CHAPTER 6 MAINTENANCE, REPAIR AND ADJUSTMENT

CONTENTS

A. Removal and installation of chuck assembly (with jaws). Please refer to fig. 6-1 and 6-2.

Work content	Check, and reference
1. Keeping the ring chuck lowered, slightly spread four arms?	• Before installing the chuck assembly on the head, verify that the wave washer is surely present in the chuck assembly.
2. Keeping the state 1, slowly pull down and off the chuck assembly.	
3. Pass another chuck on the shaft of the main body of the head. If it is seized on the way, slightly spread four arms together.	• After installation, pull down the chuck assembly to verify that it will not be slided down.
4. Aligning the positioning key of the chuck assembly to the keyway of the main body of the head, push the chuck assembly to the deepest, and install it. (The keyway to which the key is aligned is positioned in the deep position viewed toward the front when the rotary angle of the R axis is 0 degree.)	• Check whether the inner sleeve and outer sleeve of the chuck assembly move the arm in the proper position relationship or not. • Raise and lower each head several times in the manual mode screen to verify that the four arms are not opened and closed improperly.

	Inspection	Maintenance
Once per month	Is any jaw which positions an electronic part worn in a step or chipped?	Replace the jaw.
	Does grease run short where the chuck arm is in contact with the shaft cam?	Wipe the dirt, and apply a light coating of grease.
	Is the air filter in the vacuum pump dirty? (Remove the filter.)	If excessively dirty, remove the filter and clean it of dirt.
	Is any other bolt, nut, fastener or small part loose, bent or crashed?	Retighten the loose area, and replace the deformed part.
	Do the heater and temperature controller of the dispensing head operate properly?	Observe the reading of the temperature control unit. Proper if it rises or drops within the specified range. If it rises or drops to remain out of the limit, replace the heater or thermosensor.
	Is the guide of the nozzle of the dispensing head worn or deformed?	Replace the nozzle.
Once per 6 months	Is the R axis belt loose or scratched?	Adjust the tension. If the belt itself is defective, replace the belt. If the R offset of the head is deviated, correct it.
	Is the nozzle of the vision head backlashed? Is any nozzle fastening leaf spring deformed?	Adjust or replace the leaf spring.

✍ CAUTION !

1. Don't blow any compressed air from the air hose to the vacuum sensor board side, or the board diaphragm will be damaged.

6-1 Inspection and Maintenance

6-1-1 Mechanical sections

✖ DANGER !!!

Before inspecting and maintaining the mechanical sections, be sure to turn off the power supply if possible.
If power supply is required, don't put your body within the movable rage of the head.

(1) Inspection and maintenance of the head section

	Inspection	Maintenance
Once per day	Are there any dirt, chips, oil, solder paste or dispensing fluid adhering to the nozzle or jaw?	After washing the nozzles or jaws, blow them dry with an air gun and then wipe them with a soft cloth.
	Do the chuck arms (both inner and outer) operate each smoothly? (Spread the arms with fingers to confirm the return action.)	Wipe or wash away the dirt, and supply No. 1 or No. 2 machine oil.
	Is there any dispensing fluid adhering to the nozzle or needle of the dispensing head, leaking or sticking?	Clean off the fluid. (Remove hardened sediment with a slender wire or similar.) Dip the nozzle and needle in the washing liquid, and wash them.
	Is there any dispensing fluid adhering to the syringe housing of the dispensing head?	Cleanly wipe off the liquid.
Once per week	Are there any dirt, water or oil adhering to the inner walls of the nozzle shaft of each head?	Cleanly wipe off any dirt.
	Are there any dirt, dust or similar adhering to the suction air tube (particularly the air coupling at the top of the head) of the head?	Blow them dry with an air gun, and wipe them with a soft cloth. → * CAUTION 1
Once per month	Is any nozzle shaft cam flute section sufficiently greased?	If any dirt or similar adheres, remove it, and apply a light coating of grease.
	Is any shaft spline of the vision head sufficiently oiled?	If any dirt or similar adheres, remove it, and supply a small amount of No. 1 or No. 2 machine oil.
	Is any nozzle of each head deformed or worn at the tip?	Replace the nozzle.

B. Replacing nozzles (refer to fig. 6-3).

Work content	Check, and reference
1. Supporting the nozzle with finger, move the ring nozzle upward, and the nozzle will be removed.	• Since the spring is in the nozzle shaft (the depth of the nozzle), take care to prevent missing it.
2. To install another nozzle, move the ring nozzle upward. Keeping the yellow marker of the nozzle shaft aligned the nozzle groove, insert the nozzle into the nozzle shaft. (When the rotary angle of the R shaft is 0 degree, the yellow marker of the nozzle shaft is on the right side viewed toward the front side.)	• When the nozzle is not installed well, take care for the mounting direction.
3. Keeping the nozzle at the deepest position, return the ring nozzle to the original position.	• Check whether the nozzle smoothly buffs or not.

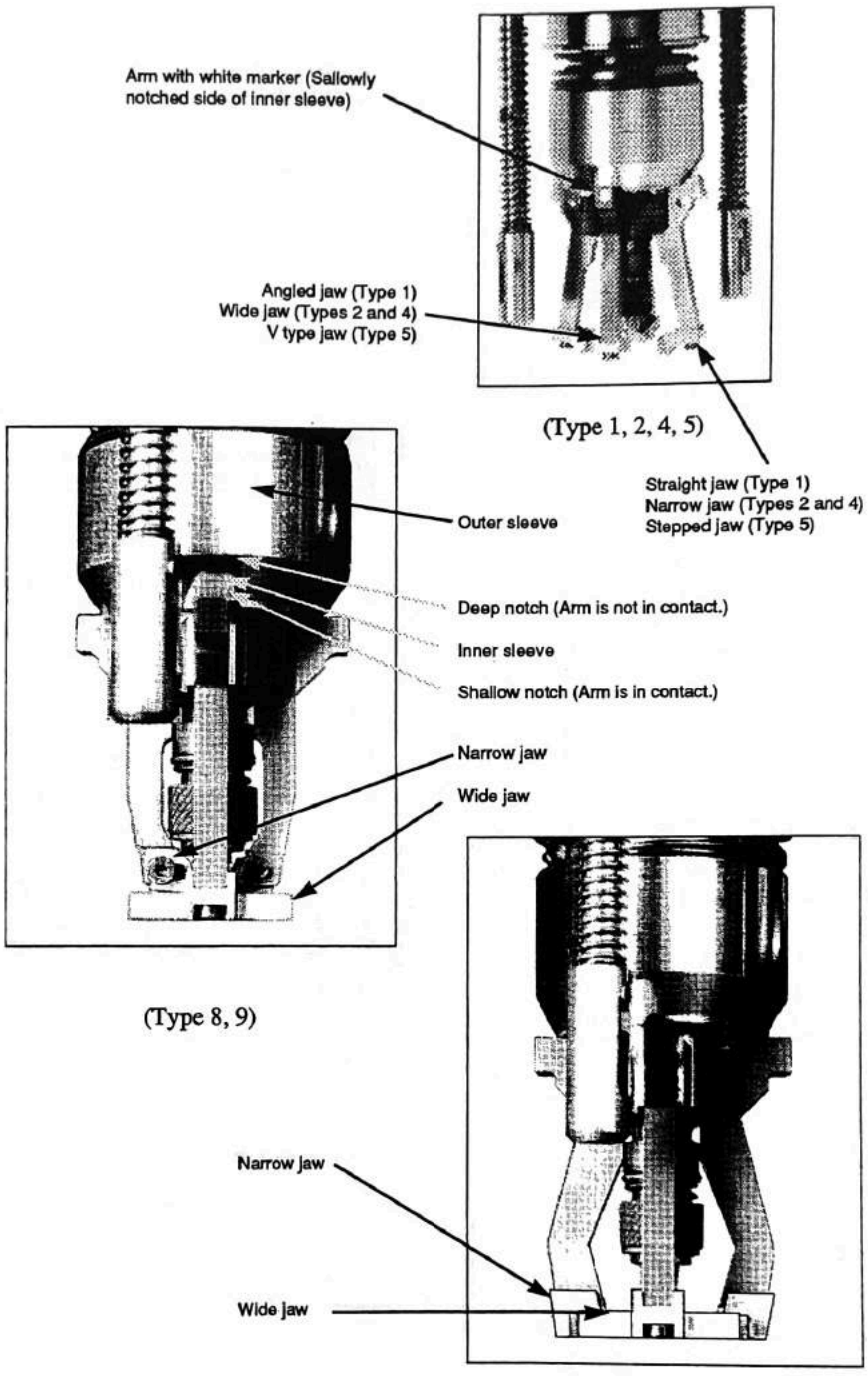


Fig. 6-2
Position relationship among the inner sleeve, outer sleeve and arm of chuck assembly

☞ WARNING !!

If the sleeve does not press the arm at the proper position, the arm will be too loose for proper centering. Moreover, there is a danger that the arm will collide with the feeder or similar.

Lower the ring chuck.

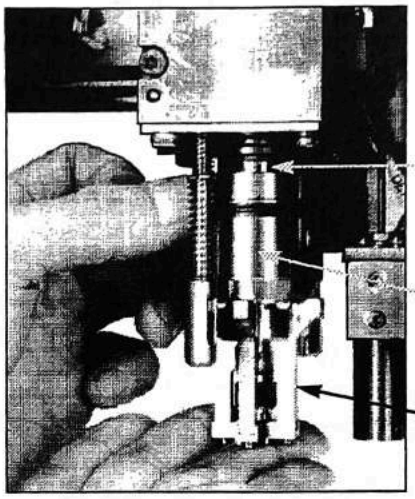
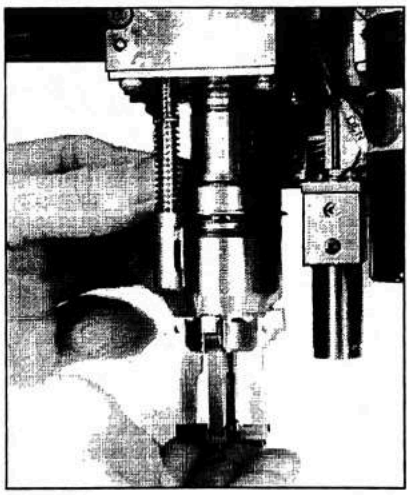
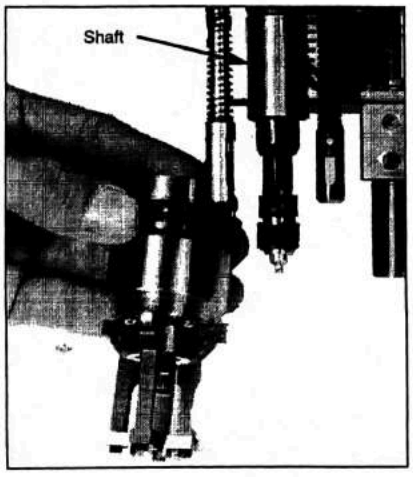


Fig. 6-1
Removal and installation of chuck assembly

Pull off.





	Inspection	Maintenance
Once per six months or year	Is the motor belt loose on the X-Y axis area? Is the pulley fixing bolt loose?	Adjust the tension, and retighten the belt. If the belt itself is defective, replace it.
	Is the conveyor belt loose, scratched or cracked?	Adjust the tension. If the belt is defective, replace it or prepare a spare.
	Is the head of the locator pin, the stopper of the main stopper or the tip of the clamp or bush-up pin too worn to position the board properly?	If it is stepped, smoothen it with emery paper. Replace the excessively worn one.
Others: Every day	Is clean air continuously supplied?	From the drain cock, discharge the water and oil which are accumulated in the regulator of the air supply connection area. Clean the filter of the air supply and the regulator section of the main body of the machine.

(2) Inspection and maintenance of X-Y axes section, conveyor section, feeder section and so on

	Inspection	Maintenance
Once per day	Are there any tools, foreign matter or similar remaining in the movable range of the head? Are the feeder and related set correctly?	Remove the foreign matter, and securely setup the feeder.
	Is there any chip or dirt adhering to the travel section of the feeder tape? Is there any chip dropping on the board push-up plate and the feeder plate?	Remove the chip. Particularly when removing and installing the feeder, take care for the chips on the feeder plate.
Once per week	Is there dust or dirt adhering to the ball screw of X-Y axis or the guide rail section? Does grease run short?	To resupply grease, wipe old grease off, and apply a light coating of grease. Using the grease gun or similar, fill grease. (NSK Grease Pack, Alvania 2)
	Is there any dust, dirt or similar adhering and caught on the board sensor, locator pin and other parts, and around the conveyor?	Remove dirt, and wipe away dust with a soft cloth.
	Is any dust accumulated on the lens of the camera? Is it dirty?	Lightly blow off dust with air, and wipe the lens with a soft cloth.
	Does the slide area or rotary section of the feeder move smoothly? Is it deformed (particularly on the shutter)?	Periodically lubricate the area where metals slide each other or the rotary area. Don't lubricate the tape travel surface or ratchet section.
Once per month	Is the conveyor width adjusting screw or the drive spline shaft greased insufficiently?	Wipe away the grease, and apply a light coating of new grease.

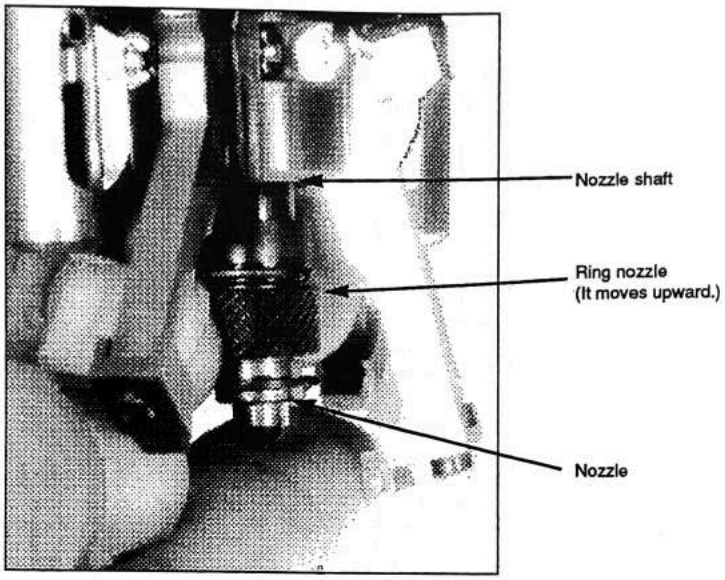
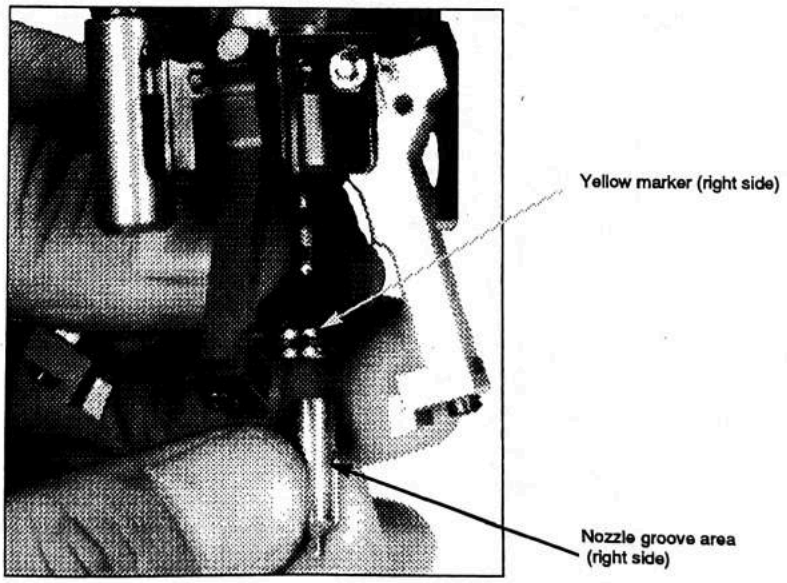


Fig. 6-3
Removal and installation of nozzle



(3) Unusual noise

Check whether any unusual noises are produced during automatic or manual operation.

1) X-T axis section

First, turn off the power. Touch the holder with finger, and move it slowly in the X axis direction (left-/rightward). Be careful not to push or pull it roughly, as strong impact may cause the head to be slightly deviated. Pushing it with hand, check for the following abnormalities.

A. Does it suddenly move heavily? Even in normal conditions, there is some variation, but if it moves extremely heavily, bearings may be damaged, or some foreign matters may be seized on the transfer section.

B. Is there any periodic clucking sound? There may be some defect in the rolling areas of the ball screw nuts, the bearings at each end of the ball screws, or the linear bearings.

C. Even without any pressure, it is easily moved, clattering. Then the screw may be loose in the connection area.

Push and pull the X axis arm and check for the same kinds of problems in the Y axis direction.
During automatic operation, check whether any suddenly loud noises or unfamiliar noises are produced. The main cause of such noises is loose screws, so please inspect the screws before anything else. Moreover, periodically inspect each section once per six months.

11199024-00

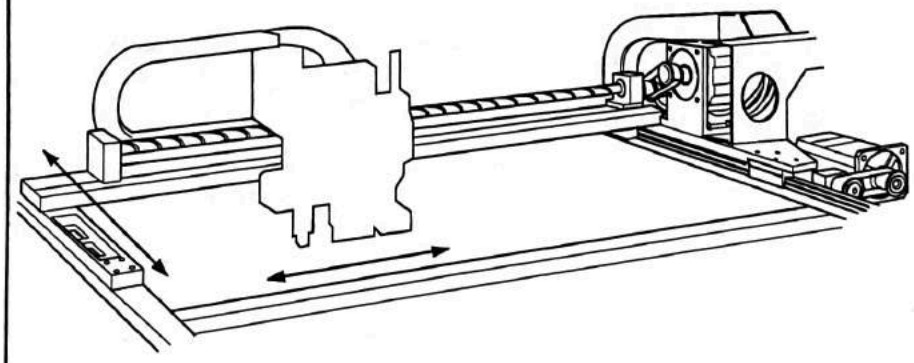


Fig. 6-4
Unusual noise of X-Y section

6-1-2 Electrical sections

✖ DANGER !!!

When inspecting and maintaining the electrical parts, don't put your body within the movable rang of the head.

(1) Operation check of actuator

1) Conveyor section
Use the function keys (F1 thru F6) to check whether each unit in the conveyor section operates properly or not.

✍ CAUTION !

The units not equipped on the machine are not displayed on the CRT screen.

2) Head section
Use the function keys (F1 thru F6) to check whether each unit in the conveyor section operates properly or not.

✍ CAUTION !

The units not equipped on the machine are not displayed on the CRT screen.

Table 6-1 Function keys in the manual mode

Page	F key	Display	Operation	DO No.
0	F1	ORIGIN	Origin point return	
1	F1	M-CONV	Conveyor motor on/off	06
	F2	M-STP.	Main stopper up/down	10
	F3	LOCATE	Locator pin up/down	11
2	F1	REVERS	Conveyor turn-over on/off	31
	F2	S-STP.	Sub stopper up/down	00
	F3	PUSHUP	Board push/up plate up/down	32
	F4	CLAMP	Outer shape clamp on/off	33
3	F1	C-SPD.	Conveyor low-speed on/off	34
	F2	PUSHIN	Board push-in on/off	35
	F3	COUNT	Board quantity counter on	37
4	F1	H1DOWN	Head 1 descending momentary	20
	F2	H1TURN	Head 1 turn on/off	22
	F3	H1VAC	Head 1 suction on/off	24
	↑	H1DISP	Head 1 coat on/off	↑
5	F1	H2DOWN	Head 2 descending momentary	21
	F2	H2TURN	Head 2 turn on/off	23
	F3	H2VAC	Head 2 suction on/off	25
	↑	H2DISP	Head 2 coat on/off	↑
6	F1	H3DOWN	Head 3 descending momentary	40
	F2	H3TURN	Head 3 turn on/off	42
	F3	H3VAC	Head 3 suction on/off	44
	↑	H3DISP	Head 3 coat on/off	↑
	F4	H3VCHG	Head 3 vacuum pressure switch	46
7	F1	MA.(Y)	Mechanical alignment Y-direction jaw open/close	50
	F2	MA.(X)	Mechanical alignment X-direction jaw open/close	51
	F3	NZB CL	Nozzle B clamp on/off	52
	F4	NZB UP	Nozzle station B up/down	53
8	F1	MA.U/D	Mechanical alignment up/down	54
9	F1	NZA CL	Nozzle clamp on/off	61
	F2	NZA UP	Nozzle station A up/down	60
	F3	MV-LED	Transmitted light recognition LED on/off	36
	F4	FX-LED	Reflective light recognition LED on/off	62

2) Conveyor section
On the manual screen, press each of the function keys to operate its conveyor. If the speed controller of air is open or any screw is loose, unusual noise will be produced.
Choke the speed controller to a suitable extent, and retighten the screw.

3) Head section
On the manual screen, press each of the function keys to elevate the head. If the speed controller of air is open or any screw is loose, unusual noise will be produced. Choke the speed controller to a suitable extent, and retighten the screw.

(4) Vibration

If the machine is wholly vibrated by abnormal vibration, the machine will be dislocated from the installed position to disturb the flow of the line or the machine itself will be adversely influenced. In this case, check the following items.

A. Check whether four adjusting bolts which support the machine are loose or not.
B. Is the floor firm? (Excessive unevenness, inclination)

If the machines are lined up, it is effective to fix the machines on the upstream side and downstream side.

(5) Others

1) Air regulator with filter
As a rule, inspect and clean the filter-equipped air regulator at the connection port of the air supply on the machine every 6 months. For cleaning, turn the drain cock at the bottom to drain water and oil. If the filter is excessively clogged, replace the filter.

2) Piping
Before and after the production, verify that any air tube is not scratched or kinked and air does not leak. If air leaks, take the countermeasure (reconnect the piping or replace the part).

✍ CAUTION !

Before reconnecting the pipe or replacing the part, stop the air supply.

6-1-3 Floppy disk drive unit

When the head of the floppy drive unit becomes dirty, it will cause a data error, scratch the floppy disk itself, prevent the machine from starting or raise other troubles.
To prevent these troubles, observe the following points.

(1) Use the machine under the environments free of dust, dirt, etc. Though it is desired to use it in the clean room, improve the environments to be as clean as possible if any clean room can not be gained.

(2) Use the floppy disk which is backed up from the master disk delivered from our company. Produce 2 or 3 back-up disk, and manage the disks to always store the update data.

(3) When the machine is not used, remove the floppy disk from the floppy disk drive unit, and store it in the case.

(4) Periodically clean the head of the floppy disk drive unit.
Use a commercially available head cleaner (Example: Hitachi Maxell brand head cleaner MF-CW(A)), and clean the head approx. once per month. The cautionary points for cleaning and the head cleaning procedure are described as follows.

1) Cautionary points for using the head cleaning disk.

A. Slide up the write protector tab of the cleaning disk or seal the opening to block the light (invisible from the opposite side).

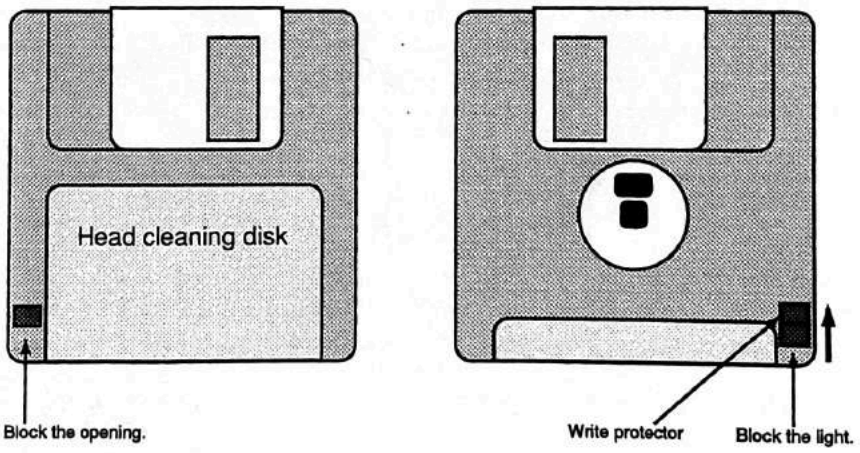


Fig. 6-5 Head cleaning disk

3) Head section
To check the sensors in the head section, the function keys (F1 thru F6) is used to practically drive it. At this time, the variation of DI of the monitor is read for checking.

Table 6-5 Sensors of head section

Role	DI status	Contact	DI port	Identifier
Head 1 lower limit	0 when dog is detected	b	DI30	N30
Head 2 lower limit	0 when dog is detected	b	DI31	N31
Head 3 lower limit	0 when dog is detected	b	DI60	N60
Head 1 90° turn	0 when dog is detected	b	DI32	N32
Head 2 90° turn	0 when dog is detected	b	DI33	N33
Head 3 90° turn	0 when dog is detected	b	DI62	N62
Head 3 (Z axis) nozzle lower limit	0 when dog is detected	b	DI60	N60
Head 3 (Z axis) push rod lower limit	0 when dog is detected	b	DI51	N51

		(DI36)	(DI34)
Head 1 vacuum sensor High level	:	1	1
Head 1 vacuum sensor Middle level	:	1	0
Head 1 vacuum sensor Low level	:	0	1

		(DI37)	(DI35)
Head 2 vacuum sensor High level	:	1	1
Head 2 vacuum sensor Middle level	:	1	0
Head 2 vacuum sensor Low level	:	0	1

		(DI66)	(DI64)
Head 3 vacuum sensor High level	:	1	1
Head 3 vacuum sensor Middle level	:	1	0
Head 3 vacuum sensor Low level	:	0	1

(4) Other checks

1) Wiring
Check for scratch, dent, enforced bent and disconnection.

2) Interlock switch
When the front or rear acrylic cover of the main machine body is opened, the interlock is activated to check whether the operation of each axis is temporarily stopped or not. When the supply pressure of the air is lowered slightly beyond 0.4MPa, it is checked whether the air switch at the connection section of the air supply is activated for interlock or not.

3) Emergency stop
When each emergency button at two places of the machine main body and at HHK-SC is pressed, it is checked whether the emergency stop is activated to urgently stop all axes or not.

4) CRT
The main power supply is turned on to check whether the screen is displayed in the normal state (brightness, focus, etc.) or not.

10	F1	LHDOWN	Feeder head UP/DOWN momentary	71
	F2	LHVAC	Feeder head pickup ON/OFF	72
	F3	HOOK	Feeder hook advance/retract	73↑
	F4	RACHE	Feeder ratchet open/close	74
11	F1	ST1VAC	Feeder traverse 1 vacuum change	75
	F2	ST2VAC	Feeder traverse 2 vacuum change	76

(2) Function check of sensor

Whether each sensor functions properly or not is checked with LED lamp integrated in the sensor and DI/DO monitor (press the DI/DO key.).

1) X, Y, R and Z axis section
The origin point sensors of the X, Y, R and Z axes are basically normal if origin point return is possible in each axis. To check the secondary limit sensors in the X and Y axes, the emergency button is first pressed, and with it continuously pressed, each axis is moved to the lateral and longitudinal limits with hand. If the emergency stop stays activated even though the READY switch is pressed with the emergency stop button reset, the secondary limit switch is proper.

Table 6-3 Sensors of X, Y and R axes

Role	DI status	Contact	DI port	Identifier
X axis origin	1 when dog is detected	b	DI14	XORG
Y axis origin	1 when dog is detected	b	DI15	YORG
R axis origin	1 when dog is detected	b	DI17	RORG
Z axis origin	1 when dog is detected	b	DI16	ZORG

2) Conveyor section
To check the sensor which detects a board, the board practically used is used. Here, the sensors of the locator pin and board push-up plate are directly installed on the air cylinder.

Table 6-4 Sensors of conveyor section

Role	DI status	Contact	DI port	Identifier
Conveyor inlet sensor	1 (when detected)	a	DI23	N23
Conveyor work position sensor	1 (when detected)	a	DI24	N24
Conveyor outlet sensor	1 (when detected)	a	DI25	N25
Upper limit of fixed locator pin	1 (when detected)	a	DI26	N26
Upper limit of movable locator pin	1 (when detected)	a	DI27	N27
Upper limit of board push-up plate	1 (when detected)	a	DI42	N42
Conveyor stand-by position sensor	1 (when detected)	a	DI41	N41

6-2-1 Troubles and countermeasures of various symptoms

(1) Troubles and countermeasures of X and Y axes.

No.	Symptom	Cause	Countermeasure
1	It abnormally sounds or vibrate in the arm during arm (axis) operation.	1. Mechanism is backlashed, loose or damaged. 2. Guide or ball screw is poorly lubricated. 3. Driver board is poorly adjusted or troubled. 4. Weight parameter is improperly set.	1. Retighten the bolts, or replace the part. 2. Refill grease. 3. Reduce the speed loop gain of the driver board, or replace the board. 4. Reset the weight parameter. (Max. 7kg: The larger value is the better for arm.)
2	Loading, coating or similar is suddenly dislocated.	1. Since arm or head collides with something, dislocation occurs in the mechanical system. 2. Since the machine reference amount is poorly adjusted, dislocation occurs one lead (20mm). 3. Board positioning unit (locator pin, etc.) is backlashed, or board is insufficiently fixed. 4. Centering mechanism of head, fixture centering equipment or other centering mechanism is troubled. 5. Shaft, drive belt tooth skip, backlash on the ball screw fixing section, etc.	1. Correct data for loading, coating, suction, etc. 2. Readjust machine reference amount. 3. Reteach board origin point, locator pin XY and board corner XY. 4. Adjust jaw, nozzle, air speed controller, etc. 5. Readjust belt tension, and recheck fixture area.
3	Loading, coating or other position is slightly dislocated during operation.	If origin point return is retried, it is returned to the origin point. 1. Encoder is defective. 2. Malfunction results from noise. 3. CPU board is defective. Even if origin point return is retried, dislocation is not corrected. 4. Backlashed or loose in the mechanical system.	1. Replace the motor. 2. Check ground resistance of motor case. If 0.1 ohm or less is not read, check the connection of shield line of encoder cable. If any motor or other equipment which generates noise is used near, relocate it to another place. If impossible, separately use power supply. 3. Replace CPU board. 4. Retighten the area.
4	Even if origin point return is tried from any other position except the origin point, the arm will move in + direction.	1. Origin point sensor harness is line-broken. 2. Origin point sensor is defective.	1. Replace harness. 2. Replace sensor.
5	Each axis may be out of position since the head collides with the feeder, etc.	Air supply pressure drops, and tape retainer of feeder rises.	Check whether each axis can be driven or not. If possible, temporarily correct the position data. If it can not be driven due to seizure or is largely out of position, contact your nearest dealer or our company.

Table 6-6 Troubles and countermeasures of X and Y axes.

6-2 Troubleshooting

This section describes the methods to estimate the cause and remedy it if any error or trouble occurs in the mounter or dispenser. Here, the errors and troubles are largely divided into 3 kinds as follows, according to the different screen displays.

(1) Troubles and countermeasures of various symptoms
(2) Messages and errors during program execution
(3) Messages and errors detected in the system

(1) Troubles and countermeasures of various symptoms

If any error or trouble not displayed on the warning flasher (indication lamp) or CRT screen occurs, it will be displayed, being disriminated according to the XY axes, head, conveyor and so on.

(2) Messages and errors during program execution

If any error is detected during program execution (loading or coating), the message will be displayed in the message display area 2 on the CRT screen. At this time, isolate the cause and take the countermeasure referring to the message and table on the CRT screen.
Keep in mind that the yellow lamp of the warning flasher (indication lamp) will come on for an error during program execution, and the system will not be able to be restarted until the ERROR CLEAR key is pressed.

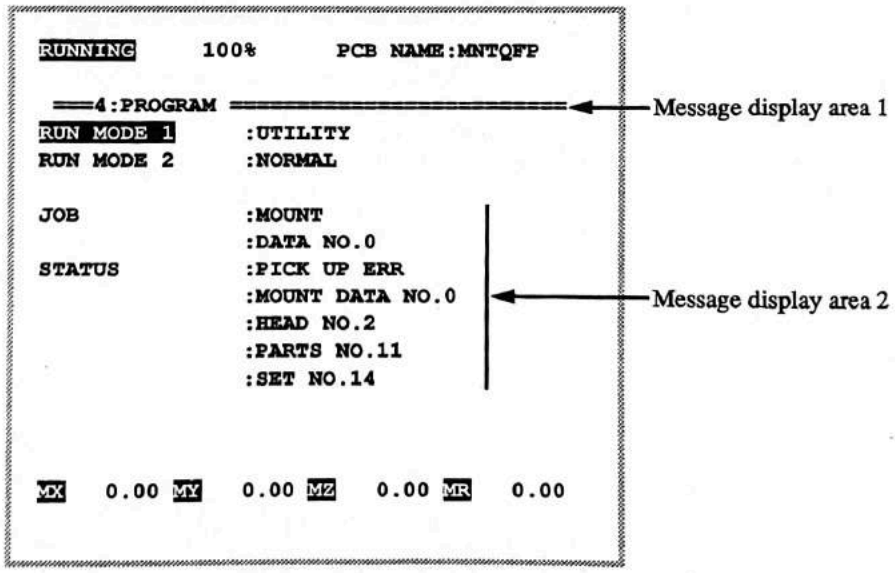


Fig. 6-6 CRT screen for error occurrence

(3) Messages and errors detected in the system

If any error is detected by the system, the message will be displayed at the message display area 1 on the CRT screen. At this time, isolate the cause and take the countermeasure, referring to the message on the CRT screen and the table.
If any serious error occurs and CPU in the controller stops, the red lamp of the warning flasher (indication lamp) will come on. Even after the cause is removed, the system will not be reset until the power is turned on again. If any other error, the yellow lamp will come on, and the system will not restarted until the ERROR CLEAR key is pressed. Keep these in mind.

B. The life of the wet type floppy head cleaner approximates 30 times if approx. 10 seconds are used one time. If any scratched, fuzzy, frayed or creased part is found on the cleaning sheet is found, use a new cleaner.

C. The floppy disk drive unit of a surface mount type is a both-side drive type. So, use the floppy head cleaner of a both-side type.

D. Before cleaning, fill a suitable amount of cleaning fluid.

E. Before using the floppy disk drive unit which is cleaned, wait for 4 to 5 minutes to dry the inside.

2) Head cleaning procedure

No.	Procedure
1	Insert the head cleaning disk into the floppy disk drive unit, and turn on the power supply.
2	When it is verified (LED is lit approx. 0.5 seconds) that a disk is present, the access operation (LED is lit.) will be executed for 10 to 15 seconds. For this while, cleaning will be executed.
3	When the access operation is ended, turn off the power supply, and remove the head cleaning disk.
4	Apply the cleaning operation approx. once per month (10 to 15 seconds/time).

(3) Troubles and countermeasures of conveyor

Table 6-8

No.	Symptom	Cause	Countermeasure
1	Locator pin, main stopper or other unit does not operate.	1. Supply air pressure drops. 2. Speed controller is excessively choked. 3. Cylinder or solenoid valve is defective. 4. I/O output circuit is defective.	1. 0.5 to 0.54Mpa is necessary as the supply air pressure. 2. Readjust the speed controller. 3. Replace cylinder or solenoid valve. 4. Replace CPU board or I/O board.
2	Conveyor motor does not run.	1. Motor cable is broken, or connector is in poor contact. 2. Motor is defective. 3. Circuit protector is activated.	1. Replace motor cable, and improve the contact of connector. 2. Replace motor. 3. After inspecting the cause, reset circuit protector.
3	Since conveyor motor runs but the belt does not move, the board stops on the way during transfer.	1. Belt slips. 2. Conveyor is narrower.	1. Clean the rear side of belt, and strongly tighten the tension of the belt. 2. Adjust the conveyor width.
4	Even though board is placed at the inlet of the conveyor, the conveyor motor does not run.	1. Conveyor inlet sensor is troubled. 2. Since the sensitivity of the board detection sensor at the working position and waiting position is poor, the sensor is activated even though no board is present.	1. Adjust the position of the sensor, or replace it. 2. Same as above.
5	Even though loading and coating are ended, board is not discharged.	Signal "Enable to discharge" is not received. Check it with DI/DO monitor.	Check GATE-IN signal which is sent from the machine on the downstream side. When GATE-IN signal is not used, short a circuit across Pins 2 and 3.
6	Board passes from inlet to outlet without stopping.	1. Passing is indicated on the data. 2. Work position sensor is troubled, or detection position is wrong.	1. Reset data. 2. Replace the sensor or adjust the position.
7	Clearance is produced between top surface of board and retaining plate of board.	Locator pin and push-up pin are lower.	Readjust the height position.

Continued from Table 6-7

No.	Symptom	Cause	Countermeasure
4	Electronic part is slightly out of angle or position.	1. Jaw is poorly adjusted. 2. Nozzle or jaw is worn or damaged. 3. Timer for lower limit of nozzle is set at a shorter time. 4. Water or oil sticks to the nozzle tip or jaw. 5. Board is poorly positioned. 6. It goes out of position due to shock when board positioning is released. 7. In the chuck assembly, wave washer is not present. 8. Suction point is out of position.	1. Readjust jaw. 2. Replace nozzle or jaw. 3. Add the timer. 4. Clean nozzle or jaw. 5. Readjust the board positioning. 6. Slow down the descending sped of the locator pin and push-up pin. 7. Put in the wave washer. 8. Reteach the suction point.
5	Electronic part is not sucked but insertion operation is done.	1. Vacuum sensor is poorly adjusted. 2. Vacuum pump is aged. 3. State of level H, M or L of vacuum sensor does not match the data indication.	1. Readjust vacuum sensor. 2. Clean or replace the filter of vacuum pump. Or replace the equipment itself. 3. Correct the data.
6	Loading and coating positions are wholly dislocated in the same direction.	1. The board positioning mechanism is out of position. 2. Position data between heads are poorly set.	1. Fasten the board positioning mechanism, and reteach the board origin point position. 2. Reset offset between the heads.
7	Loading angle and coating angle are deviated in the same direction.	1. The turn angle of the dispenser head is poorly adjusted. 2. R offset data of head is poorly set.	1. Readjust the turn stopper. 2. Reset R offset data of head.
8	Load wrong electronic part.	1. Data is wrong. 2. Feeder position is wrong.	1. Reinput data. 2. Install it into position.
9	During loading or coating, automatic operation stops (green warning flasher comes on) stops and does not proceed to the next process.	1. The supply air pressure is insufficient. 2. The sensor to detect the lower limit of head does not function.	1. 0.5 to 0.54 Mpa is necessary as the supply air pressure. 2. Replace the sensor. Replace the sensor harness.

(2) Troubles and countermeasures of head

Table 6-7 Troubles and countermeasures of head

No.	Symptom	Cause	Countermeasure
1	Nozzle which descends to suck a electronic part ascends without suction. (Suction error)	1. Position data of suction point (center of electronic part is poor. 2. When the nozzle descends, it does touch the top surface of electronic part. Or it presses the part with excessive force. 3. It is dirty in the nozzle or head. (Adhesive, paste, solder, oil, water, etc.) 4. Vacuum pump is troubled or aged. 5. Nozzle does not elevate smoothly, or is seized on the way. 6. The pitch feed of the feeder is not constant. 7. Feeder is not poorly installed. 8. Feed is improper since empty tape is clogged at the tip. 9. Top tape and carrier tape can not be separated well. 10. Since 32mm adhesive tape is not separated well, electronic part remains.	1. Reteach suction point. 2. Adjust the lower-limit adjuster of the head. 3. Be sure to clean the nozzle, and nozzle shaft (nozzle-fit shaft) inner wall once per day. 4. Clean and replace the filter of the vacuum pump. Or replace itself as a unit. 5. Clean nozzle, nozzle shaft inner wall and spring, and thinly grease them. 6. Contact your nearest dealer or our company. 7. Reinstall the feeder. 8. Correct clogging at the tip of the empty tape. 9. Change the spring installation position of the feeder, and strengthen the separating force. 10. Set up tape on 32mm tape feeder again. Position tape in such a position as the adhesive tape is finely separated and the electronic part is smoothly picked up when the push rode of the feeder is pressed.
2	An electronic part is sucked but is discarded. (Recovery frequently occurs.)	1. Nozzle and jaw are worn. 2. Jaws do not clamp an electronic part properly. 3. The ascending speed of the head nozzle is fast. 4. The face of electronic part is deformed. 5. Vacuum sensor is poorly adjusted. 6. The states of levels H, M and L of vacuum sensor does not match the data indication. 7. The pressure of air supplied to the mounter drops. 8. Vacuum pump is aged.	1. Replace nozzle or jaw. 2. Readjust the upper limit adjusting section of the nozzle. 3. Readjust the speed controller. 4. Contact the maker of the electronic maker. 5. Readjust the vacuum sensor level. 6. Correct the data. 7. 0.5 to 0.54 is required as the pressure of supply air. 8. Clean and replace the filter of the vacuum pump.
3	Electronic part stands out of position at a large angle.	1. The suction point is out of position. 2. The nozzle tip does not touch the top surface of the board. Or it is strongly pressed since the tip is excessively lowered. 3. Nozzle or jaw is worn or damaged. 4. Vacuum sensor is poorly adjusted. 5. On the chuck assembly, the notch grooves of the inner sleeve and outer sleeve are not correctly fit.	1. Reteach the suction point. 2. Adjust the lower-limit adjuster of the nozzle. 3. Replace the nozzle and jaw. 4. Readjust vacuum sensor. 5. Align the groove into proper position.

(2) Error messages during program execution

Error message	Meaning (Cause)	Countermeasure
PCB DATA ERR PCB ORIGIN DATA ERR	Origin point data of No. 0 or No. 1 is not input.	Input origin point data. (Data input → Board → Limited)
PCB FIXING ERR PUCH UP SENSOR NO GOOD	1. Sensor is troubled. 2. When push-up rises, it is seized on the way. 3. Sensor is poorly positioned.	1. Replace the sensor. 2. Remove the object which disturbs the elevation of the push-up unit on the way. 3. Change the sensor position.
PCB FIXING ERR LOCATE PIN NO GOOD	1. Sensor is troubled. 2. Locator pin is not in the positioning hole of the board. 3. Hole-positioning is applied for edge-positioning board. 4. Sensor is poorly positioned.	1. Replace the sensor. 2. Change the position of the locator pin or main stopper. 3. Change the setting data. 4. Change the sensor position.
PCB TRANSPORTING ERR REMOVE PCB	1. Board is not transferred to the specified position with a certain time. 2. Since the board request is sent from the machine on the downstream, the board is transferred but is not received by the machine on the downstream. (The machine on the downstream operates improperly, stops or is out of timing.) 3. Boards are present on both conveyor inlet and substopper.	1. Adjust the width of the conveyor to prevent the board from being seized on the way during transportation or from dropping. 2. The board transfer state, timing and system on the main machine, upstream and downstream are compared and improved. 3. Same as above.
PCB DATA ERR	Board data is wrong.	Recheck board data.
NOZZLE STATION ERR MISSED SOME NOZZLE	1. Nozzle is not in the station. 2. Nozzle is not detected by the sensor.	1. Put the nozzle in the station. 2. Replace the sensor or change the sensor position.
NOZZLE STATION ERR FAILED TO CHANGE NOZZLE NOZZLE CLAMP UNABLE	1. Nozzle replacement position data is deviated. 2. Nozzle replacing function is abnormal.	1. Reteach the position of each nozzle station. 2. Refer to the optional manual.
SYSTEM DATA ERR VIDION FILE (BAD MARK) ERR	Data is improperly input. (The binary mode is not selected for the vision file. Moreover, the fixed camera is used.)	Data is reinput. (Data input → Board → Bad mark) Or reinput the vision file.
PICK UP ERR FAILED TO FIND COMP. MOUNT DATA NO. HEAD NO. COMPONENT NO. SET NO.	Error frequently occurs during suction of electronic part. 1. Electronic parts run out. 2. Other header or feeder is poorly adjusted or troubled.	1. Supply electronic parts. 2. Check vacuum levels. 3. Check pick up positions.

Table 6-11
Error messages during program execution

6-2-2 Messages and errors during program execution

(1) Messages during program execution

Table 6-10 Messages and errors during program execution

Message	Meaning
INITIALIZE	Data is being checked or initialized.
MASTER MARK	Master mark is being detected.
MACHINE IS PAUSED	In the step operation mode, machine temporarily stops.
BAD MARK	Bad mark is being detected.
TRANSPORTING PCB	Board is being transferred.
WAITING NEXT PCB	Next board waits at the inlet of the conveyor.
WAITING FOR N54 (RESET)	When the maximum set number of boards is reached, the reset signal from the unloader is waited for.
WAITING FOR N22 (REQUEST)	To transfer the board, the board request signal from the machine on the downstream side is waited for.
MOUNT	Mounting work is on.
PRE. DISPENSE	Predispensing work is on.
DOT DISPENSE	Dot dispensing work is on.
LINE DISPENSE	Line dispensing work is on.

(4) Other troubles and countermeasures

Table 6-9
Other troubles and countermeasures

No.	Symptom	Cause	Countermeasure
1	Power supply is not turned on.	1. Power connector is disconnected, or cable is broken. 2. Non-fuse breaker is turned off. 3. Specified voltage is not supplied. 4. Fuse is molten.	1. Check power connector and cable. 2. After inspecting the cause, turn on the breaker. 3. Supply the specified voltage. 4. After inspecting the cause, replace fuse.
2	CRT screen suddenly disappears, and the same screen which is displayed at the time of power supply is displayed. The arm immediately stops.	1. Power is instantaneously stopped. 2. Since the system detects that power voltage drops beyond 90% of rated voltage, it is reset.	Check power voltage and power capacity. (Power cable is 5m or shorter.)
3	Though it is turned on as output, solenoid valve or conveyor motor does not operate. (Check on DI/DO monitor.)	1. Signal cable is broken, and connector is in poor contact. 2. Solenoid valve is troubled. 3. Circuit protector of motor is operated. 4. I/O output circuit is defective.	1. Check signal cable and connector. 2. Replace solenoid valve. 3. After inspecting cause, reset circuit protector. 4. Replace CPU board, and I/O board.
4	Electronic part is not recognized well with camera.	1. Dust or similar is accumulated on the lens of the camera. 2. LED illumination board is aged.	1. Wipe with a soft cloth. 2. Replace LED illumination board.

Table 6-11 (continued)

Error message	Meaning (Cause)	Countermeasure
TRAY HANDLING ERR TH-HEAD FAILED TO PLACE COMP. FROM TRV-ST1. REMOVE THE COMP.	1. Transfer of electronic part from feeder head to traverser station 1 is failed. 2. Even though electronic part is not present, vacuum sensor of feeder head is sometimes turned on. 3. Even though electronic part is present, vacuum sensor of traverser station 1 is sometimes turned off.	1. Clean nozzle of feeder head. 2. Readjust vacuum sensor of feeder head. 3. Clean suction pad of traverse station 1. 4. Readjust vacuum sensor of traverser station 1. 5. Replace vacuum pump of traverser station 1. 6. If any electronic part drops, be sure to remove it.
TRAY HANDLING ERR SM-HEAD FAILED TO PLACE COMP. FROM TRV-ST1. REMOVE THE COMP.	1. Transfer of electronic part from machine head to traverser station 1 is failed. 2. Even though electronic part is not present, vacuum sensor of traverser station 1 is sometimes turned on. 3. Even though electronic part is present, vacuum sensor of traverser station 1 is sometimes turned off.	1. Clean nozzle and jaws of machine head. 2. Readjust vacuum sensor of machine head. 3. Clean suction pad of traverse station 1. 4. Readjust vacuum sensor of traverser station 1. 5. Replace vacuum pump of traverser station 1. 6. If any electronic part drops, be sure to remove it.
TRAY HANDLING ERR TH-HEAD FAILED TO PICK UP COMP. FROM TRV-ST1. REMOVE THE COMP.	1. Transfer of electronic part from traverser station 1 to feeder head is failed. 2. Even though electronic part is not present, vacuum sensor of traverser station 1 is sometimes turned on. 3. Even though electronic part is present, vacuum sensor of feeder head is sometimes turned off.	1. Clean suction pad of traverser station 1. 2. Readjust vacuum sensor of traverser station 1. 3. Clean nozzle of feeder head. 4. Readjust vacuum sensor of feeder head. 5. Replace vacuum pump of feeder head. 6. If any electronic part drops, be sure to remove it.
TRAY HANDLING ERR FAILED TO PULL PALLET. SET CORRECT PALLET IN STACKER. PALLET NO.	Pull-out of pallet from the stacker to the stage is failed in the feeder.	1. Properly set up a pallet in the feeder stacker. 2. Reinput coordinate data of feeder (System - coordinate - feeder). 3. Check operation of pallet detection sensor, and replace. 4. Check operation of hook and ratchet of feeder.
TRAY HANDLING ERR HOOK FORWARD INABLE.	Feeder hook does not go forward.	1. Readjust the forward/backward speed controller of feeder hook. 2. Check operation of forward/backward valve of feeder hook. 3. Check operation of forward limit sensor of feeder hook, and replace.
TRAY HANDLING ERR RATCHET OPEN INABLE.	Feeder ratchet is not opened.	1. Readjust the open-/closing speed controller of feeder ratchet. 2. Check operation of open-/closing valve of feeder ratchet. 3. Check operation of opening limit sensor of feeder ratchet, and replace.

Table 6-11 (continued)

Error message	Meaning (Cause)	Countermeasure
MOUNT ERR FAILED TO MOUNT COMP. MOUNT DATA NO. HEAD NO. COMPONENT NO. SET POS. NO.	Loading errors of electronic parts frequently occurs. The suction sensor or board positioner are poorly adjusted.	1. Check vacuum levels. 2. Check PCB positioner.
M. CENTERING ERR COMPONENT DROP DOWN	Electronic part is dropped on the fixed centering equipment (mechanical alignment). 1. The inner diameter of the nozzle is smaller for electronic parts. 2. Generated vacuum pressure is weak.	1. Use the nozzle which matches the size of electronic part. 2. Replace vacuum pump, or check vacuum air pipe for leakage.
PREP. HEAD ERR FAILED TO MOUNT COMP.	Even though electronic part is not present on the vacuum sensor of the feeder head, it is sometimes turned on.	1. Clean the nozzle of the feeder head. 2. Readjust the vacuum sensor of the feeder head.
TRAY HANDLING ERR TH-HEAD DOWN INABLE.	Feeder head does not drop.	1. Readjust elevation speed controller of feeder head. 2. Check operation of elevation valve of feeder head. Replace. 3. Check operation of sensor at the lower limit of feeder head. Replace.
TRAY HANDLING ERR TH-HEAD UP INABLE	Feeder head does not rise.	1. Readjust elevation speed controller of feeder head. 2. Check operation of elevation valve of feeder head. Replace. 3. Check operation of sensor at the lower limit of feeder head. Replace.
TRAY HANDLING ERR TH-HEAD FAILED TO PICK UP COMP. MOUNT NO. COMPONENT NO. PALLET NO.	Suction error of electronic part frequently occurs in the feeder. 1. Electronic parts run out. 2. Even though electronic part is present, vacuum sensor of the feeder head is turned off.	1. Resupply electronic parts to the tray. Or use a tray which contains electronic parts. 2. Readjust or replace vacuum sensor of feeder head. 3. Replace vacuum pump of feeder head.
TRAY HANDLING ERR COMP. DROP DOWN FROM TH-HEAD. REMOVE THE COMP.	1. Electronic part sucked by the feeder head is dropped. 2. Even though electronic part is present, vacuum sensor of feeder head is sometimes turned off.	1. Clean nozzle of feeder head. 2. Readjust vacuum sensor of feeder head. 3. If any electronic part drops, be sure to remove it.
TRAY HANDLING ERR SOMETHING IS ON TRV-ST1. REMOVE IT.	1. Transfer of electronic part from the traverser station 1 to the machine head is failed. 2. Even though electronic part is not present, vacuum sensor of traverser station 1 is sometimes turned on.	1. If any electronic part is loaded on the traverser station 1, remove it. 2. Clean suction pad of traverser station 1. 3. Readjust vacuum sensor of traverser station 1.

Table 6-11 (continued)

Error message	Meaning (Cause)	Countermeasure
VISION ERR IMAGE IS NOT GOOD	1. The vision file of the relevant electronic part is wrong. 2. A wrong vision file No. is set. 3. The lead line of electronic part is bent. 4. The lead number, pitch or other item of an electronic part are wrong. 5. The electronic part is out of the view field. 6. The nozzle is detected. 7. The illumination lamp is aged, and an unsuitable illumination is used. 8. The calibration is improper.	1. Correct the vision file. 2. Set the correct vision file No.. 3. Use an electronic part which is not bent, or consult the maker of the electronic part. 4. Use the electronic part as specified. 5. Use the electronic part which matches the view field of the fixed camera, or dislocate the fixed camera into the view field. 6. Correct the suction point. 7. Replace the illumination lamp. 8. Retry the calibration.
VISION ERR MARK SHAPE IS NOT GOOD	1. The mark is rusted to make the detection poor. 2. Data of the diameter, circumference and so on of the mark is wrong. 3. A wrong vision file No. is set. 4. The illumination lamp is aged, and an unsuitable illumination is used. 5. The calibration is improper.	1. Derust the mark for easier detection, or change the mark material. 2. Reinput data. 3. Set the correct vision file No.. 4. Replace the illumination lamp. 5. Retry the calibration.
BAD MARK ERR FAILED TO FIND MARK	1. The mark is rusted to make the detection poor. 2. Data of the diameter, circumference and so on of the mar is wrong. 3. A wrong vision file No. is set. 4. The illumination lamp is aged, and an unsuitable illumination is used. 5. The calibration is improper.	1. Derust the mark for easier detection, or change the mark material. 2. Reinput data. 3. Set the correct vision file No.. 4. Replace the illumination lamp. 5. Retry the calibration.
SYSTEM DATA ERR VISION FILE (FIDUCIAL) ERR	Wrong data is set. (FID is not selected as the mode of the vision file. Or the fixed camera is used.)	Reinput data. (Data input → Board → Fiducial)
PCB DATA ERR COMP. POS. LIMIT OVER	Wrong data is set. (Head which can not go is used to suck the electronic part.)	Check the position data, tray pitch, matrix size, head No. data of the electronic part.
SYSTEM DATA ERR VISION FILE (COMPONENT) ERR	Wrong data is set. (The mode of the vision file is not set for electronic parts. Or fixed camera is used.)	Reinput data. (Data input → Board → Mount)
COMP. DISCARDING ERR	1. Discarding electronic part is failed. 2. Even though electronic part is not present, the vacuum sensor of the head is sometimes turned on.	1. Clean the nozzle and jaws, or increase the blow rate of air from the nozzle tip. 2. Readjust the vacuum sensor of the head.

Table 6-11 (continued)

Error message	Meaning (Cause)	Countermeasure
TRAY HANDLING ERR TH-HEAD FAILED TO PICK UP COMP.FROM TR V-ST2. REMOVE THE COMP.	1. It is failed to transfer electronic part from traverser station 2 to supplier head. 2. Though electronic part is not present, negative pressure sensor of traverser station 2 is sometimes turned on. 3. Though electronic part is present, negative pressure sensor of supplier head is sometimes turned off.	1. Clean adsorption pad of traverser station 2. 2. Readjust negative pressure sensor of traverser of traverser station 2. 3. Clean nozzle of supplier head. 4. Readjust negative pressure sensor of supplier head. 5. Replace negative pressure generator of supplier head. 6. If electronic part drops, be sure to remove it.
TRAY HANDLING ERR COMP.DROP DOWN FROM TR V-ST2. REMOVE THE COMP.	1. Electronic part adsorbed in the traverser station 2 drops. 2. Though electronic part is present, negative pressure sensor of traverser station 2 is sometimes turned off.	1. Clean adsorption pad of traverser station 2. 2. Readjust negative pressure sensor of traverser station 2. 3. If electronic part drops, be sure to remove it.

Table 6-11 (continued)

Error message	Meaning (Cause)	Countermeasure
TRAY HANDLING ERR HOOK SHUNT INABLE.	The supplier hook does not return to the waiting position.	1. Readjust the forward/backward speed controller. 2. Check operation of forward/backward value of the supplier hook. Replace valve if necessary. 3. Check operation of waiting sensor of supplier hook. Replace sensor if necessary.
TRAY HANDLING ERR RATCHET CLOSE INABLE.	Supplier ratchet does not close.	1. Readjust open-/closing speed controller of supplier ratchet. 2. Check operation open-/closing valve of supplier ratchet. Replace valve if necessary. 3. Check open-/closing sensor of supplier ratchet. Replace sensor if necessary.
TRAY HANDLING ERR PALLET IS PULLED ON STAGE. REMOVE THE PALLET.	Pallet is present on the supplier stage.	1. Properly set up pallet on the supplier stacker. 2. Check operation of pallet detecting sensor. Replace sensor if necessary.
TRAY HANDLING ERR COMP. DROP DOWN FROM TR V-ST1. REMOVE THE COMP.	1. Electronic part adsorbed in the traverser station 1 drops. 2. Though electronic part is present, negative pressure sensor of traverser station 1 is sometimes turned off.	1. Clean adsorption pad of traverser station 1. 2. Readjust negative pressure sensor of traverser station 1. 3. If electronic part drops, be sure to remove it.
TRAY HANDLING ERR SOMETHING IS ON TRV-ST2. REMOVE IT.	Though electronic part is not present, negative pressure sensor of traverser station 2 is sometimes turned on.	1. Clean adsorption pad of traverser station 2. 2. Readjust negative pressure sensor of traverser station 2.
TRAY HANDLING ERR TH-HEAD FAILED TO PLACE COMP.FROM TR V-ST2. REMOVE THE COMP.	1. It is failed to transfer electronic part form supplier head to traverser station 2. 2. Though electronic part is not present, negative pressure sensor of supplier head is sometimes turned on. 3. Though electronic part is present, negative pressure sensor of traverser station 2 is sometimes turned off.	1. Clean nozzle of supplier head. 2. Readjust negative pressure sensor of supplier head. 3. Clean adsorption pad of traverser station 2. 4. Readjust negative pressure sensor of traverser station 2. 5. Replace negative pressure generator of traverser station 2. 6. If electronic part drops, be sure to remove it.
TRAY HANDLING ERR SM-HEAD FAILED TO PLACE COMP.FROM TR V-ST2. REMOVE THE COMP.	1. It is failed to transfer electronic part form machine head to traverser station 2. 2. Though electronic part is not present, negative pressure sensor of machine head is sometimes turned on. 3. Though electronic part is present, negative pressure sensor of traverser station 2 is sometimes turned off.	1. Clean nozzle and jaw of machine head. 2. Readjust negative pressure sensor of machine head. 3. Clean adsorption pad of traverser station 2. 4. Readjust negative pressure sensor of traverser station 2. 5. Replace negative pressure generator of traverser station 2. 6. If electronic part drops, be sure to remove it.