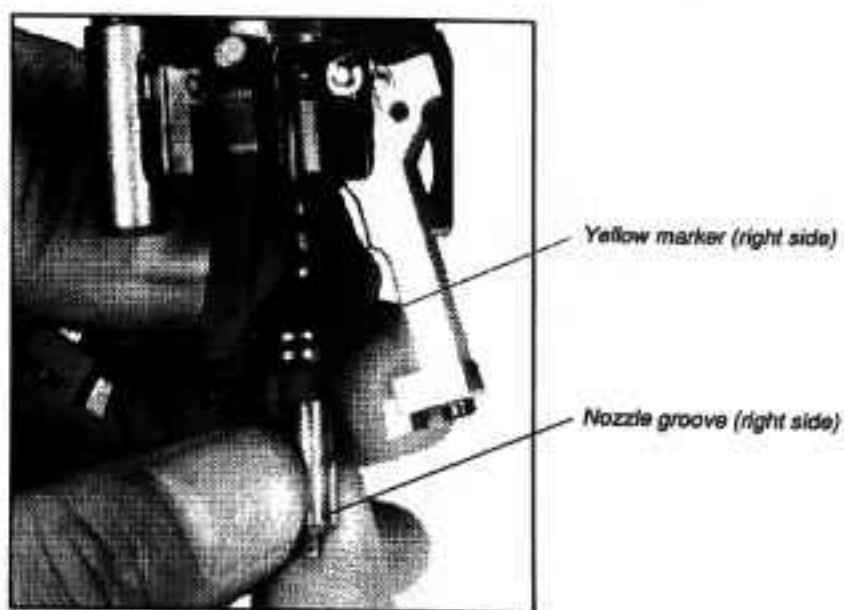


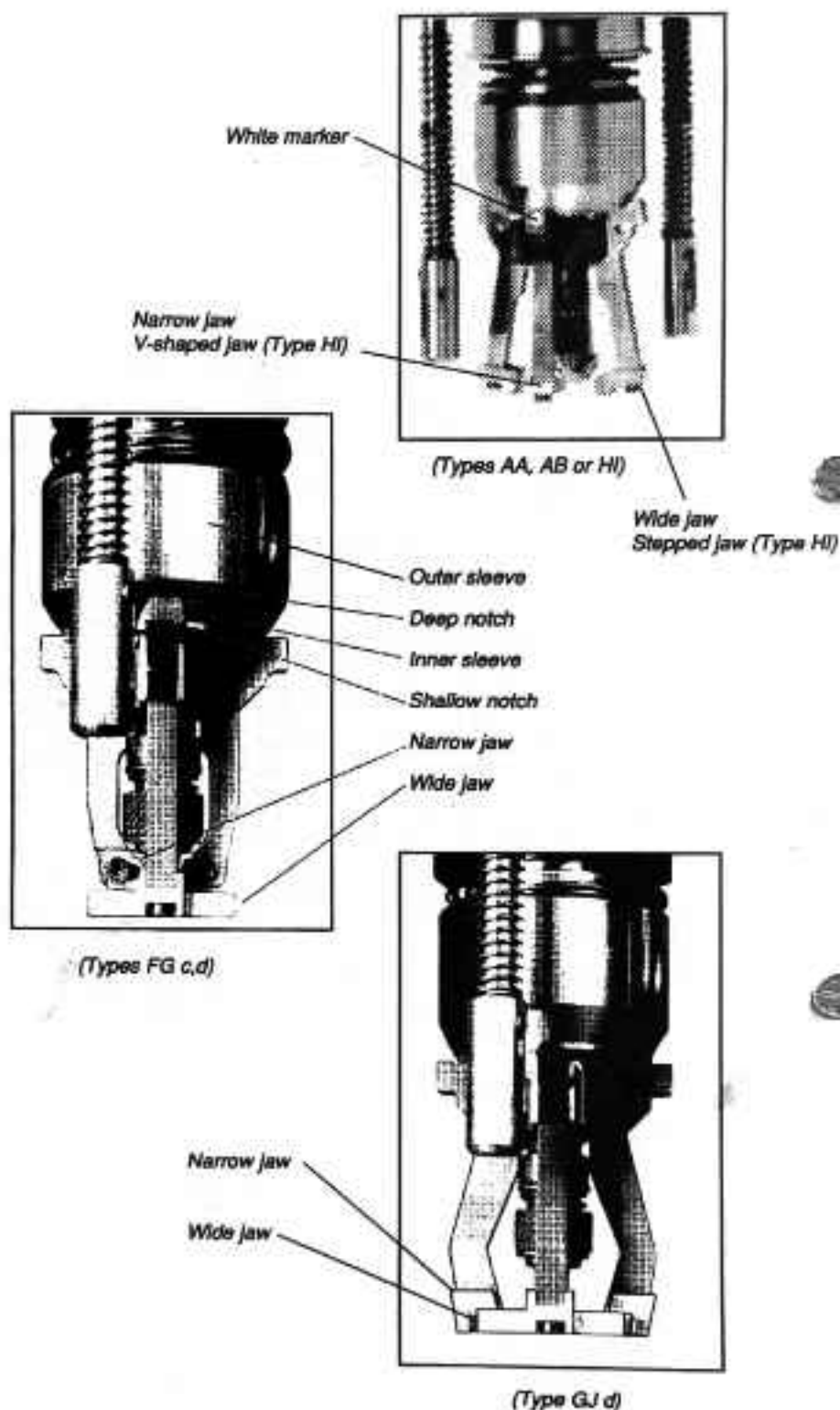
Fig. 8-48
Attaching and
Removing
Nozzles



B. Replacing nozzles

Work Content	Confirmation and Reference
<ol style="list-style-type: none">1. Supporting the nozzle with a finger, move the ring nozzle upwards to remove it.2. When attaching a different nozzle, move the ring nozzle upwards and align the nozzle groove with the yellow marker on the nozzle shaft. Then fit the nozzle onto the nozzle shaft. (The yellow marker on the nozzle shaft should be on the right side when viewed from the front, when the rotation angle of the R axis is set to 0 degrees.)3. With the nozzle inserted all the way to the back, return the ring nozzle to its original position.	<ul style="list-style-type: none">• There is a spring inside the nozzle shaft (at the back of the nozzle). Be careful not to lose it.• If the nozzle cannot be attached properly, check to make sure it is facing the right direction.

Fig. 8-47
Positional
Relation
Between the
Inner Outer
Sleeves of the
Chuck
Assembly



If the sleeve is not pressing on the arm at the correct position, the arm will vibrate, making it impossible to center components correctly. There is also a danger of the arm bumping into the feeder or other parts.

Fig. 8-52
Creating Data

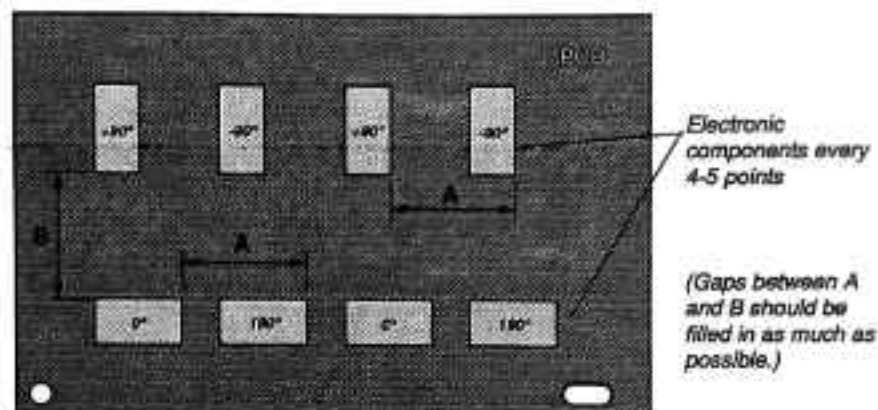


Fig. 8-53
Arm Numbers

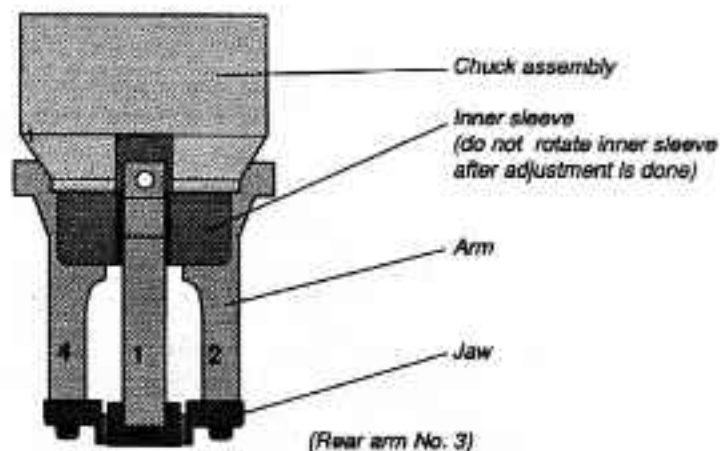
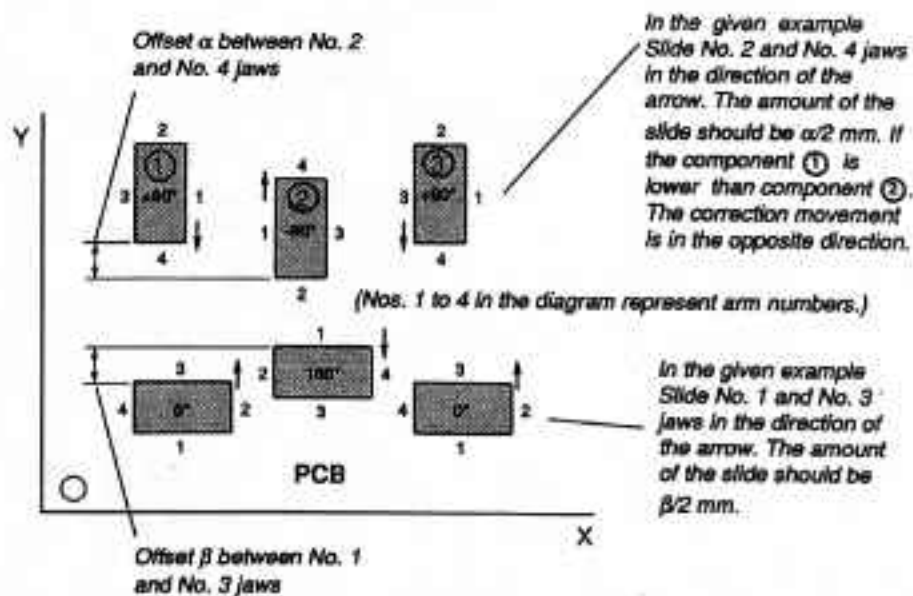


Fig. 8-54
Jaw Offset



The adjustments described above will basically provide the system with the ability to mount electronic components. However, the following fine adjustments should be carried out. Start when adjusting the ABb chuck, with the SOT 23 (the biggest component for that chuck) and check all other smaller components (down to 0603).

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Have one PCB ready, and affix double-sided tape to it. Set up the conveyor so that the PCB can be positioned. 2. Of the electronic components to be mounted, select the smallest component and mount the tape reel for that part (stick, tray, etc.) on the feeder. Then attach the feeder to the feeder plate. 3. Create data which will mount the electronic components at the correct positions on the PCB, mounting in the +X direction (from left to right) and repeating the movement from 0° to 180° and back (the rotation angle for the R axis). Then create data that will mount components in a repeated pattern of +90°, -90°. (See Fig. 8-52.) 4. Using a pencil, number the arms of the chuck assembly. With the rotation angle of the R axis at the 0° position, the front arm should be numbered 1, the arm at the right side 2, the arm at the back 3, and the arm at the left 4. (See Fig. 8-53.) 5. Begin mounting the electronic components. 6. Components will be mounted alternately from left to right, as shown in Fig. 8-54. 7. In Fig. 8-54, in the row mounted at 0° and 180°, the No. 1 and No. 3 jaws are offset, while in the row mounted at +90° and -90°, the No. 2 and No. 4 jaws are offset. 8. To eliminate the alternation between 0°/180° and +90°/-90° rows, slide the jaws little by little until the correct adjustment has been made. 	<ul style="list-style-type: none"> • Continue repeating the adjustment until the alternation seen in Fig. 8-54 has been eliminated. • When the adjustment has been completed, tighten the M2 bolts securely. • At the point where this adjustment has been completed, there may be some instances where the electronic component is not symmetrical in relation to the center of the nozzle. • For information on creating data, please refer to Chapter 3. • Make sure that the jaws are in parallel to each other.

Fig. 8-49
Jaw
Adjustment

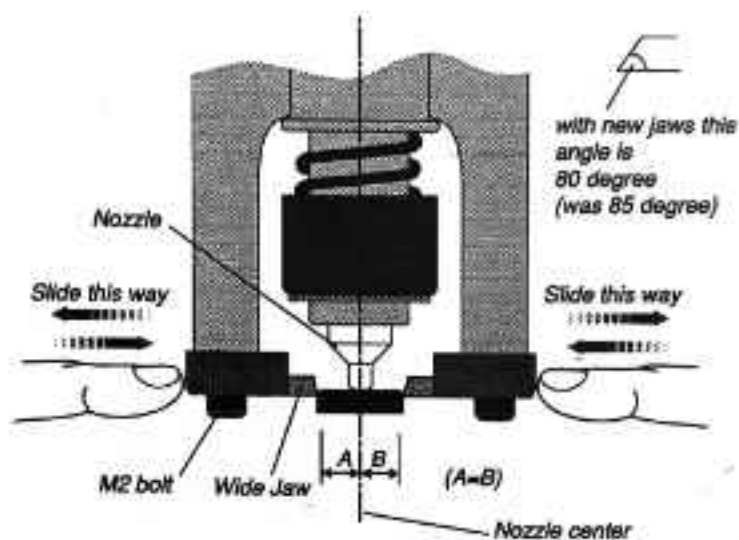


Fig. 8-50
Position for
Chucking
Electronic
Components

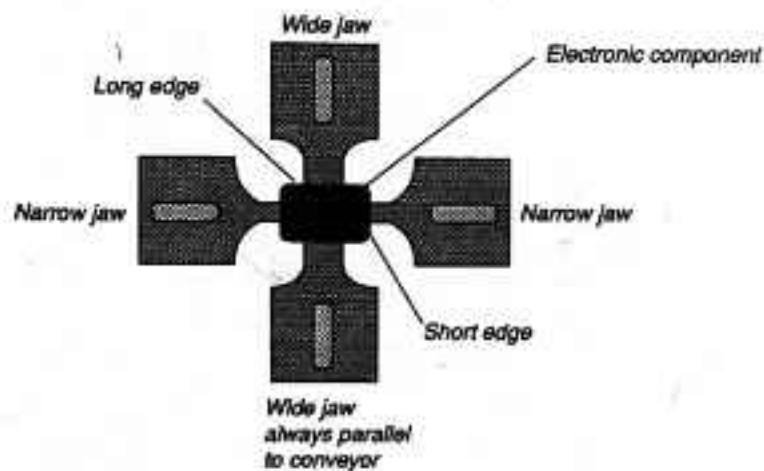
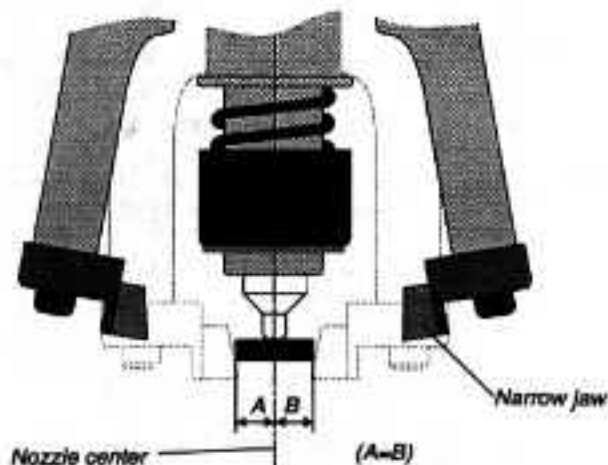


Fig. 8-51
Jaw
Adjustment



a. Jaw adjustment



NOTE

When the ascent end of the nozzle must be adjusted along with the jaws, refer first to "b. Adjusting the nozzle ascent end", and follow the procedure described in that section.

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> Before starting the jaw adjustment first check the head up-down speed with the speed utility program (the sound of the up/down going head must be like a 'running horse'). When the jaws have worn down and need to be replaced, remove the M2 bolts shown in Fig. 8-49, and attach the new jaws. Leave the M2 bolts loosened. Press the F3 (H1, 2, 3VAC) keys on screen 4, 5, and 6, to create a vacuum. Select the smallest of the electronic components to be mounted, and pick it up with the vacuum. Chucking should be done with the long edge of the component held by the wide jaws, and the short edge of the component held by the narrow jaws (Fig. 8-50). Visually inspecting the unit, slide the jaws with your finger until the electronic component being chucked is symmetrical in relation to the center of the nozzle, as shown in Fig. 8-49. When the component is largely symmetrical, tighten the M2 bolts temporarily. Press the F1 (H1, 2, 3DOWN) keys on screen 4, 5, and 6 two or three times to move the nozzle up and down. Adjust the jaws again by sliding them with your finger, so that the electronic component is positioned symmetrically to the nozzle center when the nozzle is either in the raised (chucking) position or the lowered position (see Figs. 8-49 and 8-51). Repeat the above steps to adjust all four of the jaws. 	<ul style="list-style-type: none"> When replacing jaws, make sure they are attached to the correct arm, as shown in Fig. 8-47. If the jaws wear down, the electronic components being mounted will be bent or crooked. If it is difficult to tell which side of the electronic component is the long side and which is the short side (for example, with aluminum electrolytic capacitors), pick up the components in the orientation at which they are supplied from the feeders, and chuck them in that position. If the jaws are adjusted using electronic components which are not shaped symmetrically, mounting of other electronic components may be defective. Make sure that the jaws are in <u>parallel</u> to each other and that they are in one line with the arms see point 'x' fig 8-51.

2) Dispenser head (if applicable)

With a dispenser head, the type of liquid being applied can be changed by replacing the nozzle, needle, and syringe. There are also two different types of nozzles for dispensing adhesives, one with a single hole and one with two holes, and these can be used for different applications. When the type of liquid is changed, it may be necessary to change the discharge pressure and application temperature as well.

Fig. 8-60
External
Diagram of
Dispenser
Head

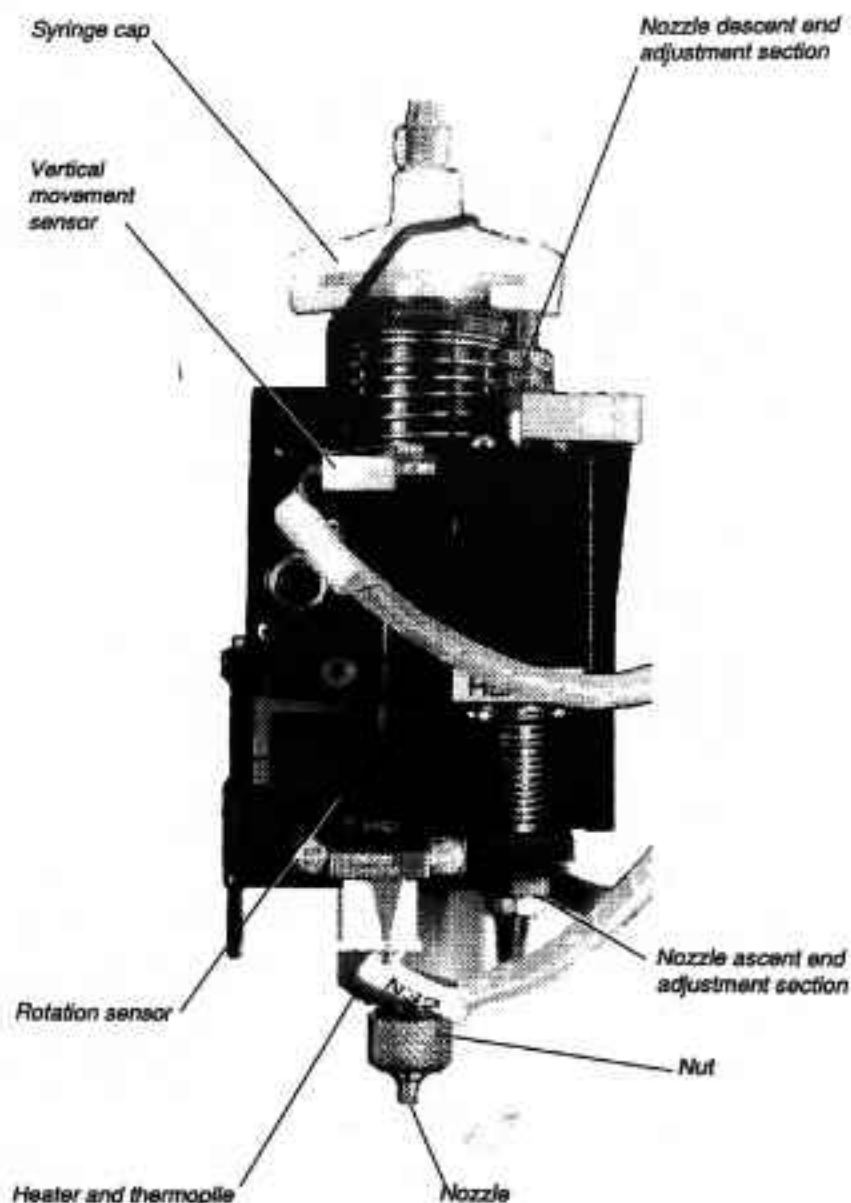
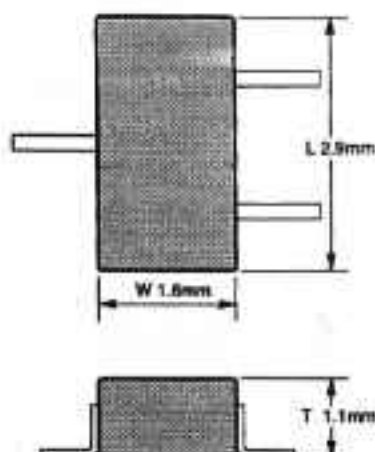


Fig. 8-58
Mini-mold
Transistor
Made by
Rohm, Ltd.



Nozzle Ascent End Position for Types FGc,d and GJd (Changing from Types AAa, ABb, and ABe to Types FGc, FGd, and GJd)

Work Content	Confirmation and Reference
1. In the nozzle ascent end position for Types FGc, FGd, and GJd, as shown in Fig. 8-59, the tip of the nozzle is fairly closely aligned with the tip of the arm attached to the wide jaw. Use a wrench to turn the double-nut used for adjustment and change the position.	<ul style="list-style-type: none"> After adjustment is finished, try actually mounting a SOP or another appropriate component, and check to see if the adjustment is correct.

Fig. 8-59
Nozzle Ascent
End Position
for Types FGc,
FGd and GJd

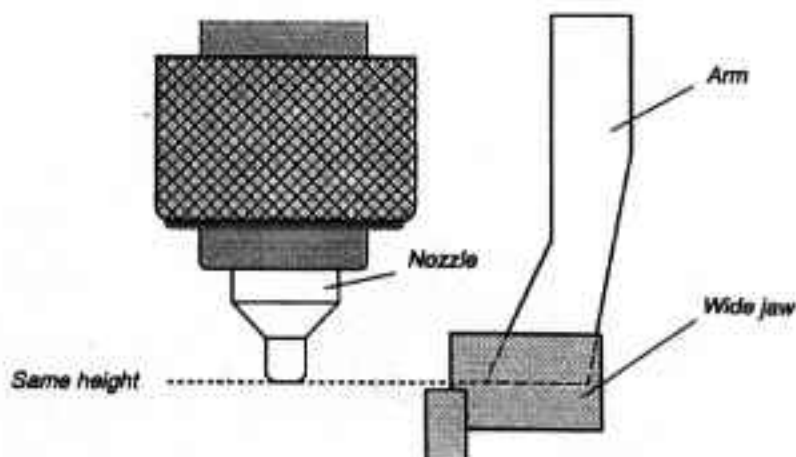


Fig. 8-55

Ordinary Nozzle
Ascent End
Position for
Types AAa,
ABb and ABc

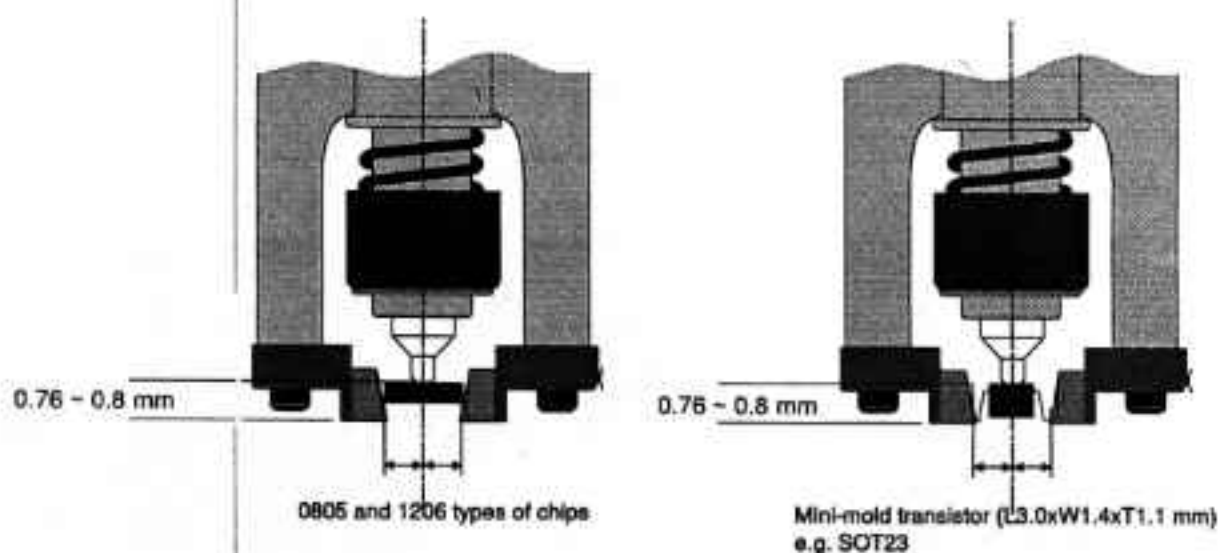
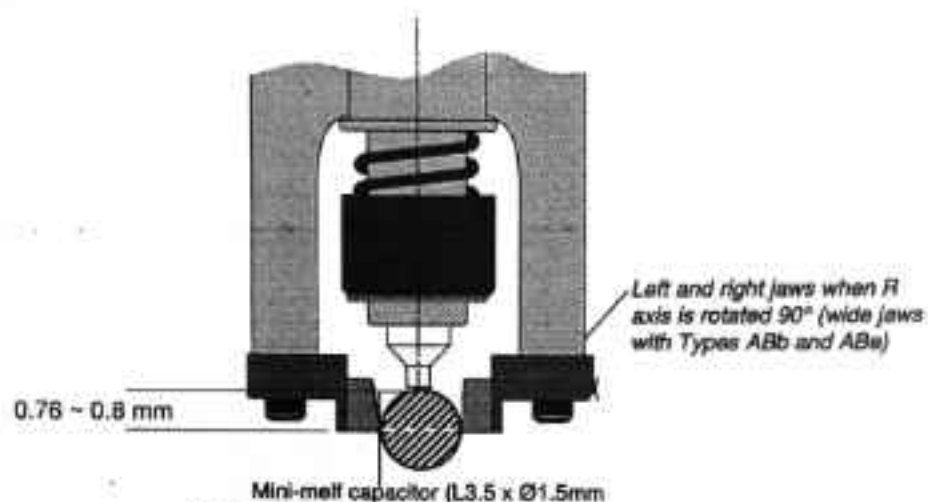
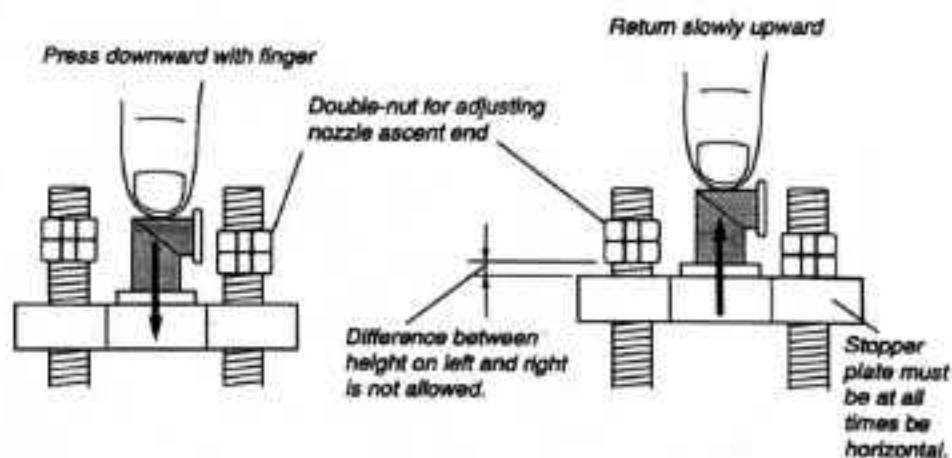


Fig. 8-56

Fig. 8-57

Left and Right
Nozzle Ascent
End Positions



b. Adjusting the nozzle ascent end

Components are mounted very differently depending on the position of the component at which chucking is done by the jaws when the component is picked up by the nozzle. The nozzle ascent end serves to determine the position at which chucking of the electronic component is done by the jaws.

Nozzle Ascent End Position for Types 1, 2 and 4 (changing from Types 8, 9 and 10 to Types 1, 2 and 4)

Work Content	Confirmation and Reference
<ol style="list-style-type: none"> 1. Of the electronic components presently stocked by your company, if there are any parts such as mini-mold transistors and diodes which have leads attached, have them ready. (The size of the components should be L2.9 x W1.6 x T1.1 mm or less.) If such parts are not available, the 0805 and 1206 box-type chips can be used. 2. Press the F3 (H1, 2, 3VAC) keys on screen 4, 5, and 6 to create a vacuum and pick up the electronic components. 3. Using a wrench, turn the double-nut for adjusting the nozzle ascent end (see external diagram in Fig. 8-45), until the position shown in Fig. 8-55 is achieved. 4. In Fig. 8-55, the lead is attached to the side of the electronic component, but with some components, the lead is separate. In a case like this, adjust to a position where the mini-mold is chucked, avoiding the lead, as shown in Fig. 8-56. This item applies only to Type 2 units. 5. There are two double-nuts for adjusting the nozzle ascent end, one on the left and one on the right. If there is any problem with these positions (with their height), defects will result when mounting is carried out. Make sure the height is adjusted carefully, Fig. 8-57. 	<ul style="list-style-type: none"> • Use for the ABb chuck the SOT 23 transistor as starting component. • With electronic components that have weak leads, like mini-mold transistors, it is very important not to chuck the leads. • In the ordinary nozzle ascent end position, there may be cases where it is impossible to chuck irregularly-shaped components. It will be necessary to change the adjustment in order to avoid the irregularly-shaped sections of such components when chucking.

A. Replacing the dispenser nozzle, needle, and syringe

If a compound type of adhesive or solder paste is being used, or an adhesive and solder paste are being used together, always use one particular nozzle, needle, and syringe for each type, and avoid mixing them. For this reason, it is a good idea to purchase several nozzles, needles, and syringes.

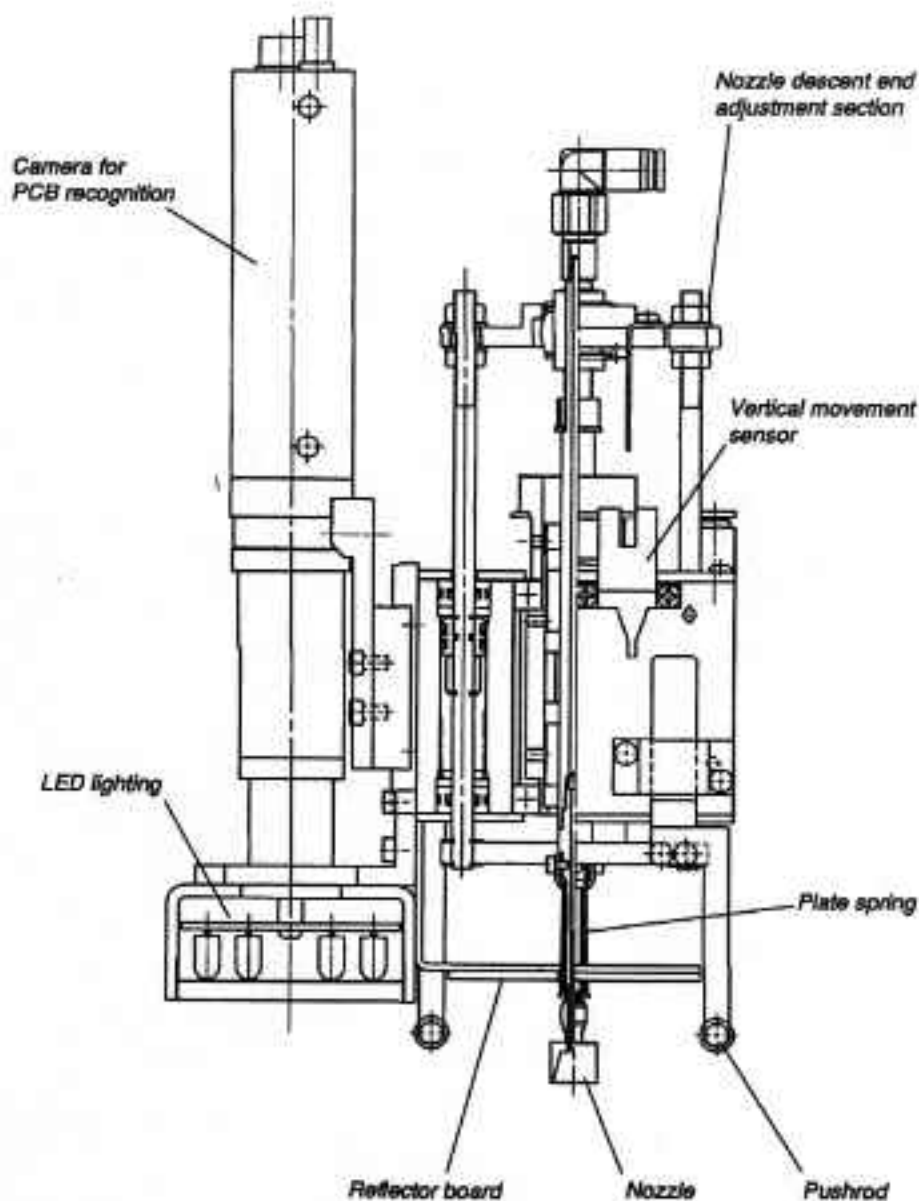
(When using a 10 cc syringe dispenser head)

Work Content	Confirmation and Reference
1. Remove the nut and pull off the nozzle.	<ul style="list-style-type: none"> Using a precision (flat-bladed) screwdriver or similar object, remove the small O-ring positioned where the nozzle and needle fit together. If liquid is adhering to the O-ring, wipe it away with a cloth. If the O-ring is scratched, replace it (check once a day). If liquid is adhering to the O-ring on the syringe cap, wipe it away with a cloth. When refilling the syringe with liquid, always bleed out any air bubbles, as these can cause an uneven flow of liquid. It is a good idea to have syringes refilled by the manufacturer of the adhesive or solder paste. Use alcohol-based solutions to clean O-rings, and acetone to clean needles and nozzles.
2. Remove the O-ring from the syringe cap, and twist the syringe cap to remove it from the syringe.	
3. Pull the syringe upwards to remove it.	
4. Screw the needle of the refilled syringe, or a syringe containing a different type of fluid, into the needle.	
5. Insert the syringe from the top of the head, all the way in.	
6. Line up the width across flats of the nozzle with the sliding section under the head, and screw in the nut.	
7. Fit the syringe cap onto the syringe and screw it to tighten it.	
8. When the syringe has been pressed down all the way into position, fit a large O-ring onto the syringe cap and the head itself.	
9. Press the F3 (H1, 2DISP.) keys on screen 4 and 5. If liquid is discharged from the nozzle tip, wipe it away with a cloth.	

3) Vision head (CSM 84V type)

With the vision head, the size of the electronic components that can be mounted can be changed simply by changing the nozzle.

Fig. 8-63
External
Diagram of
Vision Head



B. Adjusting the discharge pressure and temperature

Section (A) of the discharge positive/negative pressure adjustment section prevents the discharge of pressure, while section (B) prevents the leakage of liquid. If the fluid has a low viscosity, the pressure in (A) can be reduced, and the pressure in (B) can be adjusted to the point where no liquid is leaking (MIN.). If the fluid has a high viscosity, increase the pressure in (A) and set (B) to zero. The pressure stabilizes as the pressure setting is increased.

Using the temperature adjustment controller, the liquid being used can be discharged at the optimum viscosity, thus avoiding any influence from the ambient environment. The temperature adjustment controller is set using the digital switch.

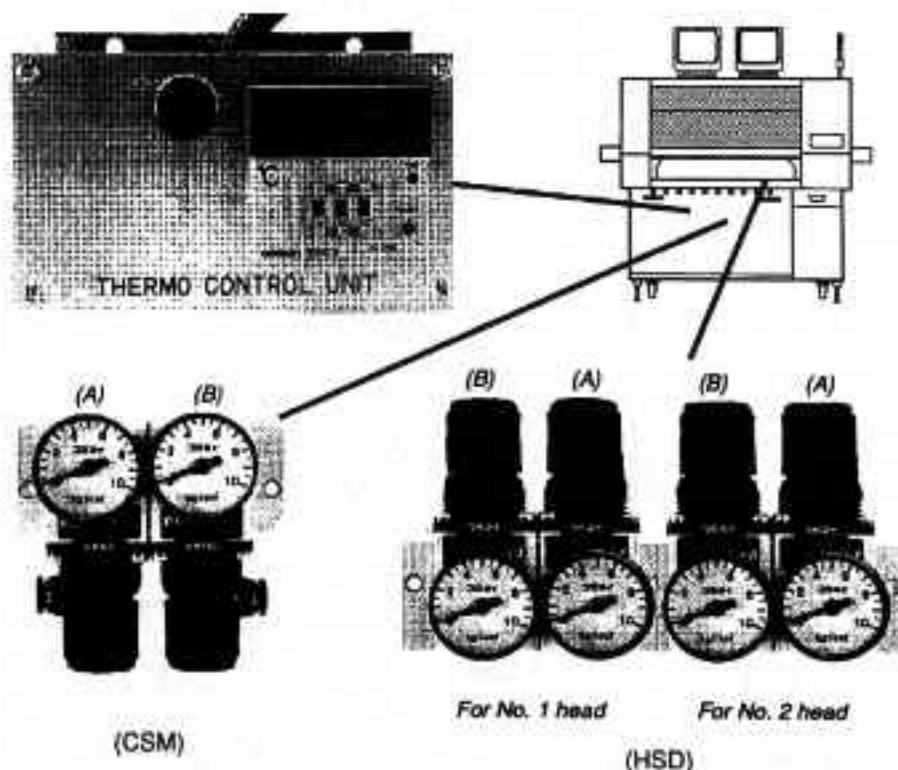
Adjustment conditions vary somewhat, depending on the properties of the liquid. Contact the manufacturer of the liquid, or try changing the adjustments and applying liquid to find the optimum dispensing conditions. Make a note of the optimum conditions for future reference.



Table 8-2
Example
Showing
Adjustment of
Locktite 360
Adhesive

Target electrical component	2125 and 3216 box-type chips
Application time	30ms
Discharge pressure Vacuum (to prevent liquid from leaking)	2.0kgf/cm ² 0.2kgf/cm ²
Temperature	25°C

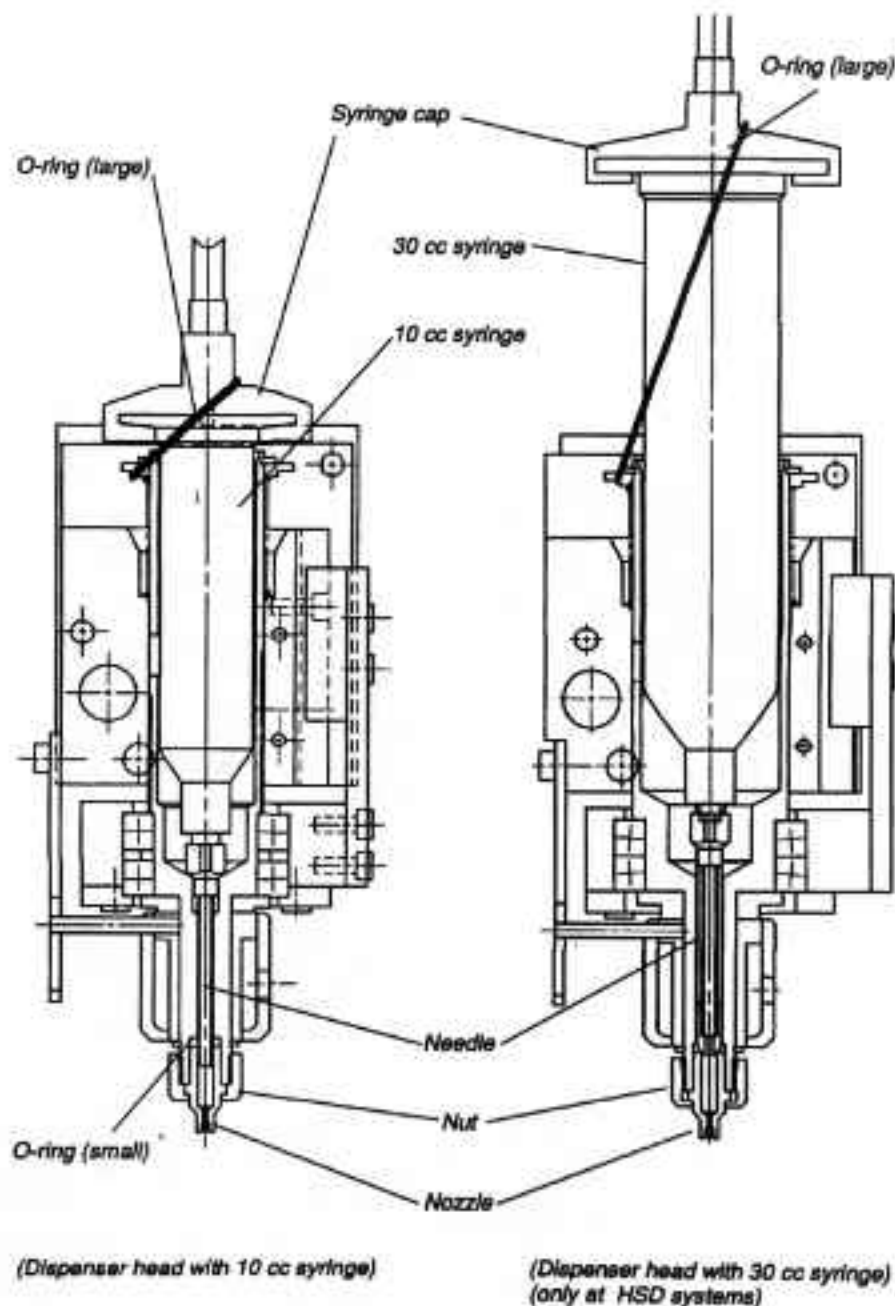
Fig. 8-62
Discharge
Positive/Negative
Pressure
Adjustment
Section and
Temperature
Adjustment
Controller





Always clean the nozzles, needles, and O-rings every day. The work can be speeded up by using an ultrasound machine or air gun for cleaning. If there is liquid left inside the syringe, store it in a refrigerator. If adhesive or solder paste is left on the head, the liquid inside will solidify, making it impossible to dispense it.

Fig. 8-61
Cross-section
View of
Dispenser
Head



(When using a 30 cc syringe dispenser head)

Work Content	Confirmation and Reference
1. Remove the nut and pull off the nozzle.	<ul style="list-style-type: none"> When refilling the syringe with liquid, always bleed out any air bubbles, as these can cause an uneven flow of liquid. It is a good idea to have syringes refilled by the manufacturer of the adhesive or solder paste.
2. Remove the O-ring from the syringe cap, and twist the syringe cap to remove it from the syringe.	
3. Pull the syringe upwards to remove it.	
4. Screw the needle into the refilled syringe, or into a syringe containing a different type of fluid.	<ul style="list-style-type: none"> If liquid is adhering to the O-ring on the syringe cap, wipe it away with a cloth. If liquid is adhering to the section where the nozzle fits into the head, or the section that the syringe fits into, wipe it away with a cloth. If left on the surface, it will harden.
5. Line up the width across flats of the nozzle with the sliding section under the head, and screw in the nut.	
6. Insert the syringe from the top of the head, all the way in.	
7. Fit the syringe cap onto the syringe and screw it to tighten it.	
8. When the syringe has been pressed down all the way into position, fit a large O-ring onto the syringe cap and the head itself.	
9. Press the F3 (H1, 2DISP.) keys on screen 4 and 5. If liquid is discharged from the nozzle tip, wipe it away with a cloth.	



WHEN USING ACETONE OR ALCOHOL-BASED SOLVENTS FOR CLEANING, MAKE SURE THE AREA IS WELL VENTILATED. IF ANY OF THE SOLVENT, ADHESIVE, OR SOLDER PASTE GETS ON YOUR SKIN, WASH IT OFF IMMEDIATELY.