PV Module Equipment

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Maintenance Manual

Tabbing & Stringing Machine

MODEL : NTS-150-S-H-3K

TS-1010－232

NPC Incorporated

Upon receipt of the product and prior to initial operation,
read these instructions thoroughly, and retain for future reference.

Thank you for your selecting our product.

Please keep this manual handy for future reference.

Contents

1. For Safe and Appropriate Use of This Machine

Before using this machine, read “Safety Instructions” stated in this chapter and fully understand each article in order to ensure safe and appropriate use of this machine. If you have any question, feel free to contact us. Thank you.

1-1. Comprehensive Safety Instructions

(1) Carefully read **Operation Manual / Maintenance Manual** and the **manuals of parts and devices** in order to operate the machine safely and appropriately in all events such as installation, operation and maintenance.

(2) Assign **a person responsible for the machine management** in order to ensure overall safety and appropriate operation of the machine.

(3) In consideration of the workers’ safety and health, the person responsible for the machine management should prepare “**Safe Working Procedures**” in accordance with the manuals and equip necessary protective gears on the shop floor. The person in charge should train the workers so that they become safety-conscious enough to wear personal protective gears and abide by “Safe Working Procedures”.

(4) The machine should be handled only by the workers who have been trained fully to get necessary **knowledge and skills**.

(5) Workers should follow **Operation Manual / Maintenance Manual and “Safe Working Procedures**.” They should wear work clothes and cap, not leaving shirt, necktie, long hairs and such untucked, and should not wear accessories which may hinder the work such as big earrings and a pendant. And use necessary **personal protective equipment** such as protective gloves, protective shoes, and protective glasses in order to ensure safe and appropriate work.

(6) When a third party other than the person responsible for the machine management and the operator in charge needs to access the machine, he or she should be under supervision of the person responsible for the machine management. **Minimize third party’s access to the machine**.

(7) Use the machine **only for the originally intended purpose** and **within its specifications**. The operator must not do the work which is intended to be done by the machine (material arrangement and spreading in the equipment, material loading/unloading on the conveyor, etc.) by the hand.

(8) Retrofits may affect the safety aspect of the machine. **In any case of retrofit to the machine, surely advise us on it in writing**. Do not modify or disassemble based on your own independent judgment. It may result in fire, electric shock, or injury. We assume no responsibility whatsoever for any damages resulting from modification or disassembly.

1-2. Warning Signs

The following warning signs are used in our manuals to ensure safe and appropriate use of this machine and to prevent accidents when the workers are engaged in installation, operation, maintenance, and any other handling of this machine. The workers should be familiar with each sign's meanings (what hazards, how hazardous, and how to avoid them) to operate the machine accordingly. These signs are also labeled on the machine. Beware each of them. Also pay attention to signs other than listed below if any label is attached on the machine or parts.

Warning Sign	Description
	**Electric Shock** Electric shock or burn is possible. Mishandling by neglecting this warning may bring death or serious injury to the workers or significant damage to the machine. Turn power off, in principle, before installation and maintenance.
	**Pinching / Crushing** The machine has hazards such as pinching, crushing unless the instructions are observed, which may bring death or serious injury to the workers or significant damage to the machine. Beware of protruding parts or moving elements. Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.
	**Entanglement** The machine has hazards such as entanglement, drawing-in, or trapping unless the instructions are observed, which may bring death or serious injury to the workers or significant damage to the machine. Beware of protruding parts or moving elements. Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.
	**Cutting / Severing** The machine has hazards such as severing, cutting, and shearing unless the instructions are observed, which may bring death or serious injury to the workers or significant damage to the machine. Beware of protruding parts or moving elements with sharp blades or edges. Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.

	**High Temperature** Even after turning off the main breaker, some objects may remain hot. Mishandling by neglecting this warning may cause serious injury. Handle them only after making sure they are cool enough.
	**Rotating Objects** The machine has rotating parts. Mishandling by neglecting this warning may bring serious injury to the workers or heavy damage to the machine. Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance in the periphery of rotating objects. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.
	**Explosion** There are always possibilities of explosion of the xenon lamp, and flying debris may seriously hurt the workers. When opening the xenon lamp storage unit or handling a lamp, wear personal protective equipment such as a protective mask and/or protective gloves beforehand anticipating contingencies.
	**Laser** Observe the following instructions. Otherwise, injury to the human body (eyes and skin) may result. ➢ Do not direct the laser beam to a person. ➢ Do not disassemble the unit. ➢ Do not look directly into the laser beam.
	**Other Warnings / Attentions** The machine has other various hazards such as stabbing or puncture, impact, friction or abrasion unless the instructions are observed, which may bring death or serious injury to the workers or significant damage to the machine. Beware of protruding parts and moving elements. Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.

	**Prohibition (Do not step on)** Do not step on the machine. Use a stepladder to climb the machine. Careless step on the piping or the chain may cause damage or distortion, which may result in poor performance.
	**Instructions Related to Performance and Reliability of Machine** In order not to impair the machine's performance or reliability, follow the instructions accompanying the symbol in the manuals.

1-3. Installation

(1) Specify hazard zone in the periphery of the machine and mark it on the floor. Prevent unnecessary approach during operation.

(2) The primary electric hook-up shall be done by a qualified electrician. Malconnection may cause not only machine damage but also injury accidents.

(3) Protect and take care of the cables and hoses.

(4) For sufficient air supply, make sure that the primary air regulator reads 0.5-0.6MPa.

(5) Take measures of the labeling, the protective equipment, etc. according to regulations when the chemical is used.

1-4. Operation

(1) Avoid fire use in the periphery of the machine and secure the safety in the area before and during operation.

(2) Before operation, make sure that all the safety doors and lower covers are closed, that all the screw-fixed panels and safety fences are in place, and that all the safety devices are functional. During operation, never conduct dangerous deeds such as inadvertently opening a safety door, opening a lower cover, or entering the area covered by area sensors' detection.

(3) When finding a damaged work, surely switch to manual mode and then clean up. When cleaning inside the machine, be careful of dangerous objects such as heating plates, cutters, and protruding parts. Before resuming the operation, completely remove the debris.

(4) Finding a damaged part, surely turn off the main breaker and the primary air supply to the machine and release the residual pressure, then revamp or replace the parts soon. Be very careful of objects such as heating plates, cutters and protruding parts.

(5) When there are plural workers in the machine periphery, unexpected movement of the machine may cause injury accidents. Exchange signals one another, pay attention to all workers' safety.

(6) To avoid electric leak or electric shock, keep the machine away from water. Also never operate it wet-handed.

(7) At the end of operation, turn off the main breaker without fail.

(8) Never touch hot objects like heating plates, which may remain hot regardless of on/off status of the heaters or the main breaker. The products just after thermally processed may be very hot, too. Also avoid touching barehanded potentially hot parts and devices such as the xenon lamp and the pump. Well ventilate the area and wait until they get cool enough to handle.

(9) When a xenon lamp, a laser device and the kind are used, be careful not to directly look at the beam from them.

(10) Keep the machine periphery tidy to prevent workers from falling and slipping. Do not stamp on cables or hoses. And never put anything on them.

(11) Well ventilate the working area and avoid inhaling the gas exhausted from the vacuum pump, the gas or smoke that emanates from heating units, and the dust discharged in the process.

(12) To avoid damage to the machine, never point at the display screen with sharp-pointed objects such as a pencil and a cutter.

(13) All the parameters and the prescribed values of the programmable logic controller (PLC) should be managed and recorded by the person responsible for the machine management. After editing the parameters and the values of the system, double check if the newly entered values are correct.

1-5. Maintenance

(1) Turn off the main breaker and the primary air supply to the machine and release the residual pressure in principle, before installation and maintenance. Before maintenance of pneumatic or hydraulic devices, surely release the residual air. When any pressure is left, unexpected motions may take place during maintenance work. Then, lock a handle(s) that cuts off energy supply using a padlock(s) to prevent careless energy supply. When energy supply is indispensable for the work, do it in manual mode with extra care.

(2) Avoid fire use and secure the safety in the periphery of the machine.

(3) When finding any damage of the machine or a damaged part, repair or replace the parts soon. Be careful of dangerous objects such as heating plates, cutters and protruding parts.

(4) After opening a lower cover or removing a screw-fixed cover for maintenance, double-check they are closed or fixed before resuming the operation.

(5) When there are plural workers in the machine periphery, unexpected movement of the machine may cause injury accidents. Exchange signals one another, pay attention to all workers' safety.

(6) For fear of electric leak and electric shock, keep the machine away from water. And never operate it wet-handed.

(7) Keep the machine periphery tidy to prevent workers from falling and slipping. Do not stamp on cables or hoses. And never put anything on them.

(8) Never touch hot objects like heating plates, which may remain hot regardless of on/off status of the heaters or the main breaker. Also avoid touching barehanded potentially hot parts and devices such as the xenon lamp and the pump. Well ventilate the area and wait until they get cool enough to handle.

(9) The xenon lamp may explode during lamp replacing and/or optical part maintenance. Be careful with the lamp. Be sure to wear an adequate face mask, long-sleeved jacket and protective gloves beforehand.

(10) The person responsible for the machine management should list up all the periodic inspections and make certain that all the inspections are carried out properly to grasp the machine conditions.

(11) In order to prevent other workers from operating the machine during maintenance work, post visible notices around the machine to let them know that the machine is under maintenance.

(12) To avoid damaging the machine, use only appropriate tools for maintenance.

2. Periodic Inspection

This is the inspection list for each unit. Refer to the following for each maintenance details.

2-1. Daily Inspection

No.	Check point	Description
1	Primary Air Pressure	Make sure air supply pressure at the regulator reads around 0.5MPa to 0.6MPa. Cylinders may seize up if the pressure over 0.7MPa is kept supplied to them. Check air filters and mist separator as well.
2	Hot Air	Secondary hot air regulator needs to be at 0.2 - 0.3MPa. Analog flow-meters need to be at 15 L/min. Digital flow-meters need to be at 20 L/min. If the value falls below 15L/min, the air heater may get burnt.
3	Each Table Alignment Unit Movable Parts	Wipe off the dirt or dust of each table, alignment unit or other movable parts. Keep the moving units clean and check them for any obstacles to prevent the machine from damage or miss-movement.
4	Flux Nozzle Unit	Daily check if there is no flux leak from the flux tank, piping, and joints. Flux tends to accumulate in a flux spray nozzle, so clean up nozzles every end of shift. Also, wipe off flux that might leak from the flux nozzle and visually check piping for any sign of abnormality.
5	Flux Application Unit, Soldering Unit and Perimeters	Clean the units and the perimeters if any flux or soldering particles. Clean with brush and vacuum cleaner when adherence like snow is found around the hot air unit. Do not use an air blow gun for cleaning because it scatters the dust inside the machine.
6	LED Table	Wipe dust of LED Table. The dirt of the LED table influences the inspection.
7	Tab Holding Pin	Remove and clean up the whole tab holding pins every 8 hours. Exchange the pins a) when they are bent or warped b) when dirt cannot be removed even after cleaning c) when expansion and contraction of the spring are not smooth due to dirt.
8	String Conveyor Belt	Cleaning every 8 hours is recommended. Fill the tank with cleaning 100% alcohol (Isopropanol). Replace the sponge if necessary by removing the screw.
9	Tab Transfer Hand	Vacuuming holes of tab transfer tend to be clogged with foreign objects. Clean the holes 2-3 times every day with the drill bit (approx.0.7mm diameter). Change the setting so that air may blow from the holes before cleaning.
10	Whole Machine	Clean up the whole machine.

2-2. Weekly Inspection

No.	Check point	Description
1	Vacuum Pad	Check the pad's condition by touching/ watching. When it is damaged, replace it. When the up/down movement is not smooth, apply some silicon oil.
2	Tab Guide	Check the tab guide entrance / exit for solder components and remove them if exist. When using scraper made of hard material, care not to damage guide flute.
3	String Belt Tension	Make sure that tension guide touches the belt while the cylinder is lifted. Also, make sure that the regulator for tension indicates between 0.2MPa and 0.3MPa.
4	Timing Belt	Check if the groove is deep enough on the flip-over and sponge belt. Check for any splits. If there is any, replace it.
5	Appearance Check	Clean the places which normally can not be handled. Check the appearance for any trouble.

2-3. Monthly Inspection

No.	Check Point	Description
1	Vacuum Ejector	Clean the vacuum ejector filter.
2	Cleaning of Moving Element	Clean each moving element.
3	Tab Chuck and Tab Cutter	Make sure there is no damage in the tab chuck and the tab cutter. Check the cutting edge sharpness by manual operation.
4	Flexible Coupling	Remove the cover of the coupling and check that the shaft is firmly fixed.
5	Flux Tank	Clean the flux tank.

2-4. Others

NO.	Check Point	Description
1	Cylinder Sensor and Connecter Connection	Check that the cylinder sensors and connectors are firmly fixed. Tighten them if necessary.
2	Cell Feed Unit to Cell Transfer	Check the conveyor sprockets and plastic chains for looseness.
		Check the transfer and shock absorbers movement.
3	Cell Feed Transfer	Visually check cables and air hoses in cable carriers have no damage or rips.
		Visually check the transfer forward/backward strokes and the stopping position by manual operation.
4	Tab Table	Check tabs are not slanted, warped or dented on the tab table. Check tab table is horizontal. Check the height of delivery position by manual operation.
		Check vacuum piping and connection by hand and visually.
5	Tab Transfer	Check the piping of vacuum holes and hoses during auto operation.
		Check if the tab transfer hand keeps the right angle using a scale.
6	Hot Air Heater	Firmly tighten servo axis sensors and sensor brackets.
		Visually check heater and thermocouple wiring.
7	Ball Screw and LM Guide	Inject grease from the nipples every 3-6 months. Use Lithium-based grease. (Consistency JIS number 2, NLGI No.2)
8	Gear and Sliding Unit	Inject grease from the nipples every 6 months. Use Lithium-based grease. (Consistency JIS number 2, NLGI No.2)
9	Alignment Robot	Record the four axes data every 6 months. (X,Y,Z, θ direction) (Standby, Alignment, Flux Table, Reject Tray)
10	O-ring at Flux Tank Lid	Exchange every year.
11	Encoder Cable Battery	When the battery needs to be replaced, alarm A830 or A930 will be displayed on the servo display. Check for the alarms on the servo display once a year. Refer to [3-16. Encoder Cable with Absolute Value Specification].

MEMO

3. Details of Inspection & Parts Replacement

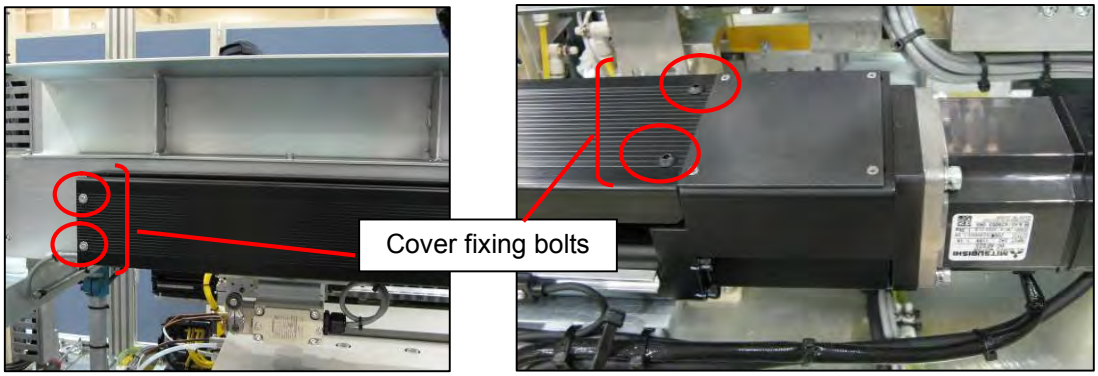
*** Pictures used in this section may not be the same as your machine.**

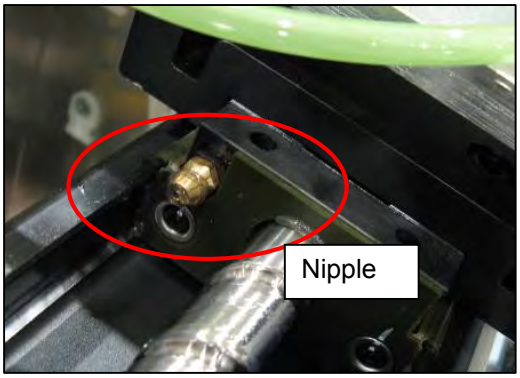
3-1. Grease Up

	**Before lubrication, surely turn off the machine and release the residual pneumatic pressure.**

3-1-1. Ball screw unit

Cycle	Once in 3 - 6 months
Lubricant	Use the Lithium-based grease (Consistency JIS number 2, NLGI No.2)
Applying	(1) Turn off the machine and release the residual pressure. (2) When ball screws are covered. Remove cover fixing screws and open the cover. (3) Inject grease from the nipple. Inject grease directly for ball screws without nipple.

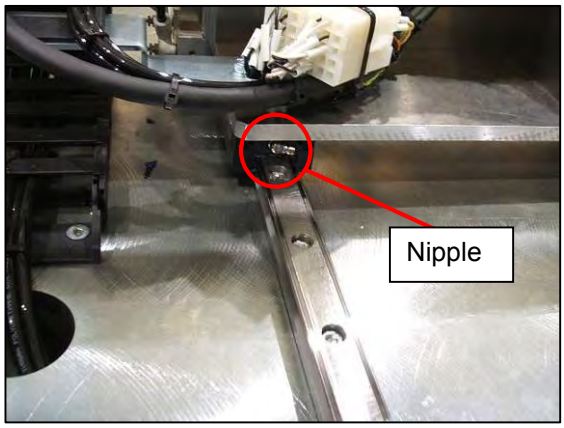




*** For Ball Screws without Nipples, apply grease directly.**

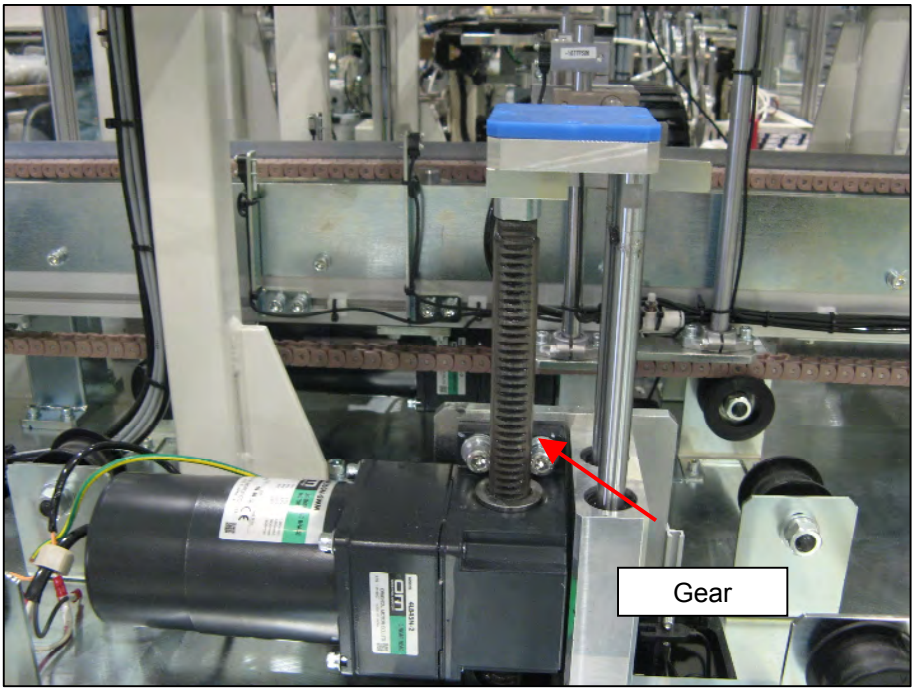
3-1-2. LM guide

Cycle	Once in 3 - 6 months.
Lubricant	Use the Lithium-based grease (Consistency JIS number 2, NLGI No.2)
Applying	(1) Turn off the machine and release the residual pressure. (2) Inject grease from the nipple. For LM Guide without Nipple, apply grease directly



3-1-3. Lubrication of Other Parts

Cycle	Once in 3~6 months.
Lubricant	Use the Lithium-based grease（Consistency JIS number 2, NLGI No.2）
Applying	(1) Turn off the machine and release the residual pressure. (2) Inject grease from the nipple. For gear etc. without nipple, apply grease directly.



Cell Lifter Unit

3-2. Coupling

A flexible coupling is used for the each servo.

Check the fixing screws of flexible coupling.

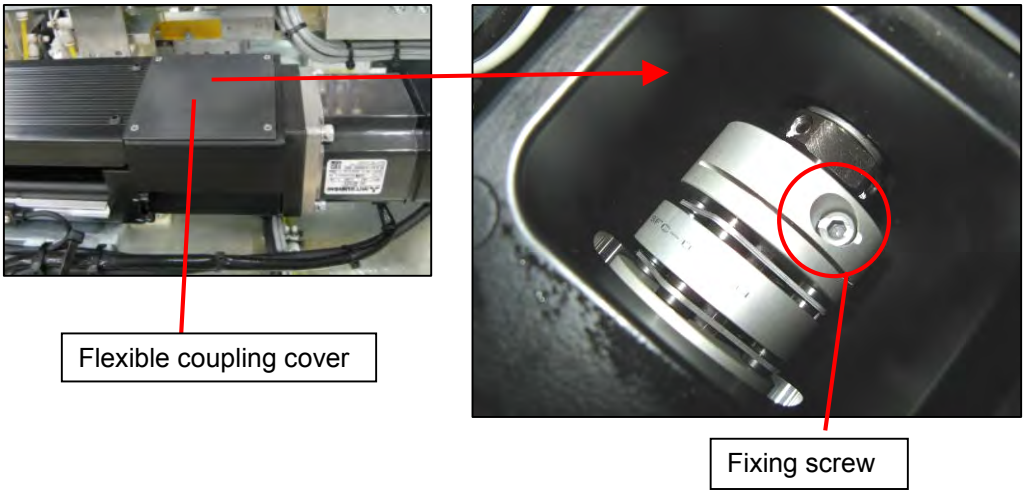
3-2-1. Servo

Unit with a cover (Tab Chuck, Flux Application Tabel, Hot Air)

(1) Remove the screws at the four corners of the cover for the flexible coupling to open the cover.

(2) Verify that the shaft fixing screw is not loose.

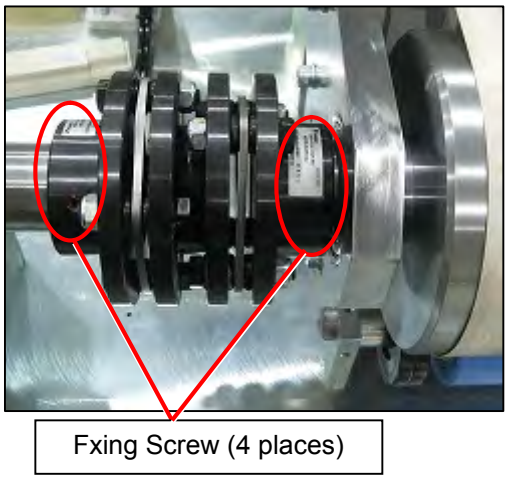
(3) Fix the cover with opposite procedure.



Tab Chuck

Unit without a cover (String Conveyor, String Transfer)

(1) Check loose of fixing screw for shaft.

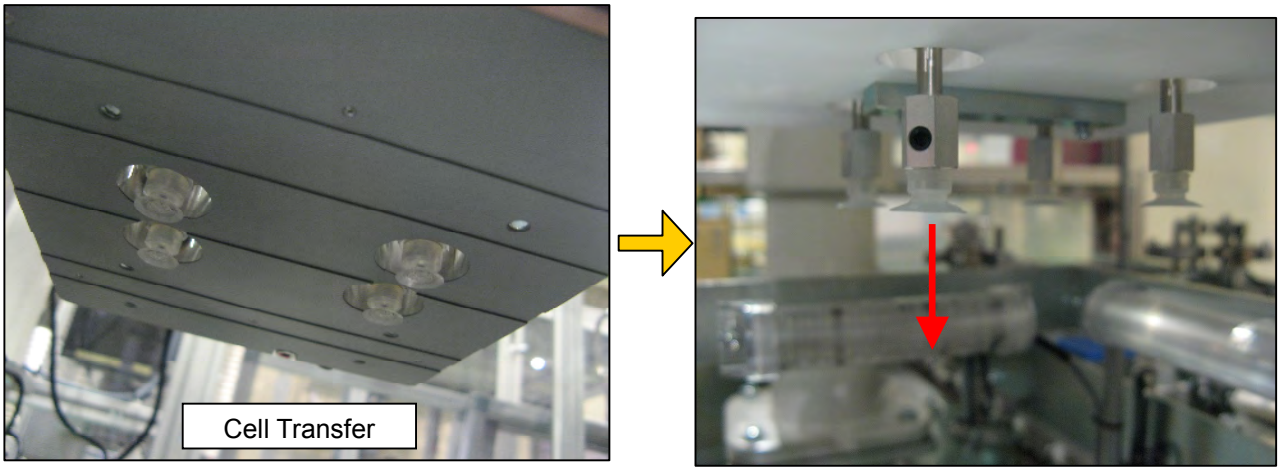


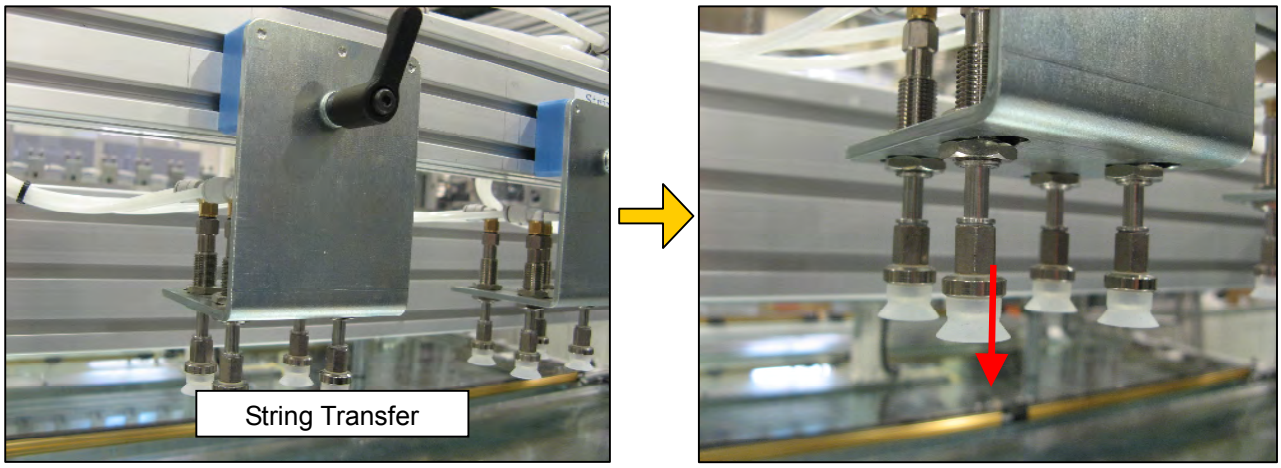
String Conveyor

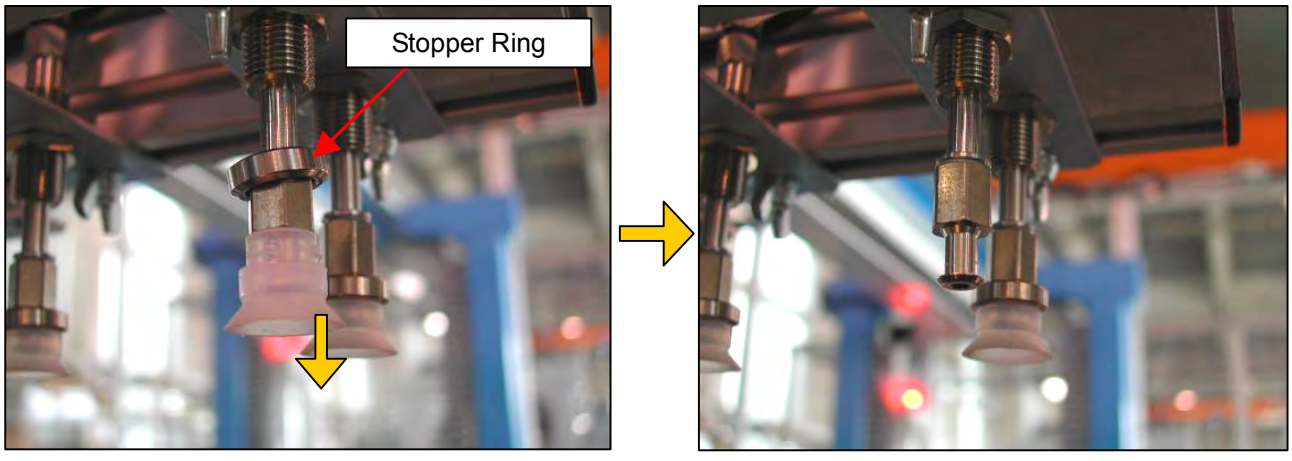
3-3. Vacuum Pad

3-3-1. Cell Transfer

Cycle	Replace them when they are damaged or worn out.
Procedure	Remove Stopper Ring upwards, and pull down the pad as the red arrow direction.

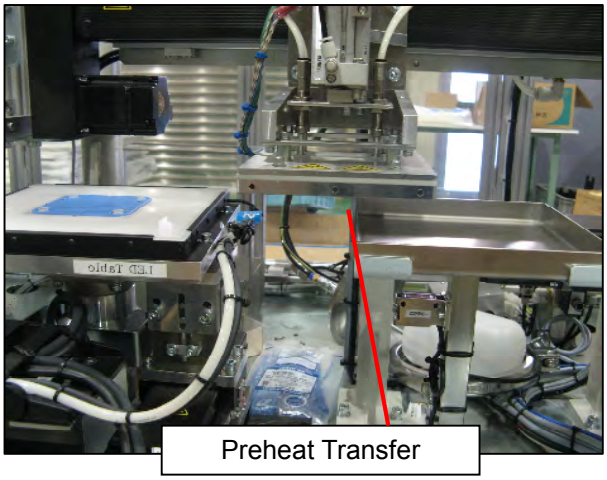




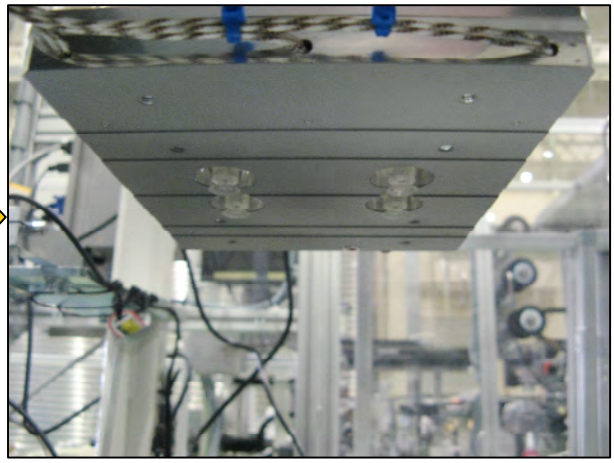


3-3-2. Pre-heat Table

Cycle	Replace them when they are damaged or worn out.
Procedure	(1) There is a heater in the plate. Confirm the power supply of the machine is off , and the plate has been cooled. (2) Pull out the vaccum pad below, and install a new pad. Do not add too much power to the pad and do not damage it.



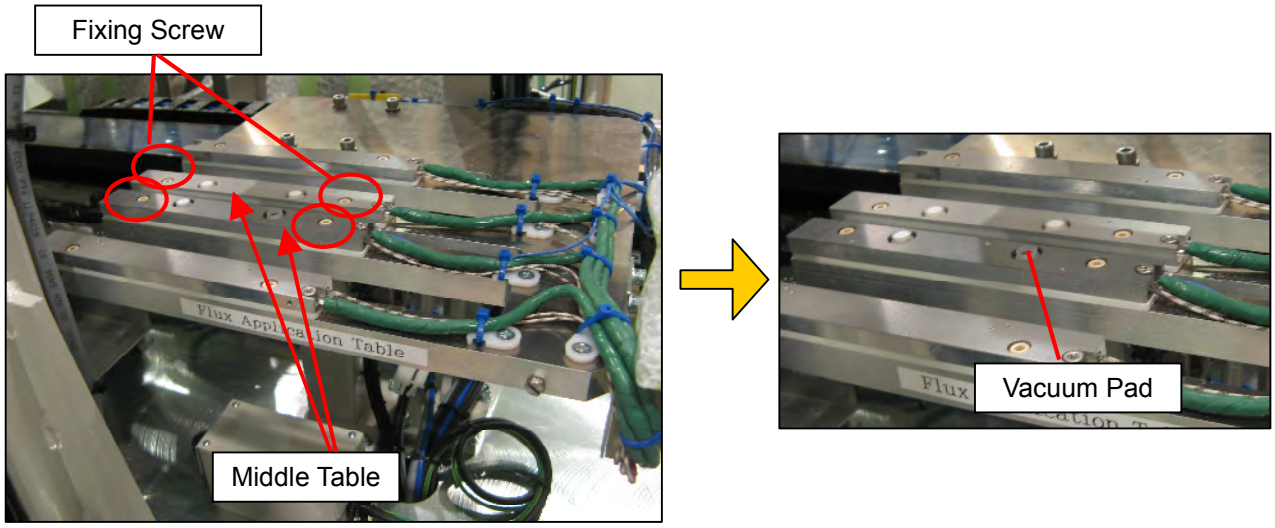
Preheat Transfer



	The heater enters in the plate and it is hot while driving. There is fear of the burn, confirm the power supply of the machine is off before works, and the plate has been cooled.

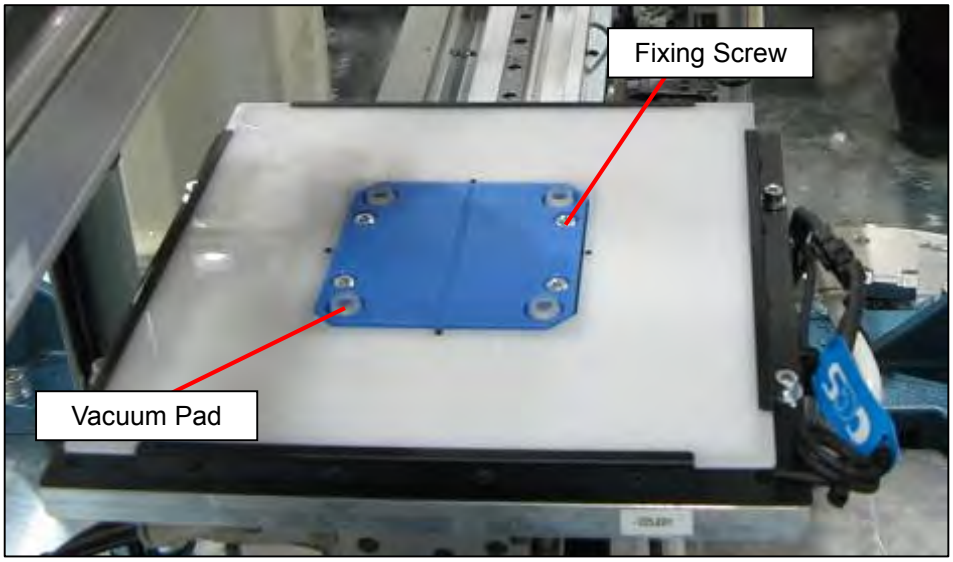
3-3-3. Flux Table

Cycle	Replace pads when they are damaged or worn out.
Procedure	(1) Unscrew fixing screws and remove the corresponding blue plate. (2) Remove the vacuum pad and replace the new one. DO NOT add extra force to vacuum pad not to be damaged. (3) Fix the blue table with fixing screws after the replacement.



3-3-4. LED Table

Cycle	Replace pads when they are damaged or worn out.
Procedure	(1) Unscrew Fixing Screw and remove the Middle Table. (2) Take old pad out and put new pad. DO NOT add extra force to vacuum pad not to be damaged. (3) Fix the table back by following the above steps in the opposite order.



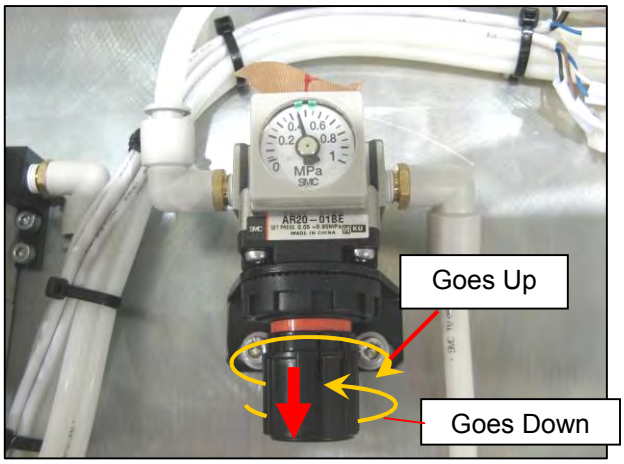
3-3-5. Vacuum control adjustment

The vacuum absorbability of vacuum pads is adjustable.

(1) Pull down the handle of the each Regulator as red arrow direction to make it adjusting condition.
(2) Turn the handle right or left direction to adjust.

*** The target value of regulator is 0.2-0.3MPa.**

*** The regulator of Hot Air Unit is not for vacuuming.**



3-4. Solenoid Valve

3-4-1. SQ Series

3-4-1-1. Replacement

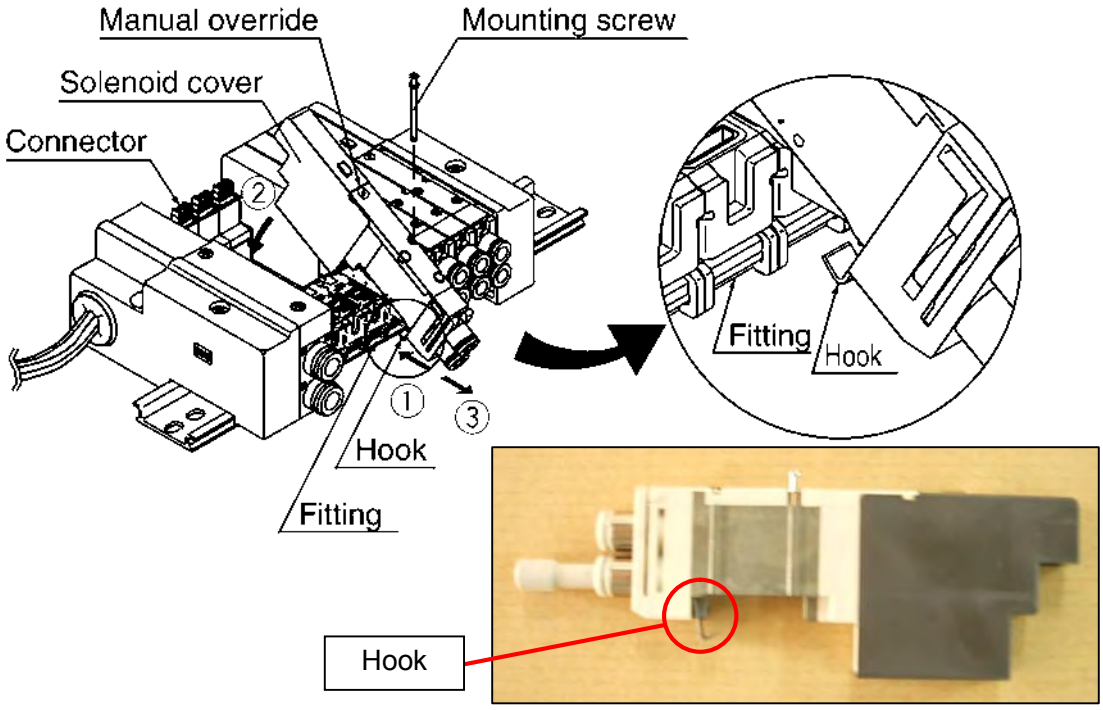
(1) Stop the air supply to the machine. Take out the remaining air.

(2) Loosen the one valve mounting screw.
When f it is difficult to loosen the screw, loosen it while pressing the valve gently on the area near the manual override. Be careful not to push the solenoid cover.

(3) Lift the valve from the connector side (solenoid cover side) and remove it by sliding it in the direction of arrow of figure below.

(4) Insert the hook of the new valve into the fitting on the manifold block, and then push the valve down into place.

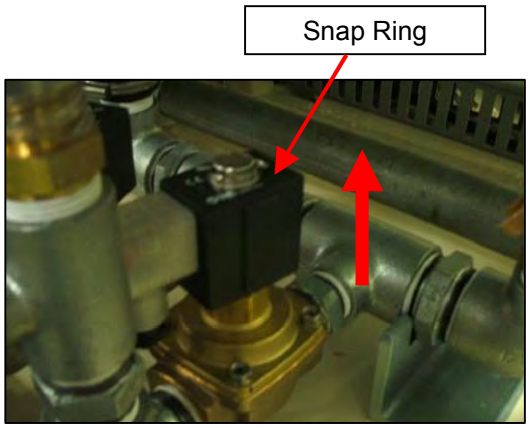
(5) Tighten the mounting screw with the appropriate tightening torque.
(SQ1000 series: 0.17~0.23N·m、SQ2000 series: 0.25~0.35N·m)



3-4-2. VXZ Series

3-4-2-1. Solenoid Valve Replacement

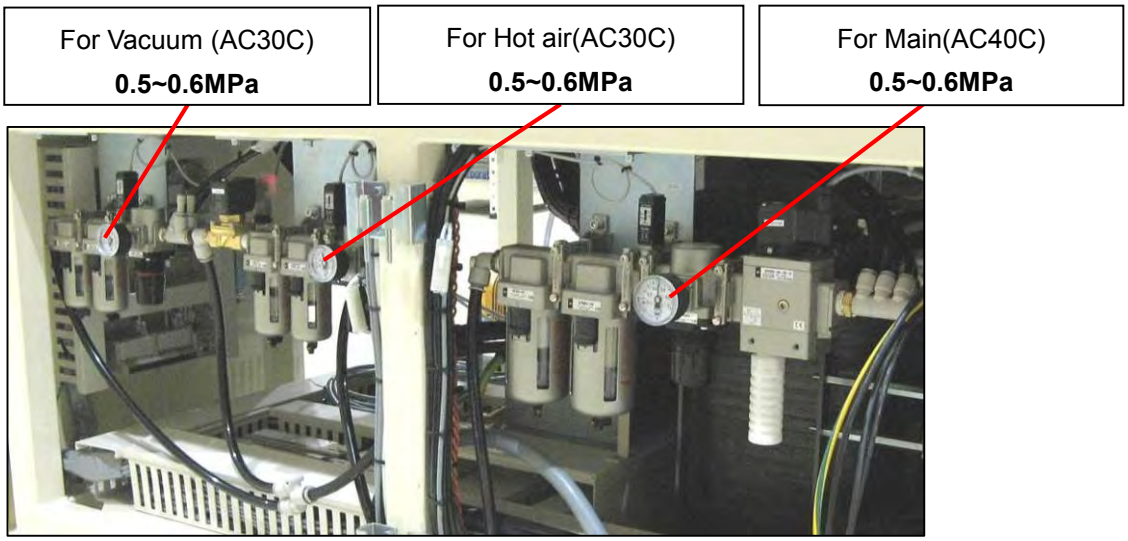
(1) Turn the machine power OFF and check the safety of the machine.
(2) Take the snap ring off from the solenoid upper unit.
(3) Pull up the solenoid to the arrow direction.



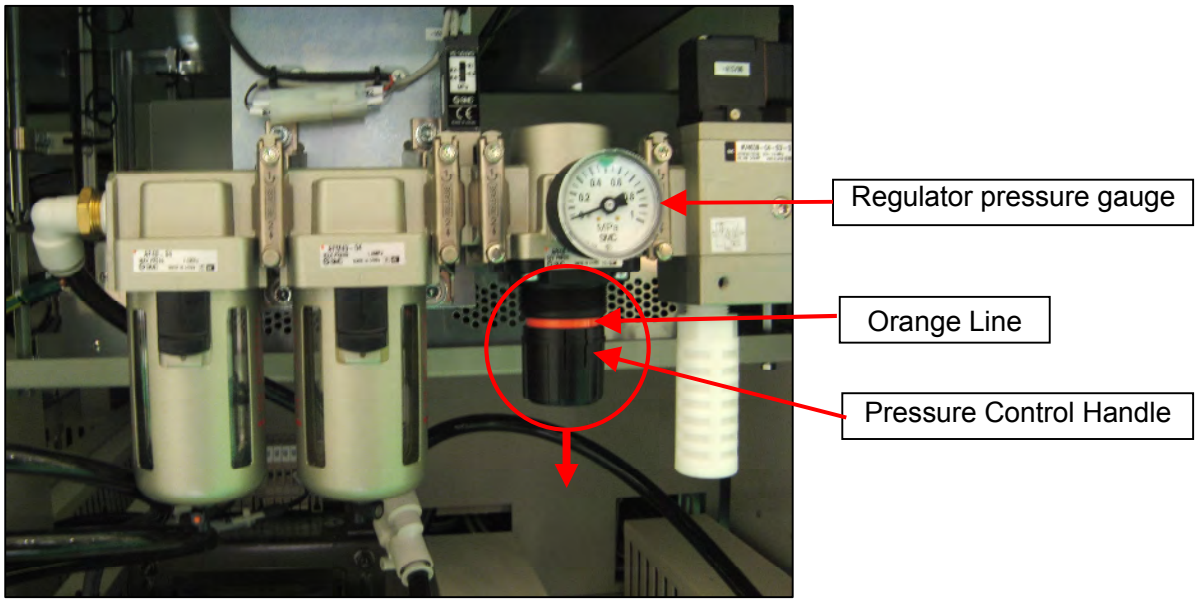
3-5. Air Pressure

3-5-1. Check

Before starting the operation, check the primary side air regulator at the lower side of the machine. The primary air should be sufficiently supplied with a prescribed pressure **around 0.5MPa to 0.6MPa**.
When it exceeds 0.7 MPa, the cylinder may get damaged.



(1) Pull down the pressure control handle to unlock. An orange line appears when pulling down the handle.
(2) Turn the pressure control handle checking the pressure gauge, until it reaches around **0.5MPa to 0.6MPa.**
(3) When pressure reaches the specified range, lock by pushing up the handle.



3-6. Air Filter and Mist Separator

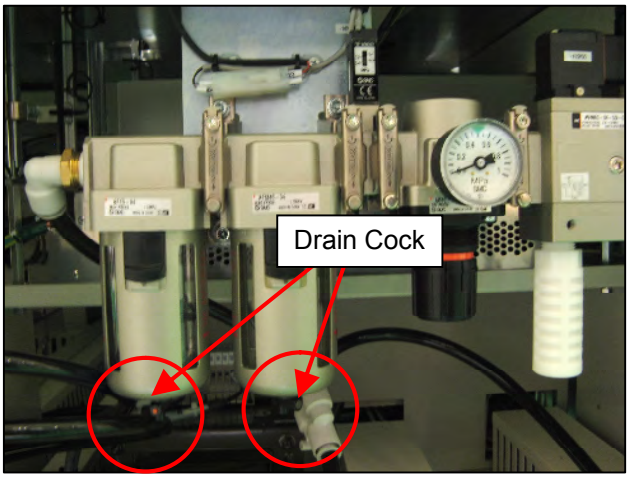
3-6-1. Draining

Frequently drain the accumulated moisture and oil content from the air combination.

	Electrical Shock Hazard! **Surely stop the electrical and pneumatic power supply and release the residual pressure before draining. Use a bucket to prevent the drain splash, or any moisture left on the electrical devices nearby can cause electrical shock when currency is applied.**

Drain accumulated moisture and oil content from the air combination.

(1) Pinch the pin on the drain cock at the bottom of the case to drain.
(2) Release the pin when draining is completed.



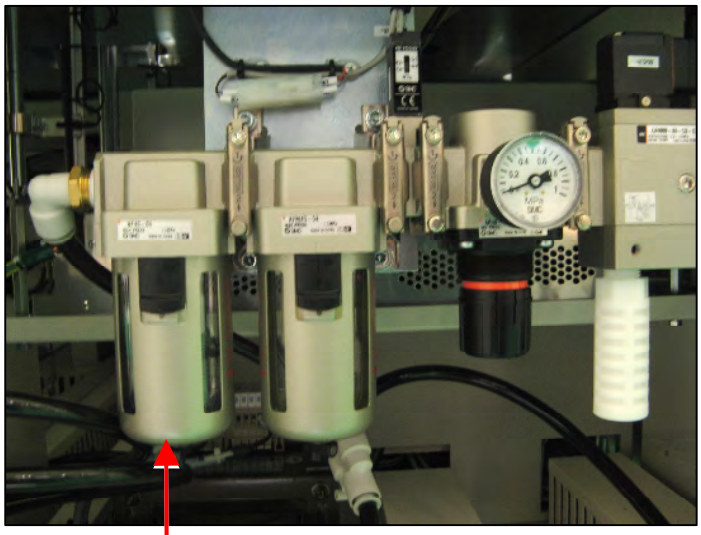
3-6-2. Elements for Air Filter

The elements in the air filter and the mist separator need to be replaced every two years. Refer to the following pages for replacement procedures.

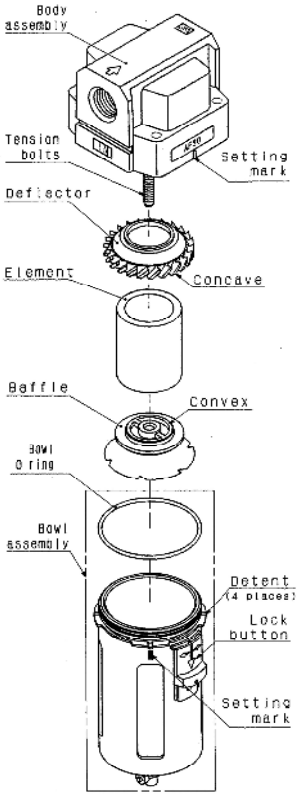
3-6-2-1. Replacement

⚠	**Before replacement, verify that there is no pressure left in the case. If any is left, unexpected movement of the machine may hurt the operator.**

(1) Push the bowl assembly lock button. Lifting the bowl assembly, rotate the assembly 45 degree (right or left) to pull out the assembly.
(2) Remove baffle, element, and deflector rotating the baffle counterclockwise by hand.
(3) Set the deflector to the body assembly minding the mount direction(concave in which the element goes in).
    * Deflector direction: concave faces the element
(4) Insert a new element to the deflector concave
(5) Insert the baffle to the element minding the mount direction (convex to which the element goes.)
    * Baffle direction: convex faces the element
(6) Rotate the baffle clockwise until it contacts the element and the deflector lightly. And then rotate approx. half more clockwise to tighten them.
    *Referential tightening torque AF30: 0.5 Nm AF40: 0.9 Nm
(7) Match the setting mark of the body and the bowl assembly to insert the assembly to the body. Rotate the assembly 45 degree (right or left) until the lock button is tossed up to mount the bowl assembly. Ensure the lock button is up.



Air FIlter
(Dust and Water are collected)

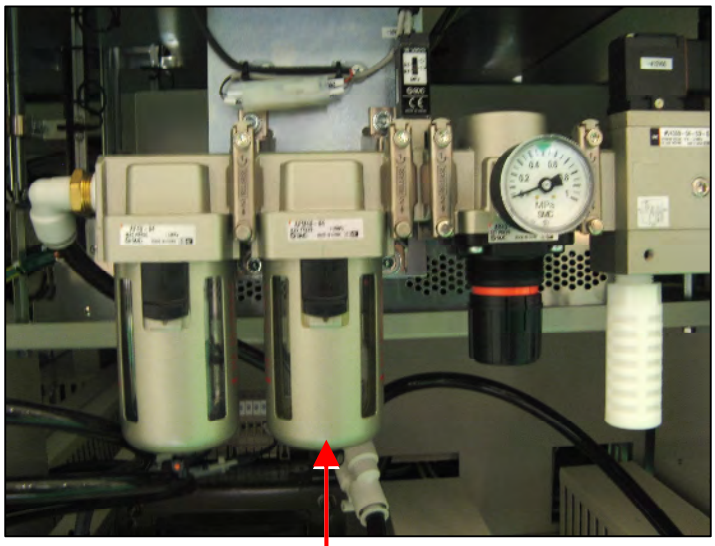


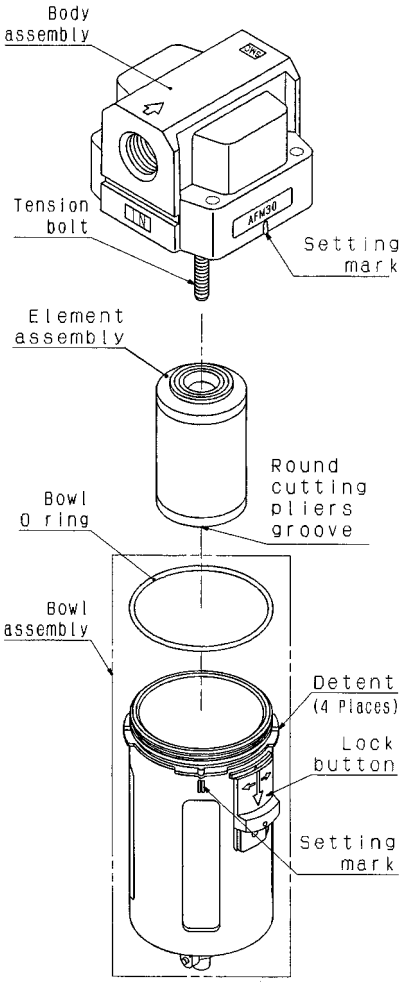
Breakdown Structure of AF30/ 40

3-6-2-2. Element for Mist Separator

⚠	**Before replacement, verify that there is no pressure left in the case. When any is left, unexpected movement of the machine may hurt the operator.**

(1) Push the bowl assembly lock button. Lifting the bowl assembly, rotate the assembly 45 degree (right or left) to pull out the assembly.
(2) Hold the flat of the element with round plier and rotate counterclockwise.
(3) Hold the flat of the elemtn with round pliers and rotate clockwise.
Tightening torque: 0.35 +/- 0.05 Nm
(4) Match the setting mark of the body and the bowl assembly to insert the assembly to the body. Rotate the assembly 45 degree (right or left) until the lock button is tossed up to mount the bowl assembly. Ensure the lock button is up.





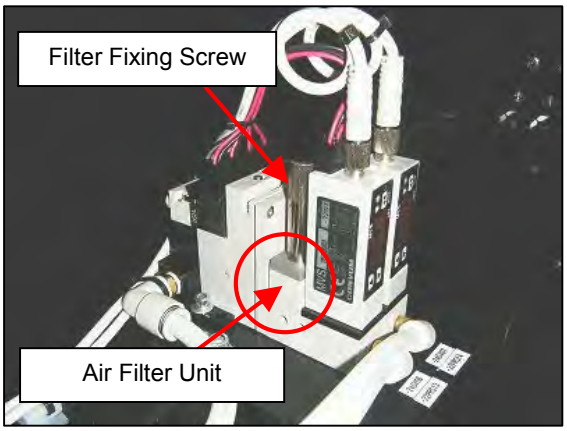
Breakdown Structure of AFM30/ 40

3-7. Vacuum Ejector

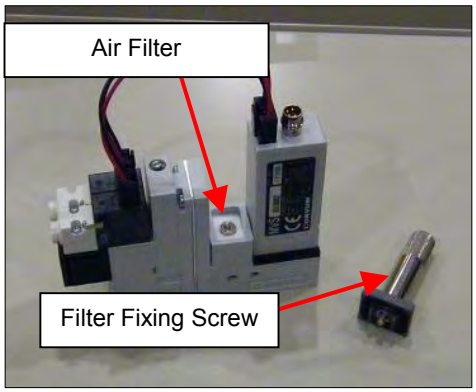
3-7-1. Filter Cleaning / Replacement

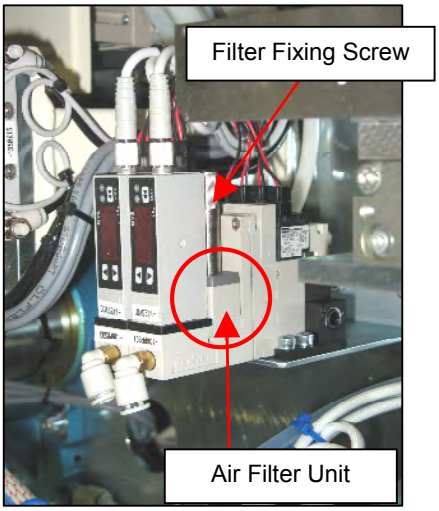
	**Certainly clean the suctioning piping of tab transfer and vacuum ejector.** **Neglect of maintenance may cause sucktioning toroubles.**

Outline	This machine ensures suction power with vacuum ejector. Vacuum ejector's malfunction causes vacuum pad failure. Adding to regular inspection, check the vacuum ejector whenever you have doubt about its suction power. When suction power seems to be insufficient, clean the air filter. When there is no improvement, replace the filter. When there is still no improvement, the vacuum ejector may be damaged. Replace it.
Suction Power Inspection	When the maximum vacuum pressure start-up takes time, the filter may be clogged. When the maximum vacuum pressure is low, there is a strong possibility of air leak from vacuum piping. Confirm the vacuum system and bend the hose near the vacuum ejector joint to check the [maximum vacuum pressure] indication. Around [-80 KPa] is indicated, vacuum ejector has no problem.
Cleaning Cycle	Monthly / When vacuum condition is poor.
Replacement Cycle	When the dust is difficult to eliminate.
Remove Air Filter	(1) Stop air supply to the machine and remove residual pressure. (2) Turn filter fixing screw to take out the filter cap. (3) Take out the filter with tweezers or such.
Clean-up	Blow the dust on the filter with air. Use a blow gun to clean the filter when it has too much dirt and the dirt blocks the air passage of filter case. * Do not use liquid or oil to wash. * Tighten the fixing screw when reassembling. * Do not disassemble except for air filter unit.

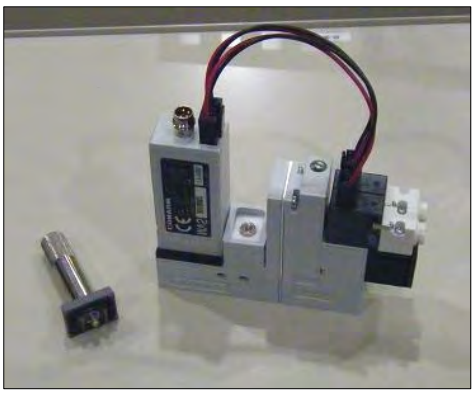


Manifold type (Double)





Manifold type (Double)



3-7-2. Pressure Sensor CONVUM MC2 (CVX-****-MC2)

3-7-2-1. Replacement

(1) Before replacing the CONVUM MC2, take a note of the current set value. You need it for resetting after replacing. Set value which you need is following. Refer to next chapter or operation manual for MVS-201 series for details.

No.	Set value item			Mean	Note
1	Set value of suction mode and Timer	Blow-off Time of Suction mode 3 OP3)	bt	(0.2-0.4)	
2		Delay Time of Suction mode 3 (OP3)	t2	0.0	
3	Set value of suction/ blow-off confirmation output (OUT1)	Drive on value during suction	H-u	(-46)	
4		Hysteresis value during suction	h-u	(7)	
5		Drive on value during blow-off	H-d	(200)	
6		Hysteresis value during blow-off	h-d	(50)	
7	Energy saving mode, Monitoring peak value, Suction/Blow-off reach time setting	Energy saving mode	SAu	oFF	
8		Monitoring peak value	P-u	oFF	
9		Suction reach time	ut	oFF	
10		Blow-off reach time	dt	oFF	
11	Set value of output mode for OUT1 and solenoid valve	Output mode for OUT1	ou1	n.o.	
12		Output mode for vacuum solenoid valve	ouu	n.c.	
13		Output mode for blow-off solenoid valve	oud	n.o.	
14		Logic of a suction/blow-off command signal	Ed9	H1	

Parenthetic numerical value of mean shows that set value might be changed by machine condition etc.

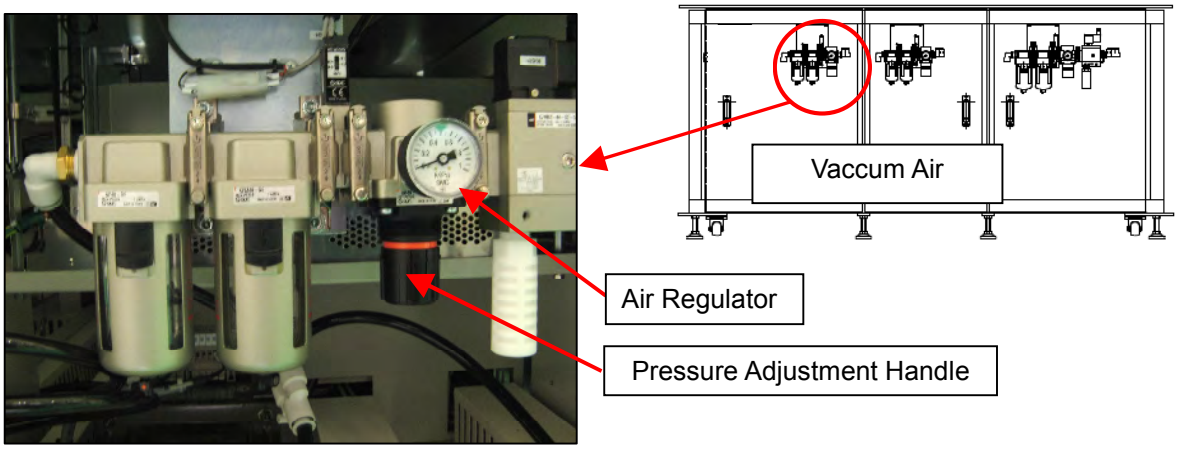
(2) Shut off the power supply by turning off the main breaker.

(3) Stop air to MC2

(a) Pull the pressure adjustment handle to unlock it.

(b) Set the pressure to 0 MPa.

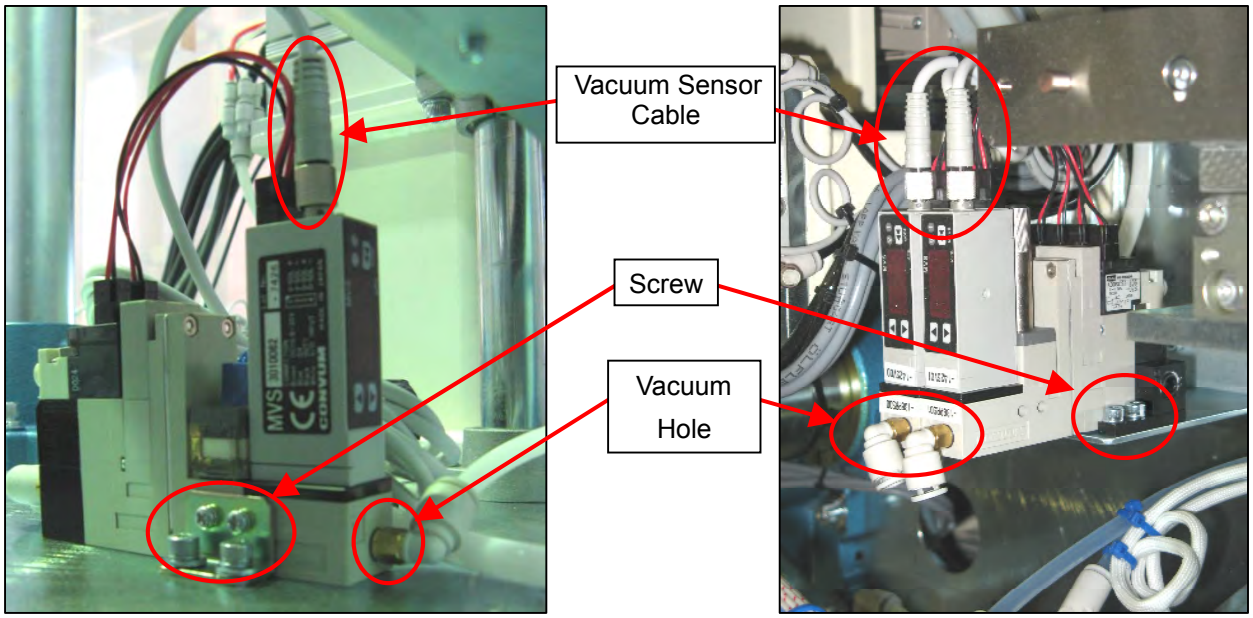
(c) Push the pressure adjustment handle to lock it.



(4)Pull out the cable which is connected to vacuum sensor. Turn the connecter part of vacuum sensor cable, pull the connector part.

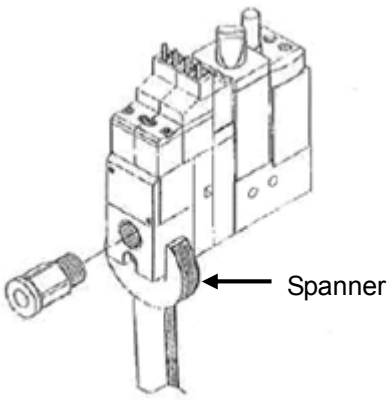
(5) Use a spanner to unfasten the joint connected to vacuum hole.

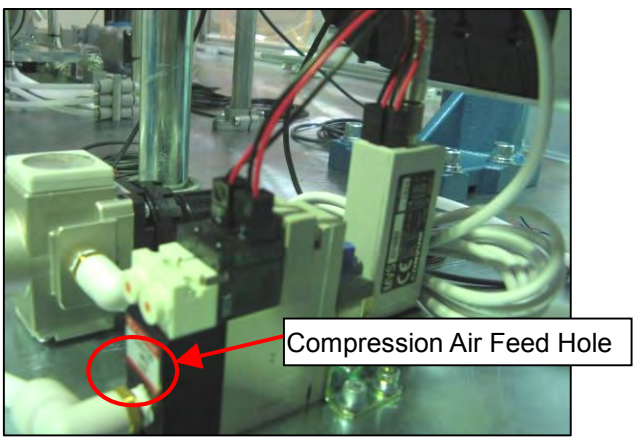
(6) Use a screwdriver to unfasten the screw which fixes the MC2 unit.



(7) Use a spanner, unfasten the joint of compression air feed hole. When unfastening the joint, unfasten the hose of joint first, and then unfasten the joint noting the following caution. If CONVUM MC2 of 2 or 3 reams, work at each vacume sensor cable and vacume hole in the same procedure.

⚠	**When unfasten the joint of compression air feed hole, fix the metal part with a spanner and unfasten it.** **Also when install the joint, fix the metal part with a spanner and then install it.**

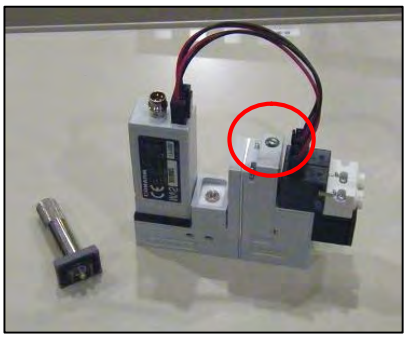




(8) Install a new MC2 unit with the reverse order of (4) to (7).

(9) Set vacuum release amount.

Turn back the screw in red circle in right picture 1 to 1.5 rounds by full screwed.



(10) Feed MC2 unit with air.

(a) Pull the pressure adjustment handle of the air regulator to unlock it.

(b) Set the pressure to 0.5 MPa.

(c) Push the pressure adjustment handle to lock it.

(11) Turn on the power supply by the main breaker.

(12) Based on the set value which you took a note of at previously-mentioned in step (1), set the MC2 unit vacuum sensor. Refer to the next chapter of MC2 unit puressure sensor or the purchased parts manual for MVS-201 series for setting method.

(13) Do zero resetting.

(a) Switch the machine to manual mode on the operation panel.

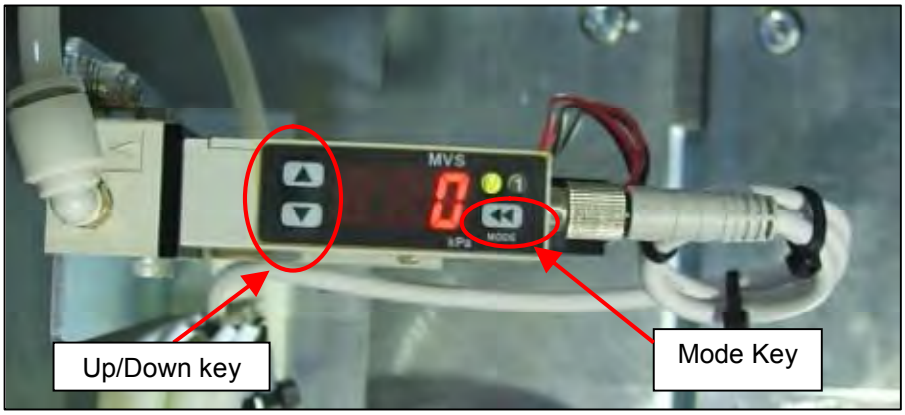
(b) On [Manual] screen of touch screen, turn off the vacuum which you replaces.

(c) Keep pressing the Mode Key of vacuum sensor for over 3 seconds. Then zero resetting will be completed.

(14) Check the machine functions such as vacuuming cells on manual mode to make sure if the machine correctly works.

3-7-2-2. Setting

The device with digital display is the CONVUM MC2 unit's pressure sensor.
Changes are "suction mode setting", "suction/blow-off confirmation output", "output mode and pressure unit setting".



Digital Pressure Sensor with Solenoid valve Control MVS-201（Myotoku）

3-7-2-2-1. Suction Mode

(1) Press MODE key once and wait for 3 seconds after having release it.

(2) oP1 is displayed, then set with MODE key after selection of oP3 with ▼ ▲ key.

oP1: Suction Mode 1（ON by timer; suction maintained by the timer）

oP2: Suction Mode 2（OFF by timer; vacuum solenoid valve OFF after expiration of timer）

oP3: Suction Mode 3（ON; vacuum solenoid valve kept ON）

(3) With ▼ ▲ key, select value of bt, t1, t2, then set with MODE key.

Set the blow-off time bt bt to 0.20.

Delay time 1 t1 t1 is not displayed when Suction Mode oP3 is selected.

Set delay time 2 t2 t2 to 0.00.

3-7-2-2-2. Suction/blow-off confirmation output (OUT1)

(1) Place the cell manually and check the data during suction (digital display value).
Display must be －○○ (e.g. -46)

(2) Press MODE of MVS-201 key twice and release. Wait for 3 seconds after -2- is displayed. H-u and then -46 is displayed.

(3) Press ▼ ▲ Up / Down key to set.
When the value is lowered too much, cracked or broken cell cannot be detected, so be careful.

(4) After setting, press MODE key until End is displayed. Display changes every time MODE key is pressed. The display will return to initial state when it is left untouched.

(5) Repeat (2) to (4) to input the value that does not lead an error during auto operation.

3-7-2-2-3. Other Settings

Set hysteresis value during suction h-u to -7.

Set ON value during blow-off H-d to 200.

Set hysteresis value during blow-off h-d to 50.

3-7-2-2-4. Output Mode and Pressure Unit

(1) Press ▲ **Up Key** with pressing MODE key**.**

(2) Select with ▼ ▲ key and set with MODE key.

・Set the output mode for OUT1 ou1 to no. (Normal Open)

・Set the output mode for vacuum solenoid valve ouu to nc. (Normal Close)

・Set the output mode for blow-off solenoid valve oud to no. (Normal Open)

・Set the suction/blow-off command signal Ed9 to Hi.

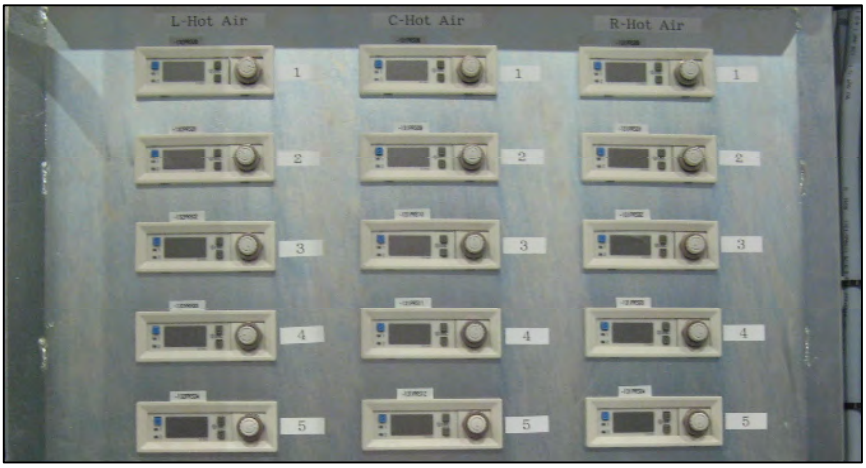
3-7-2-2-5. Zero Resetting

(1) In manual mode, turn OFF suction on the operation panel.

(2) When MODE key is kept pressed for over 3 seconds, --- and then 0 is displayed, then reset is completed.

3-8. Hot Air Flow Meter

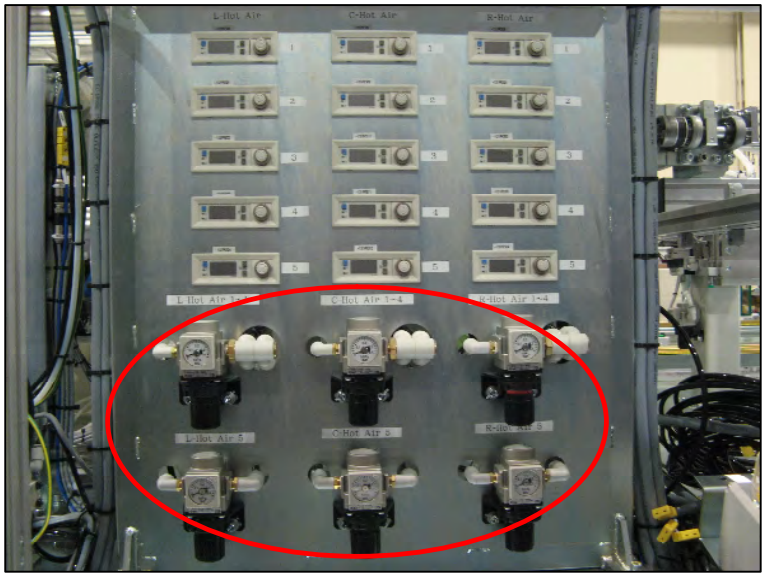
Digital type flow meter needs to be over 20 L/min. (It works by initial setting usually.)
If air flow is less than 15L/min, it may cause the heater to be burned.



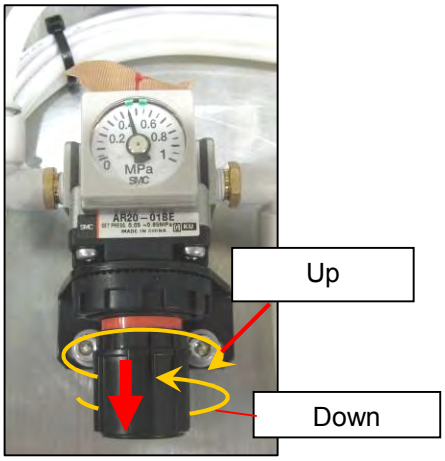
3-8-1. Hot Air Secondary Regulator

3-8-1-1. Check

The Regulator for Hot Air needs to be at 0.2~0.3MPa. (It works by initial setting usually.)
When it exceeds 0.3MPa, air heater may get burned.



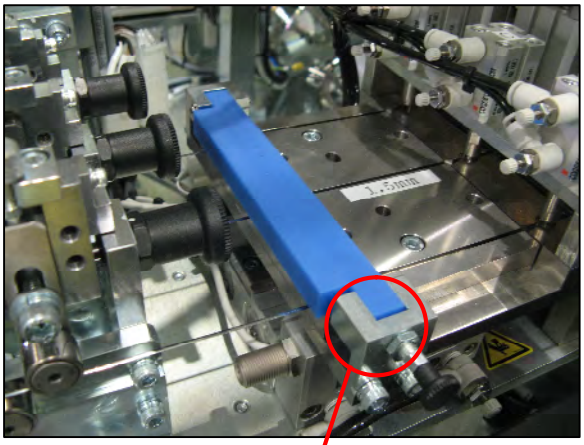
Air Regulator for Hot Air



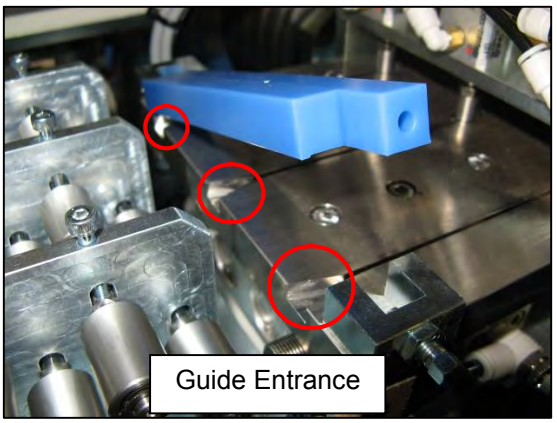
3-9. Tab Feed Unit

3-9-1. Check

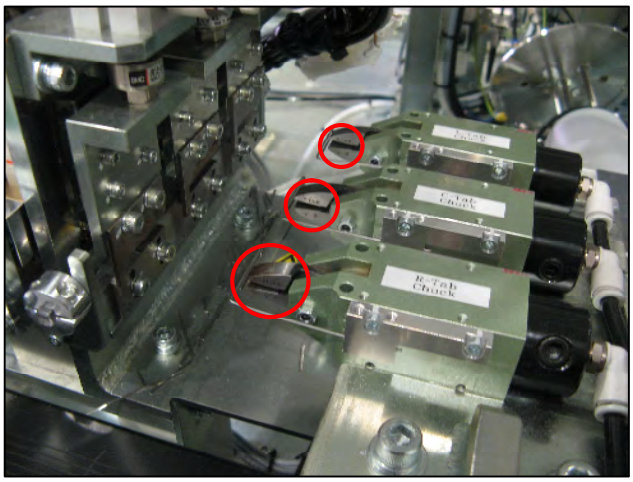
Make sure that no solder powder is stuck to the tab guide entrance. If there is any, it may cause tab to twist and bend, consequently malsoldering. Scrape off stuck solder component with a scraper. Be careful not to damage the guide flute. Also, check the chuck's clicks. If there is any dust, get rid of it without damaging the chuck.



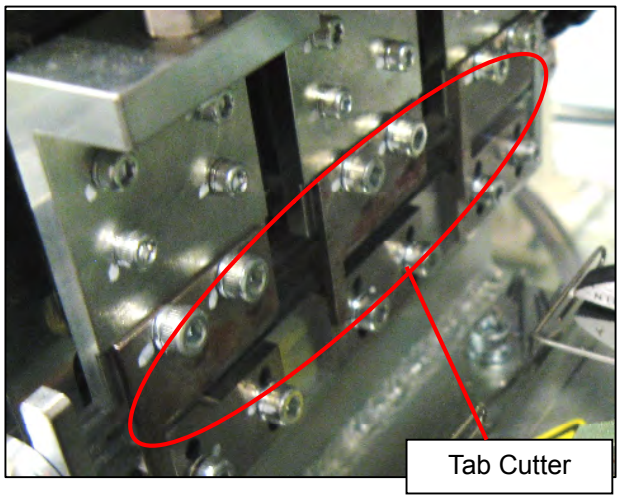
To unlock and pull up the blue tab holder, pull and turm this black knob,



Flow Direction



Tab Chuck



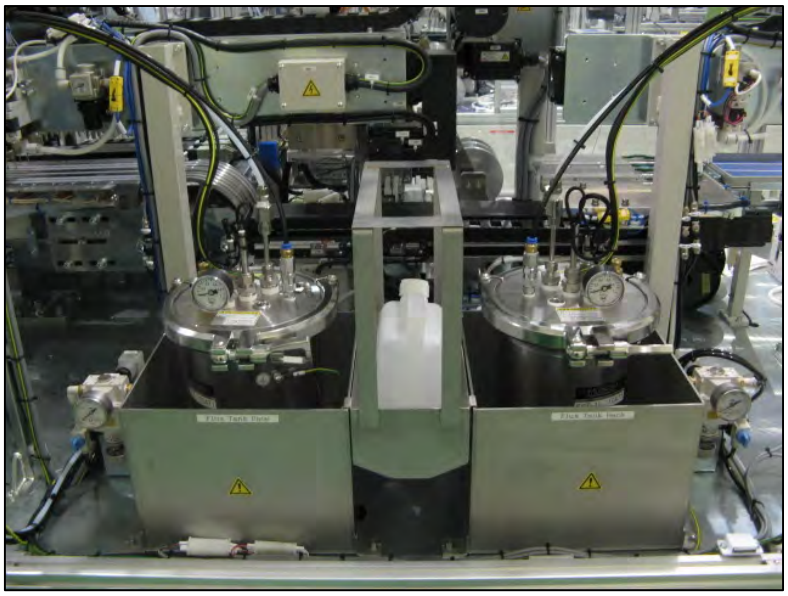
Apply the grease lublication to the LM guide/ball screw unit. Lithium-based grease (Consistency, JIS No.2, NLGI No.2) is recommended.

3-10. Flux Unit

3-10-1. Flux Tank Cleaning

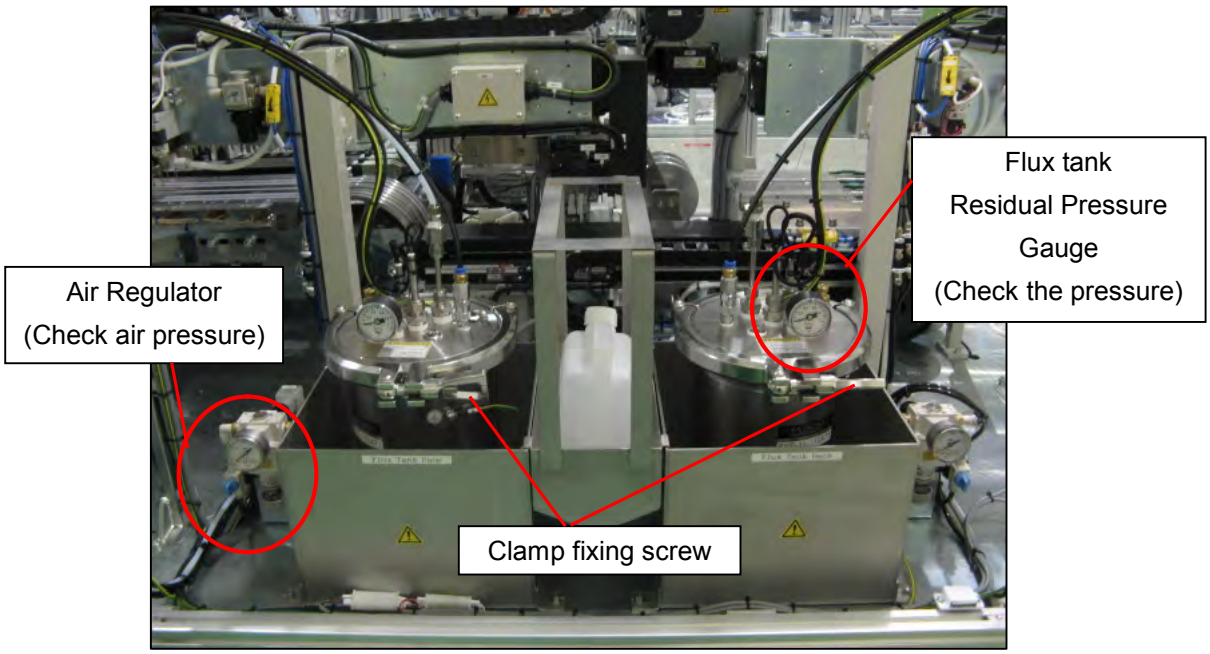
Cycle	Monthly
Clean-up	(1) When the flux gets concrete, it is recommended to remove all the flux from the tank and reserve tank. (2) Clean off the flux concrete with 100% alcohol wearing protective gloves.

	**When opening a metallic flux tank, surely release air before taking off its lid. It must be dangerous if the air left exists inside.**



3-10-2. Flux Replenishment

(1) Open the safety door.
(2) Confirm the residual pressure gauge of the flux tank. Confirm pressure in the flux tank came off.
(3) Loosen the screws fixing the clamp to remove the lid.
(4) Fill the container in the tank with flux.
(5) Make sure the O ring sits properly in the groove. Put the lid back to the tank.
(6) Set back the clamp and fix the lid with screws.
(7) Make sure the air regulator indicates a pressure between 0.1 and 0.2MPa.
（Pressure varies depending on the flux amount.）



3-10-3. Flux Nozzle and Valve

3-10-3-1. Cleaning

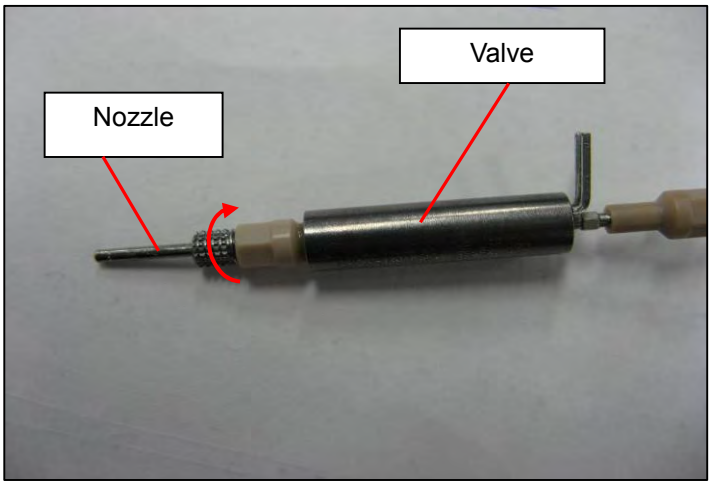
Cycle	After every shift (per 8 hours)
Storage of nozzle	Keep the nozzle in an airtight container under dry condition after cleaning and using isopropanol.

	Depending on the flux type, isopropanol may be ineffective. Ask the flux maker about the cleaning fluid to use.
	Wipe the flux nozzles and diaphragm valves every shift (every 8 hours) with a soft rag to avoid flux coagulation. (Coagulation time and state vary may change on the flux components.)

3-10-3-2. Nozzle replacement

Replace nozzles with newer when they are broken or are still clogged even after cleaning.

(1) Turn the nozzle in the red arrow direction to remove. Be careful not to cut your fingers and hands with nozzles' tip.
(2) Screw in a new nozzle until it stops. Then tighten it carefully not to strip its screw thread.



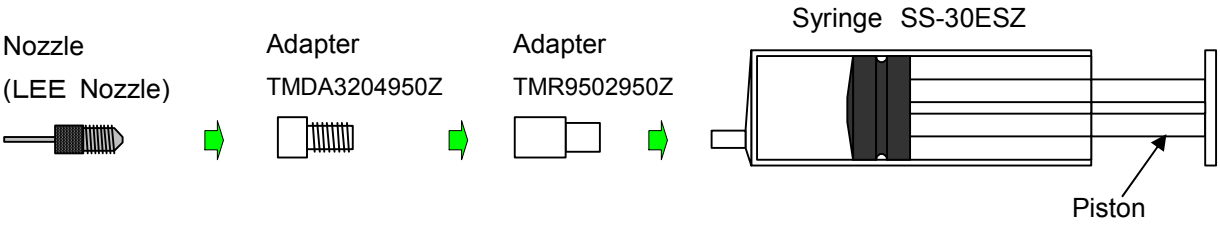
3-10-4. Flux Nozzle Cleaning with syringe

3-10-4-1. Flux nozzle cleaning with a nozzle cleaning kit

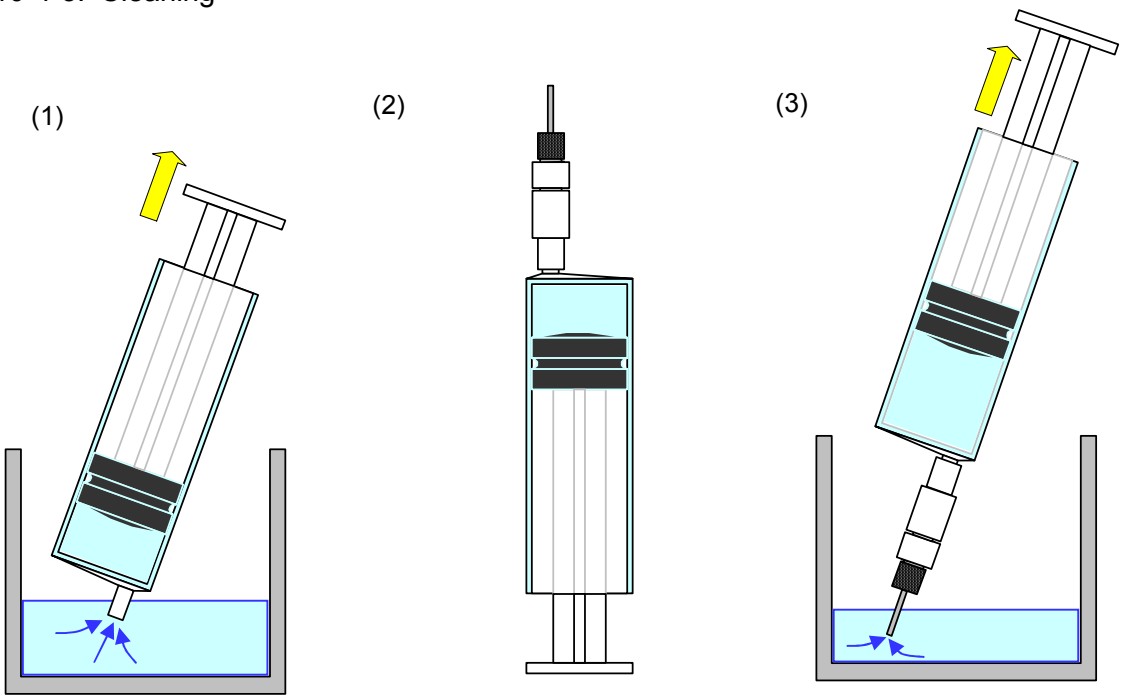
Nozzle Cleaning Kit (a set of syringe and two adapters) is provided to clean the nozzles made by LEE nozzle. This kit is intended to be used to remove the flux clotting in the LEE nozzles. It doesn't work to remove dust or contamination insoluble with cleaning alcohol. Use isopropanol or ethyl alcohol for a cleaning alcohol.

* Do not use methyl alcohol because it deteriorates rubber and plastic parts.

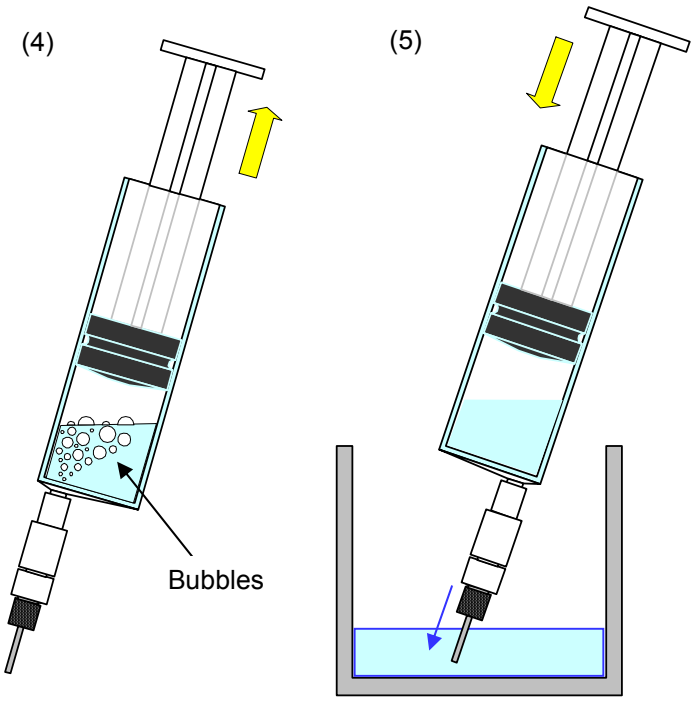
3-10-4-2. Structure



3-10-4-3. Cleaning



(1) Take a little bit of cleaning alcohol in the syringe first.
(2) Mount the adapters and the nozzle on the syringe.
(3) Sink the nozzle tip in the cleaning alcohol and pull the piston.
The cleaning alcohol is sucked through the nozzle, and the alcohol flow solves the flux clot in the nozzle. Nozzle clogg with flux clot leads a high suction resistance. Slowly pull the piston as alcohol soaks inside.



(4) Take the syringe tip out of the alcohol and pull the piston to see how the air comes in. If the clot has dissolved, bubbles will bustle.
(5) Push the piston to discharge the cleaning alcohol in the syringe.
When the clot has been dissolved, the alcohol bustles out of the syringe.
(6) Severally repeat the steps (3) to (5).

3-10-4-4. Remarks

- The nozzle tip has a fine metal for spraying the flux. Never pick it with a needle and alike.
- When the alcohol cannot be sucked in the step (3), separate the nozzle and soak it in the cleaning alcohol for some hours before trying again.
- When the flux clot is too tough to dissolve, replace the nozzle with a new one.
- After cleaning, rinse the adapters and the syringe with water and dry them before putting the nozzle cleaning kit away.

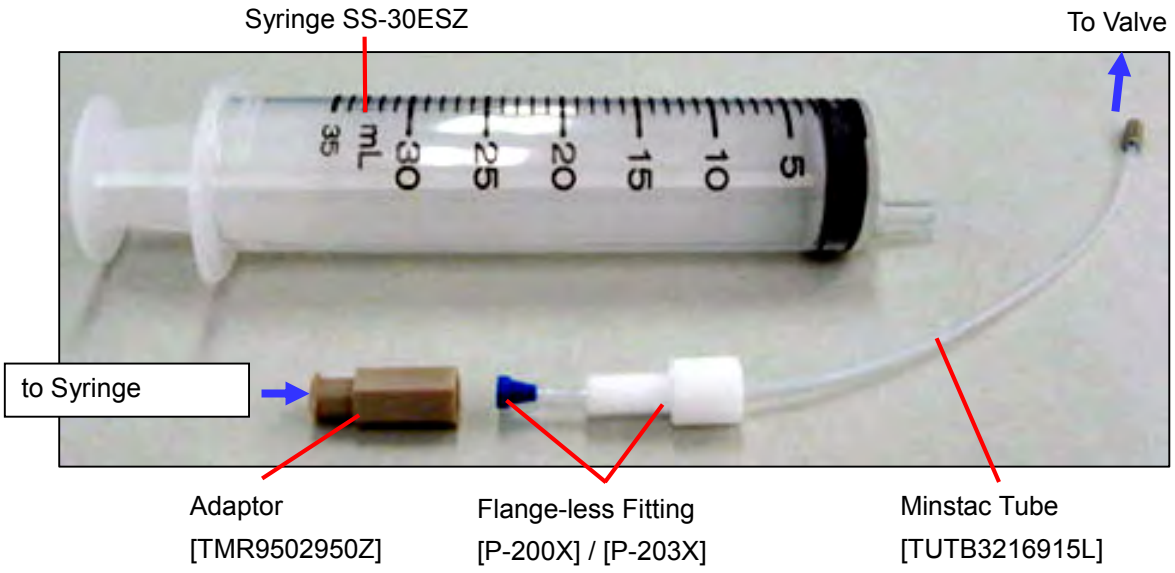
3-10-5. Flux Valve Cleaning with syringe

3-10-5-1. Flux valve cleaning with a nozzle cleaning kit

Valve Cleaning Kit (a set of syringe, adapter, flange-less fittings and Minstac tube) is provided to clean the valves made by LEE.
This kit is intended to be used to remove the flux clotting in the valves. It doesn't work to remove dust or contamination insoluble with cleaning alcohol.
Use isopropanol or ethyl alcohol for a cleaning alcohol.
* Do not use methyl alcohol because it deteriorates rubber and plastic parts.

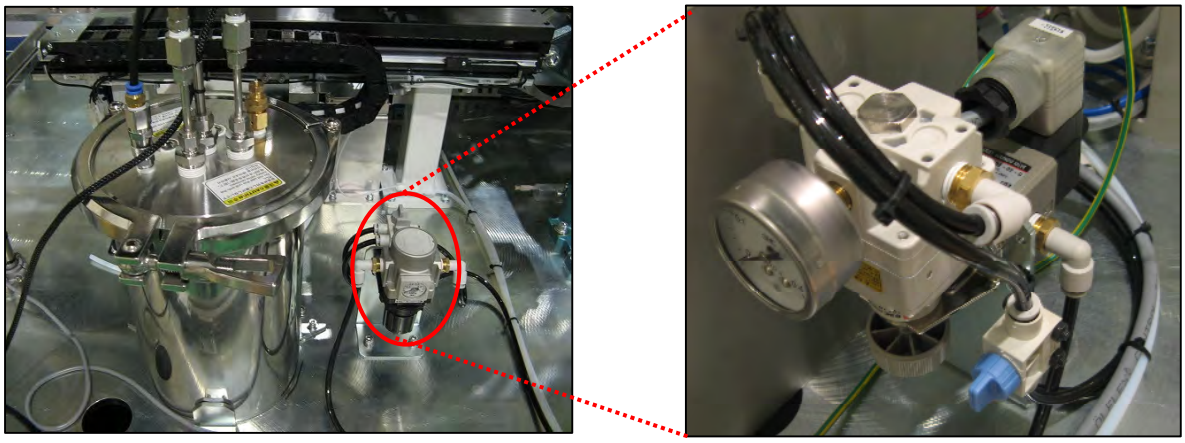
3-10-5-2. Structure

Build the cleaning kit, seeing the picture below.



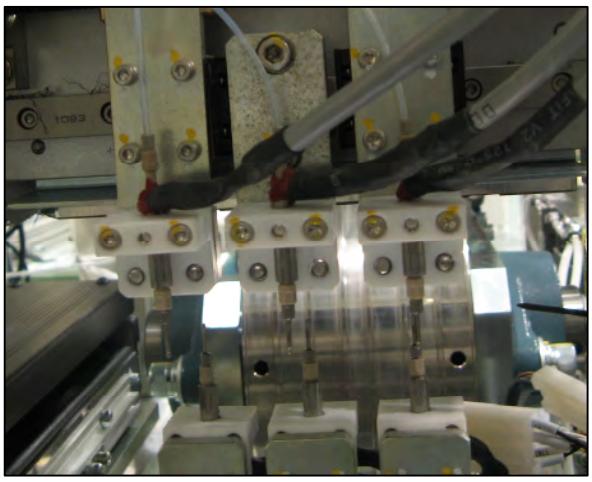
3-10-5-3. Cleaning

(1) Open the safety door at the flux tank. Air in the flux tank is released.
(2) Confirm the residual pressure gauge of the flux tank. Confirm pressure in the flux tank came off.

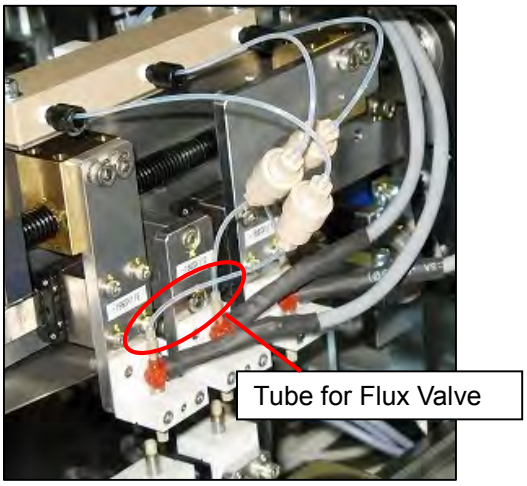


(3) Take a little bit of cleaning alcohol in the syringe first.

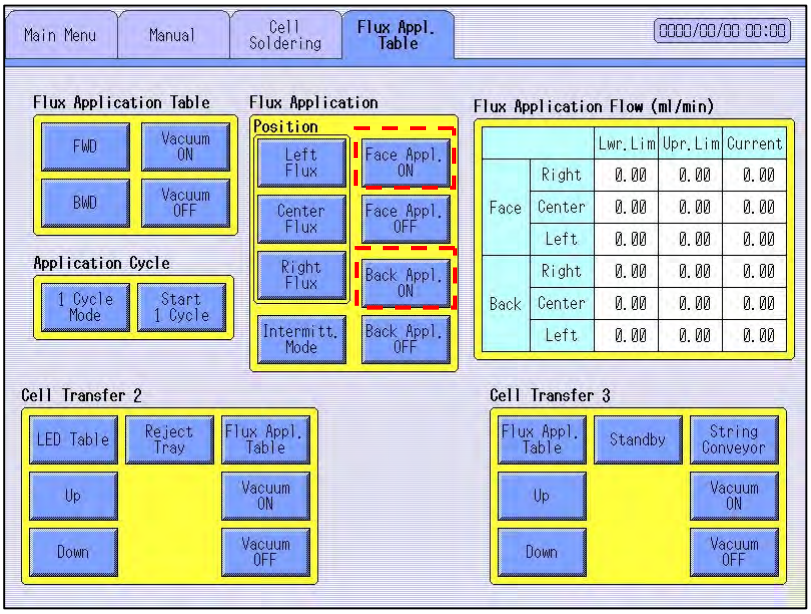
(4) Remove the flux nozzle and the tube from the flux valve. Then connect the cleaning kit to the side fixing the nozzle.



Flux Valve



(5) Touch [Face/Back Appl. ON] button of [Flux Appl. Table] screen to open the valve and cleaning with alcohol.



(6) Push the piston of the syringe to flush the inside of the valve out with the cleaning alcohol. Repeat cleaning several times to remove the flux clot.

3-10-5-4. Remarks

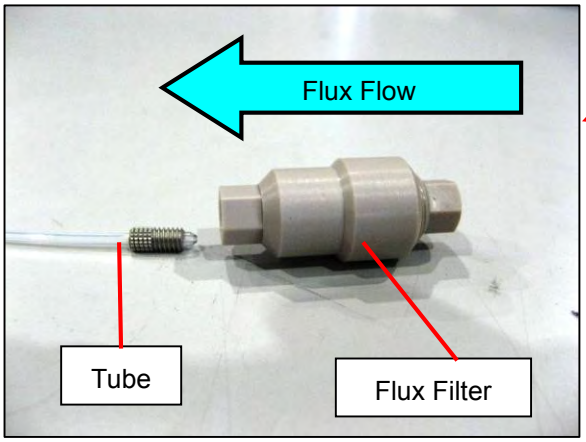
* When the flux clot is too tough to dissolve, replace the valve with a new one.
* After cleaning, rinse each part of the cleaning kit with water and dry them before putting it away.

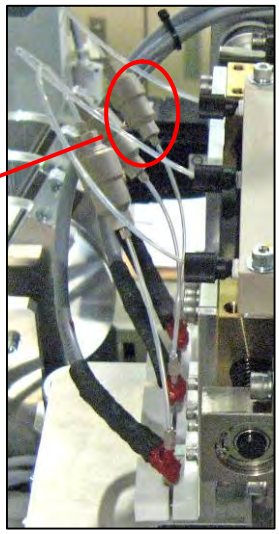
3-10-6. Flux Filter

Cycle	Replacement frequency would be affected by level of fluid cleanness. Recommended method is the flux filter need to be inspected in a short period of time. Short term inspection makes the cleaning frequency less.

3-10-6-1. Cleaning and Element Replacement

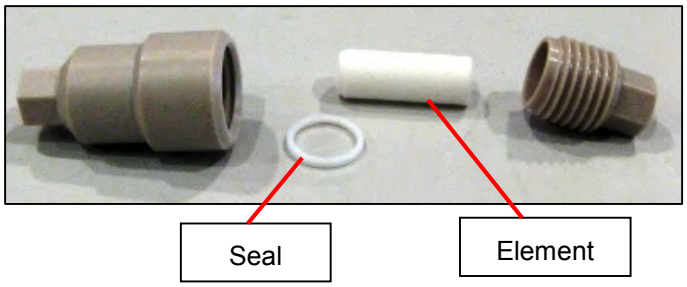
(1) Remove tubes in both side of the flux filter.





Flux filters of the face side flux application unit
(The picture is different from the actual machine.)

(2) Unscrew center of the flux filter inside, and remove an element and a seal.

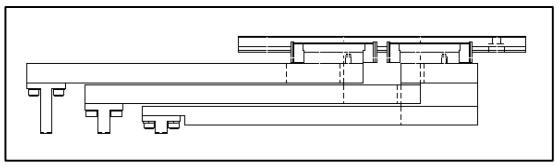


(3) Clean the flux filter body with isopropyl alcohol, and then install the element and the seal.
*The element has a direction to install. The inlet port is a convex side.

Convex Side.
(The other side is a concave side)

3-11. Tab Transfer Hand

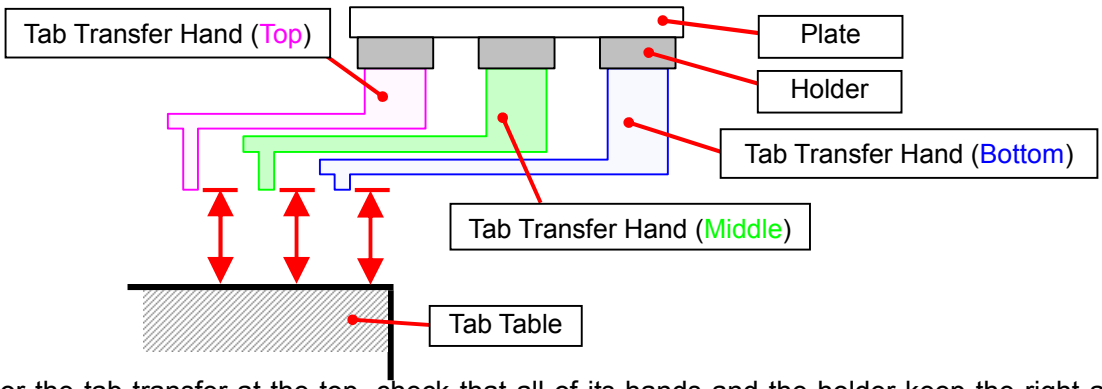
3-11-1. Check



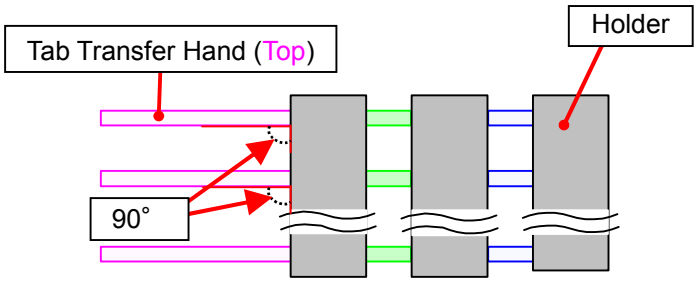
In case such as a tab falls from the tab transfer hand, check for clogging of vacuum unit at the end of the tab transfer. If suctioning power is all right, mounting of the tab transfer hand may be distorted.
Check that the tab transfer hand keeps at a right angle using a scale. **If it does not look a right angle, contact NPC**. Do not force to adjust the angle by hand.

Check the tab transfer hands as follows.

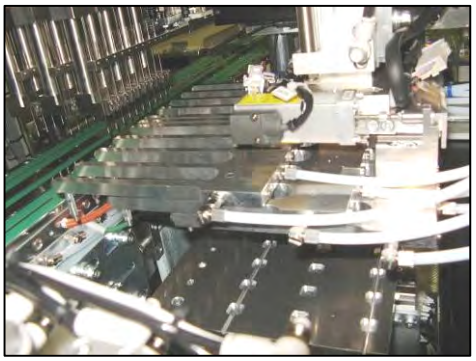
(1) For all the tab transfer hands, measure the distance between each tab transfer hand and the tab table to make sure that the distance between all the tab transfer hands and the tab table are same.



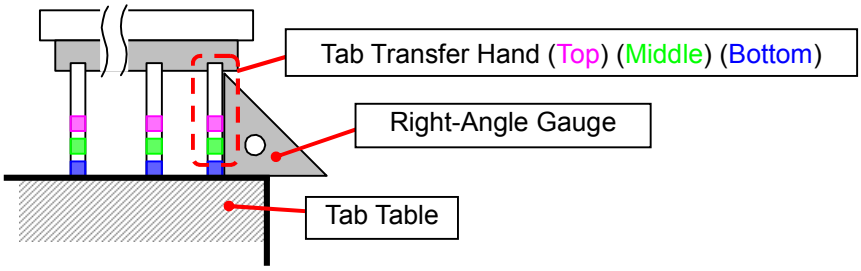
(2) For the tab transfer at the top, check that all of its hands and the holder keep the right angles. Make sure to check the angles of the same side in relation to the holder as shown below.



* Mesure the angles of the same side.
* Mesure the tab transfer hand at the top only.



(3) For all the tab transfer hands, put the right-angle gauge on the hands and tab table to check that the tab hands at the top, middle, bottom are installed in the same vertical line to the tab table.

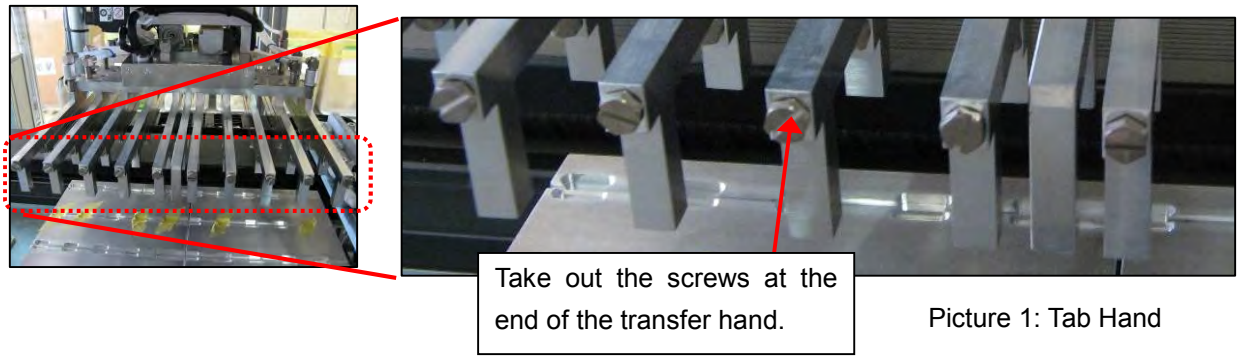


3-11-2. Cleaning

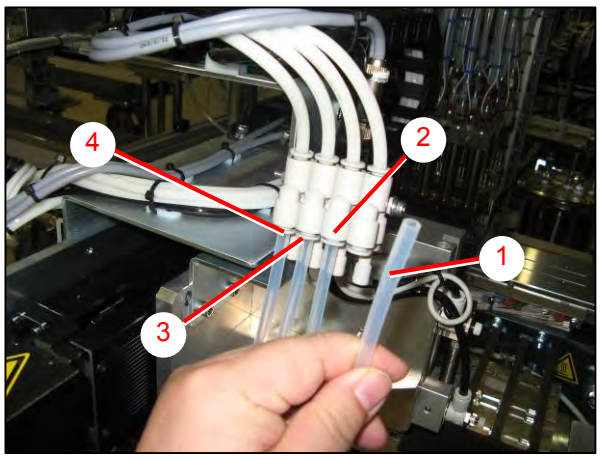
Tab transfer hands' holes are easily clogged with foreign particles due to their size.
Clean each hand's hole frequently.

	**Fingers may be pinched. Stop the electric and pneumatic power supply and release the residual pressure before maintenance work in principle.**

(1) Turn the machine power OFF, stop air supply and release residual pressure.
(2) Insert a drill blade (approx. φ 0.7mm) or like into the tab hands' holes to clean.
(3) Remove the screws at the end of tab transfer hand as picture 1.
(4) Take out the hose 1 as picture 2 and blow out the foreign objects with air gun from the hose as picture 2.
If the hose is severely unclean, pour isoprppanol to clean it.
(5) Clean other hoses 2 to 4 in the picture 2 in the same way as done for hose 1.
(6) After cleaning hoses as the step (1) to (5), set back the hoses after cleaning hoses.
(7) Set back the screws taken out at step (3) to the tab transfer hand.
(8) Clean the tab table's vacuum holes with a drill blade (approx. φ 0.7mm) or like without damaging inwall of the tab table.

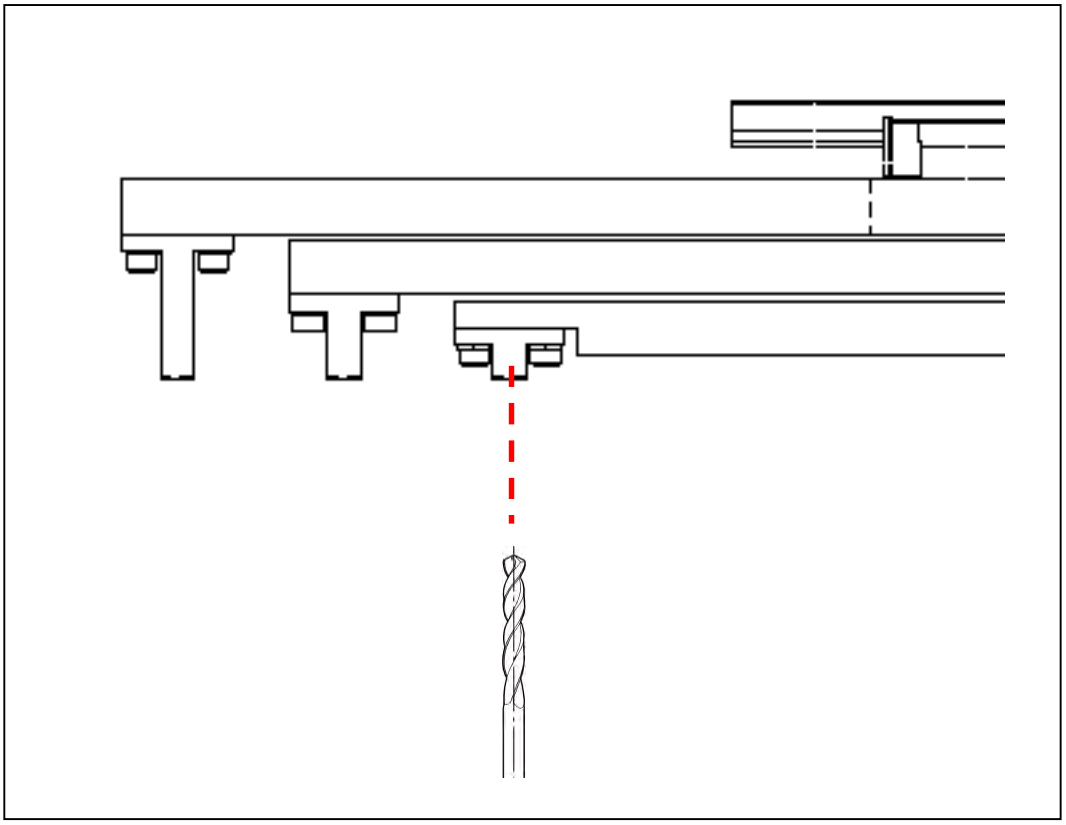


Picture 1: Tab Hand



Picture 2: Air hoses for tab transfer hand

Picture 3: Air Gun



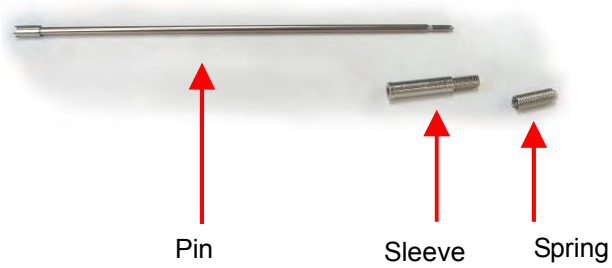
Picture 4: Cleaning Hole of tab hand

3-12. Tab Holding Pins

	**Burn Hazard! Ensure that the hot objects such as hot air unit and holding pins have been cooled down and wear protective gloves before the work.**

3-12-1. Cleaning

Remove the whole tab holding pins and clean them every shift (or every 8 hours).
Soak them into a container with 100 % alcohol (ethanol) to clean the sleeve unit.
Severely unclean pins may cause mal-soldering or cracked cell.
Replace bent or warped pins. Check pins every 8 hours when the machine is continuously run.

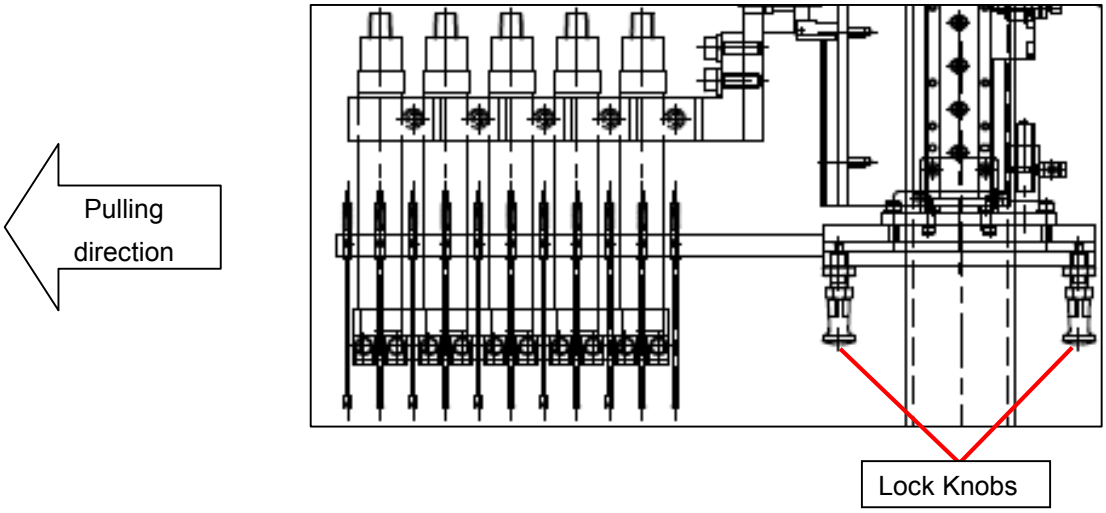


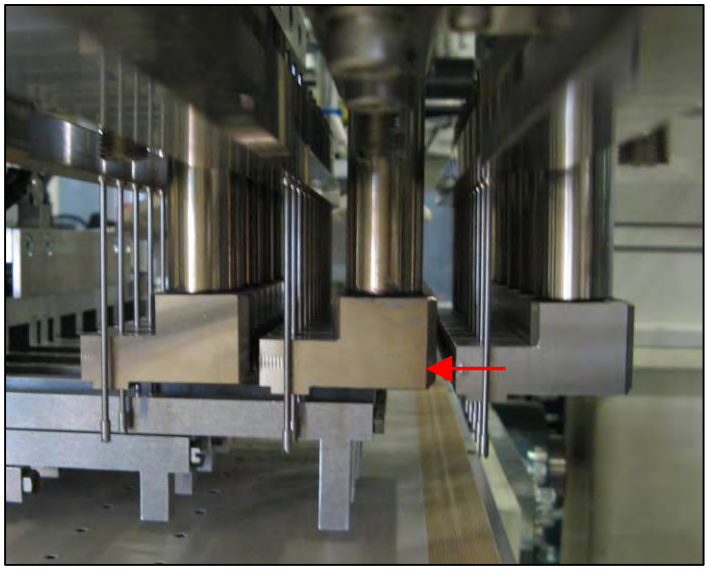
Always change springs at the same time.

3-12-2. Replacement

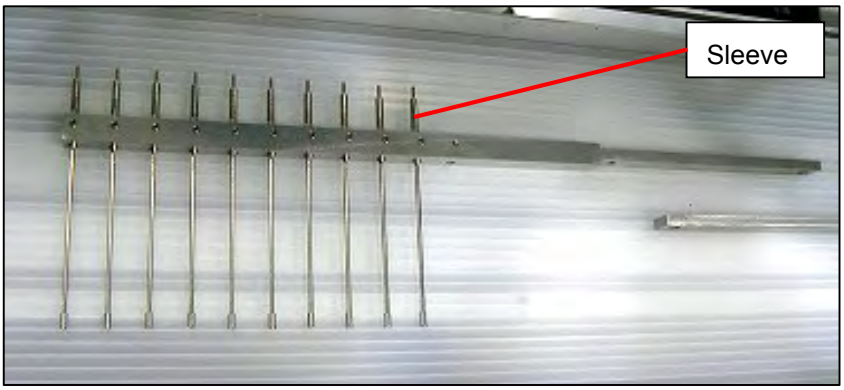
	**Burn Hazard! Ensure that the hot objects such as hot air unit and holding pins have been cooled down and wear protective gloves before the work.**

(1) Turn off the device power and check the machine safety.
(2) Certainly confirm if each unit such as hot air unit, string conveyor, holding pins or etc are cool down enough.
(3) Pull down the lock knobs at the bottom of a pin holder and turn 90 degree to unlock the pin uit.
(4) Pulling out the handle, and take out a pin unit.
(5) Dismounting the holder pin.





(6) Loosen the set bolt with 1.5mm hexagon wrench to draw the sleeve out.



Pin Holder (Whole)

(7) Holder pin adjustment.
Check the pins move up/down by pushing with finger smoothly. If it does not move smoothly or pin does not respond well, take out the pins form the pin holder and clean themup.

(8) When mounting the pins, insert the pin unit at original position and turn the lock knobs to lock the pin unit.

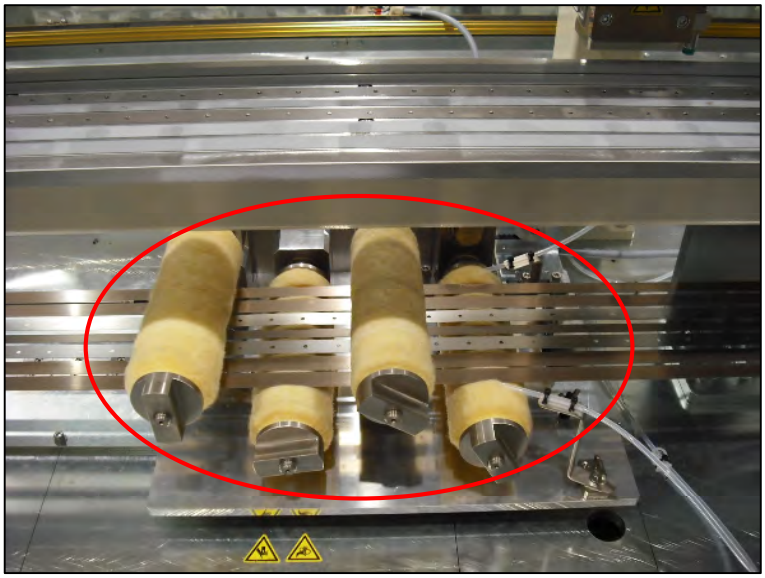
3-13. String Conveyor

3-13-1. Belt Cleaning (every shift, every 8 hours)

When the string conveyer belt is dirty, it's influence the tab soldering and the string sending.

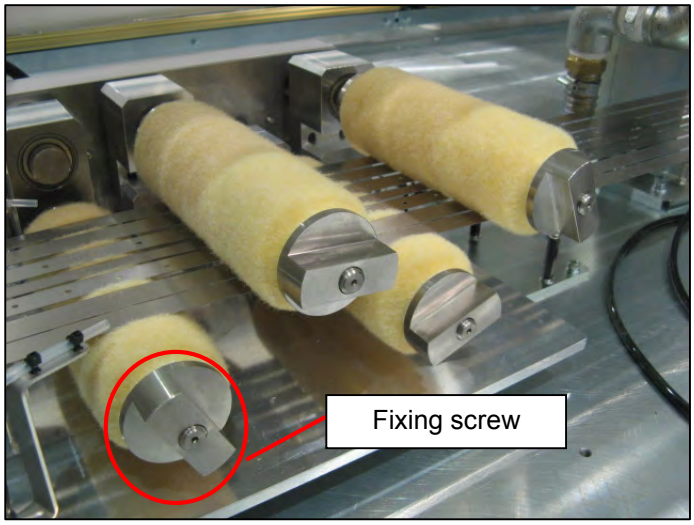
Fill a tank with cleaning alcohol (Isopropanol). Wipe the belt on the conveyor to keep clean condition with a cloth.

Clean the conveyor upper surface and vacuum holes. Replace a sponge if it gets deteriorated.



3-13-2. Cleaning Sponge Replacement

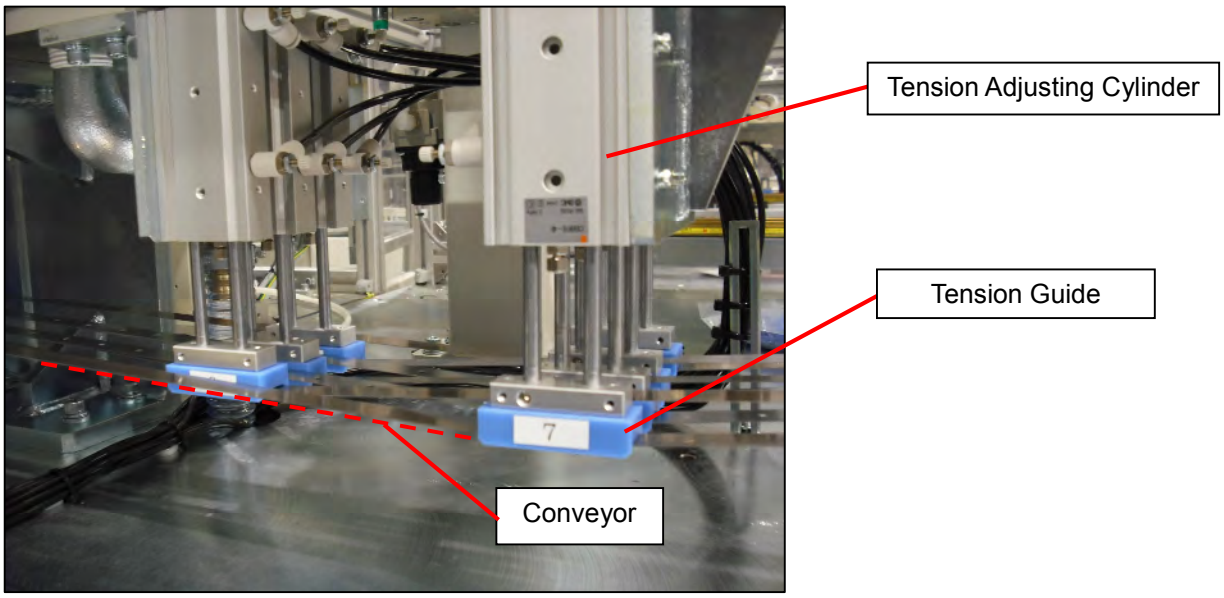
Cycle	It is needed to change the sponge when the breakage or damage are found on the sponge
Procedure	(1) Stop the air supply to the machine. Take out the remaining air. (2) Remove the lock screw after making sure the machine safety. (3) Remove the fixing plate, and remove the sponge. (4) Set the new sponge then do the opposite operation of (2) and (3).



Cleaning sponge

3-13-3. Belt Tension Check

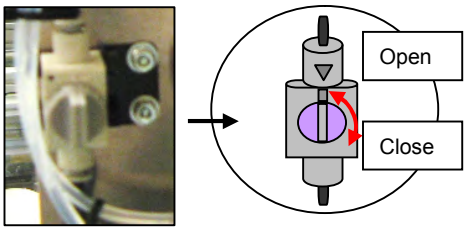
Reduce the belt tension and lift the tension adjustment cylinder. Make sure that the tension guide touches the belt when the cylinder keeps lifted.
Also, check the regulator for belt tension is between **0.2 MPa and 0.3 MPa.**



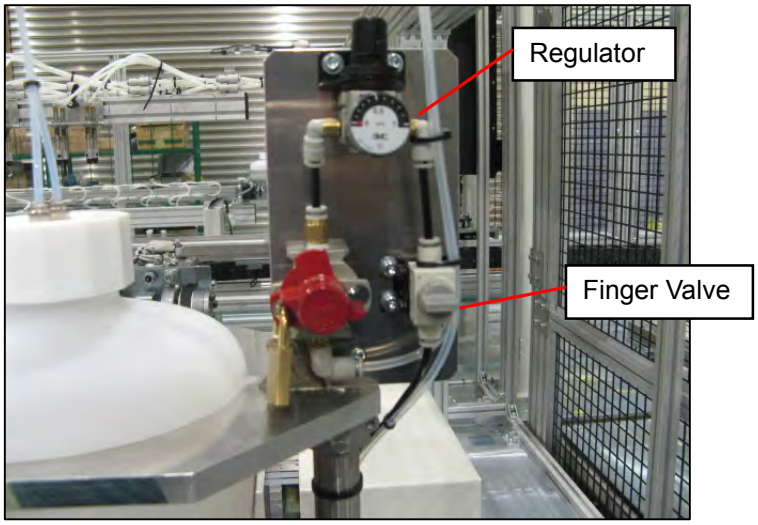
Cylinder for String Conveyor Belt

3-13-4. Washing Replenishment

(1) Turn finger valves (2 places) to the right by 90 degrees to close and stop air supply and release the residual pressure.
(2) Open the lid, and replenish the washing fluid.
(3) After replenishing, close the lid tight. If you put pressure while the lid is not closed tight, the lid might blow off.
* Set the regulator to 0.1 MPa or less.
(4) Turn finger valves to the left by 90 degrees to open it.



Finger Valve



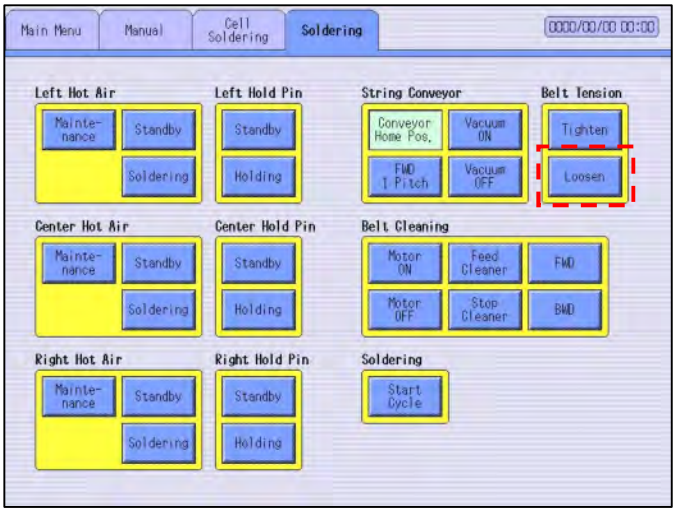
Washing fulid Tank for Cleaning Sponge

3-13-5. Belt Replacement

*** Before adjusting, DO NOT forget to apply marking the current position of string conveyor with a marker.**

(1)Travel the lead table to frontw

(2) Display [Soldering] screen ([Main Menu] →[Manual] →[Cell Soldering] →[Soldering]) then touch [Belt Tension Loosen] button to loosen the conveyor belt.



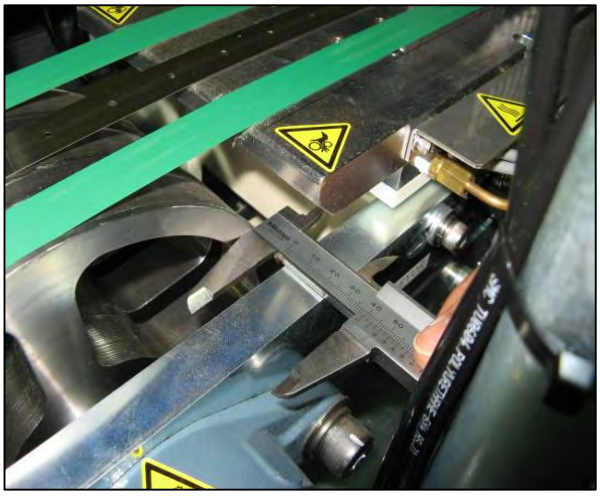
(3) Loosen the lock nuts and make about 15 mm space between the tension adjusting bolt and the roller plate.

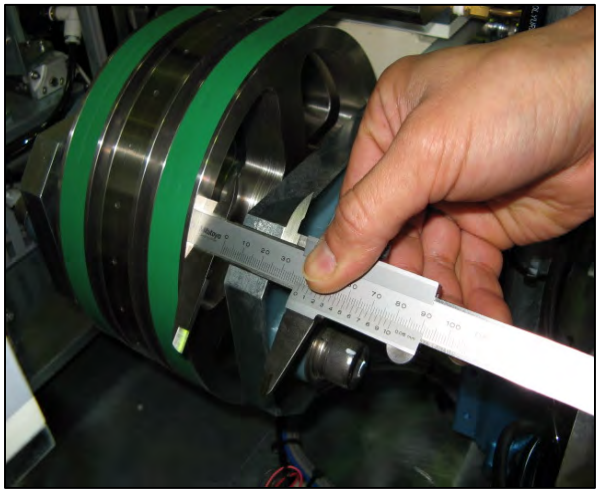
(4) Loosen the roller plate mounting bolts, and move tension roller to the opposite direction of the belt tension to loosen the belt tension totally. The belt will come off from the roller. Pull it out from the front.

(5) After mounting a new belt, apply tension to the belt by moving the roller plate. The belt needs to be adjusted so that it almost touches the tension guide. Move the left and right plates alternately to adjust the tension

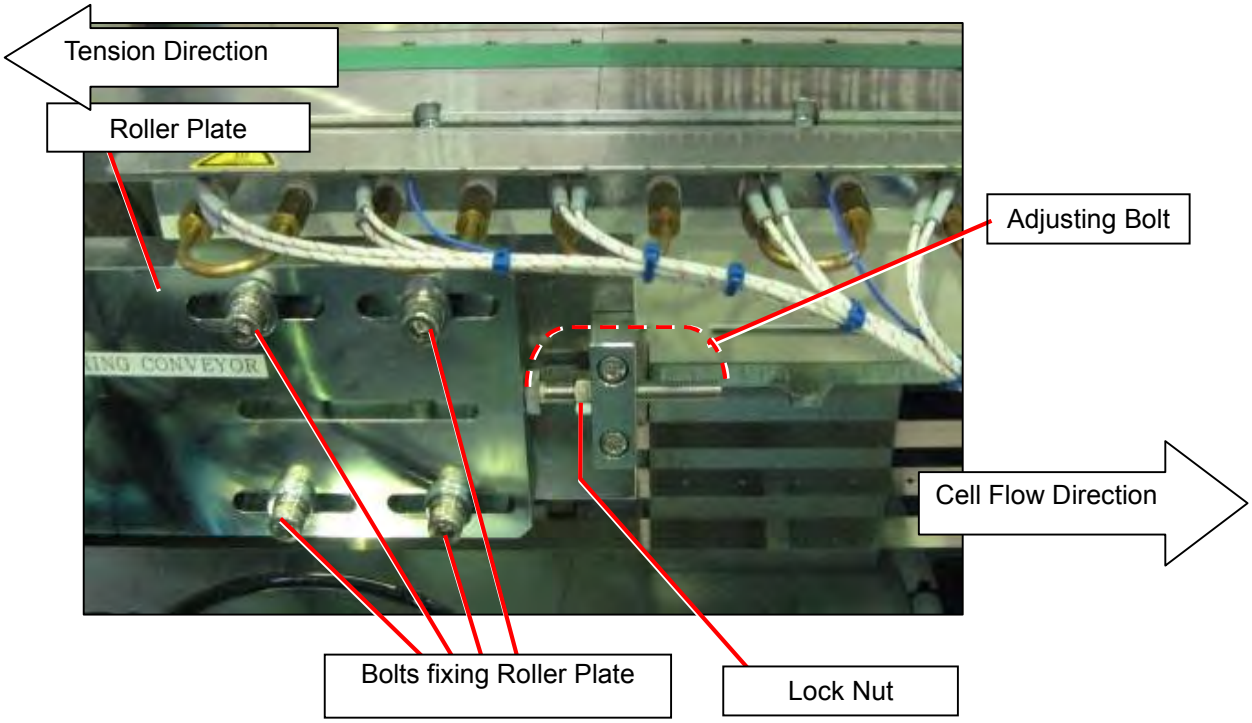
(6) Set the roller plate mounting bolts and tension adjusting bolt lock nuts in the opposite way to the procedures above.

(7) Adjust the plate and the pulley to be parallel. Adjusting either left or right is enough.





(8) Return both side of tab feeding units to the original place and tighten the clamp lever.



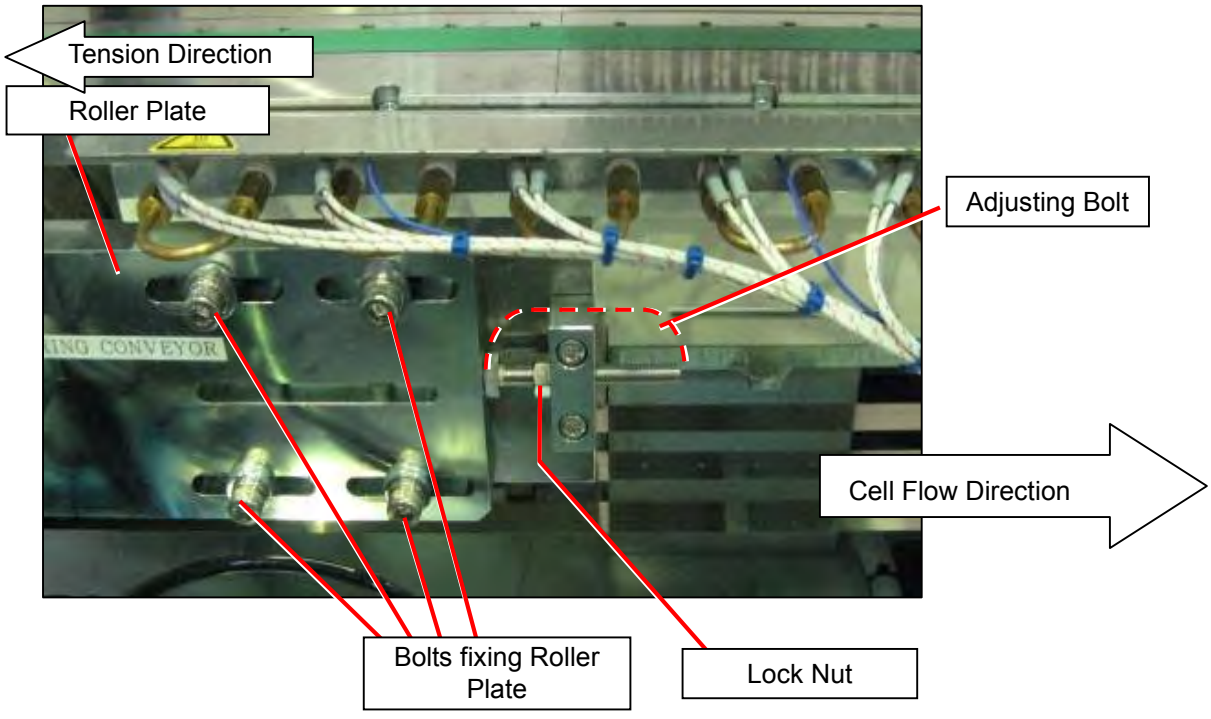
String Conveyor Adjusting Unit

3-13-6. Belt Tension Adjustment

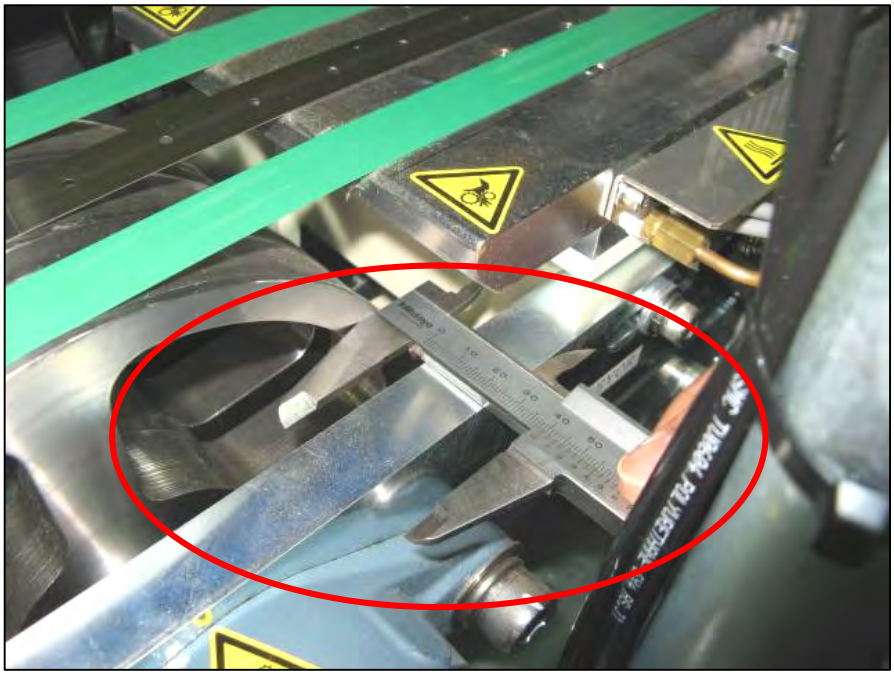
⚠	**Because the roller plate or mounting bolts is far from a part to where hand reaches, recommend to move the entire tab supply part to the side of a safety door before adjustment.**

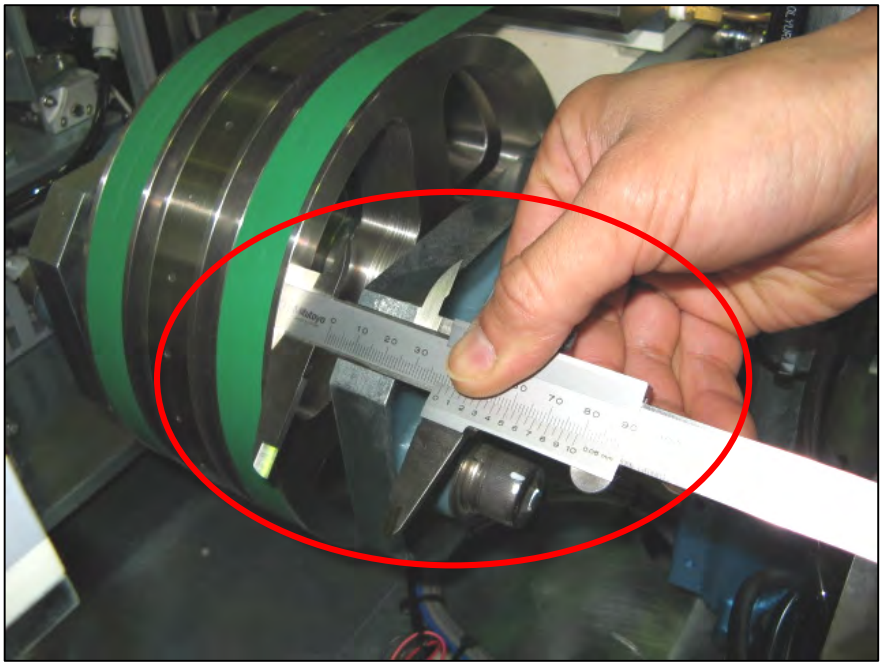
❗	**Make sure to mark the current position on the roller plate and the plate for the tension adjusting bolt before adjusting, in order to use as a guide for the string conveyor position when adjusting.**

(1) Loosen the mounting bolt of roller plate on the tension adjusting side.
(2) Loosen the lock nut.
(3) Move the roller plate to the tension direction using adjusting bolt.
Make the tension adjusting cylinder down (the status with tension). Adjust the plate of right and left alternately using the adjusting bolt to give the tension to the belt as the cylinder stroke is 30mm for allowance within 40mm.
(4) Adjust the plate and pulley to be parallel. (Refer to the bottom picture.)
(5) Clamp the lock nut after completing the adjustment.
(6) Clamp the roller plate mounting bolt.
* Have parallel either left or right.



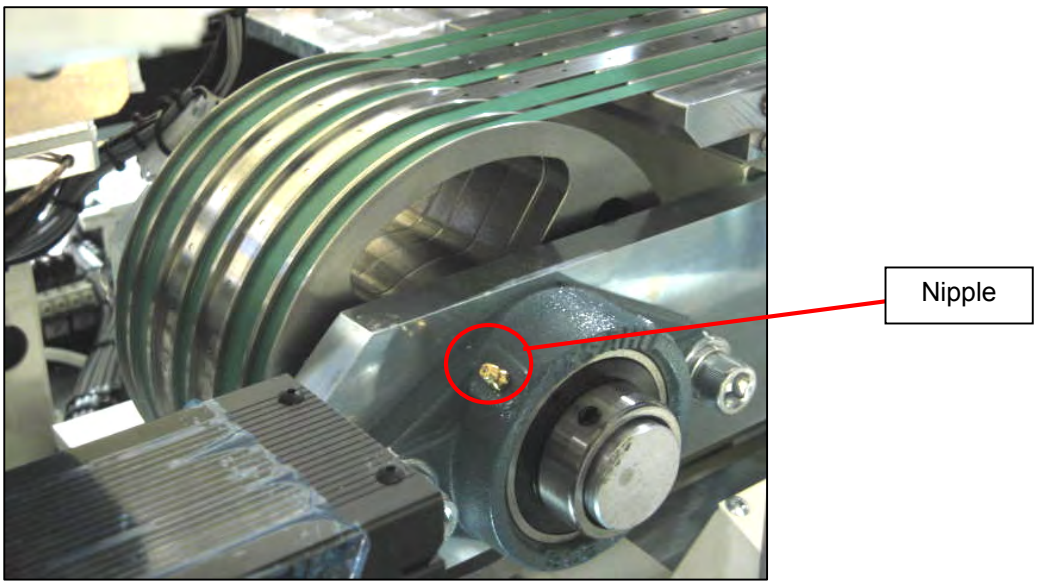
String Conveyor Adjusting Unit





3-13-7. Grease up

Apply the lithium soap grease to the main conveyor pillow from the nipple. Do once in 6 months.

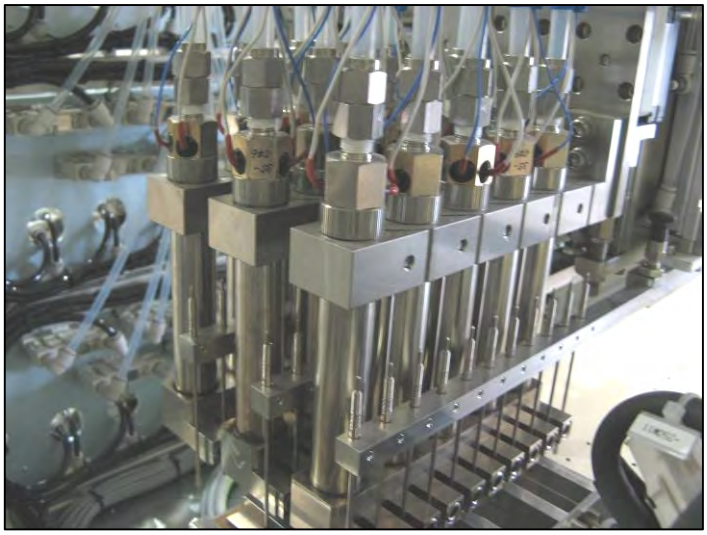


3-14. Air Heater

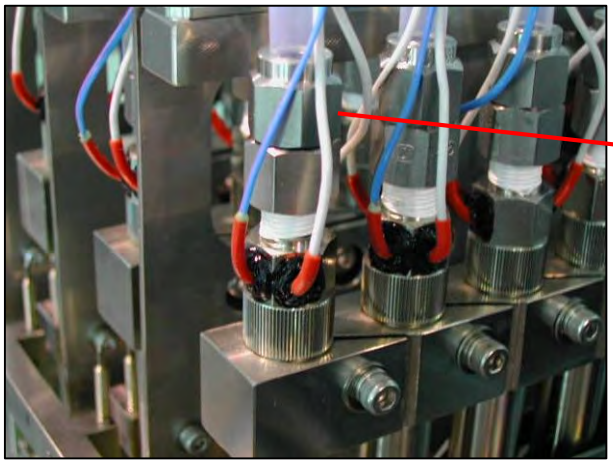
3-14-1. Replacement

	**The air heater is very hot while it is running. Make sure if the air heater is cool down enough not to get burned on your hands and fingers before replacement work.**

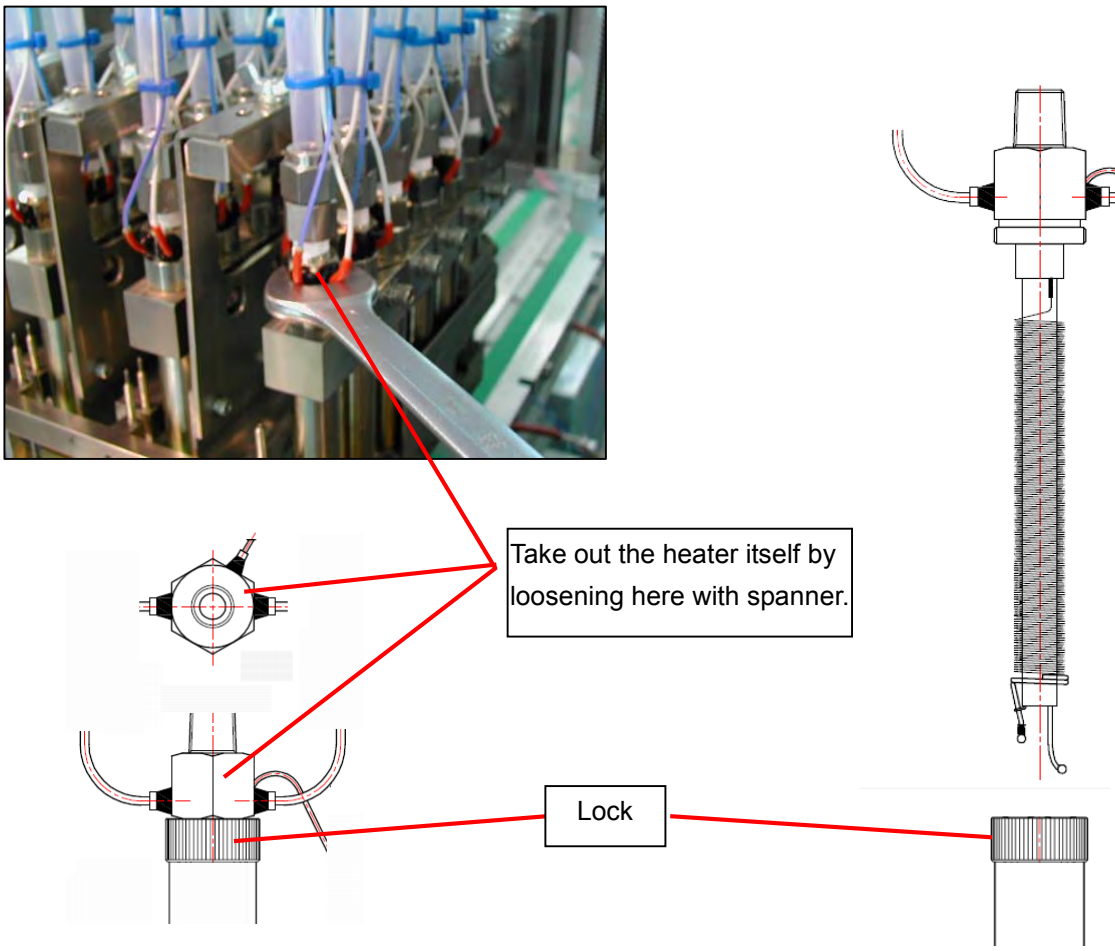
(1) Turn the machine power OFF and check the safety of the machine.

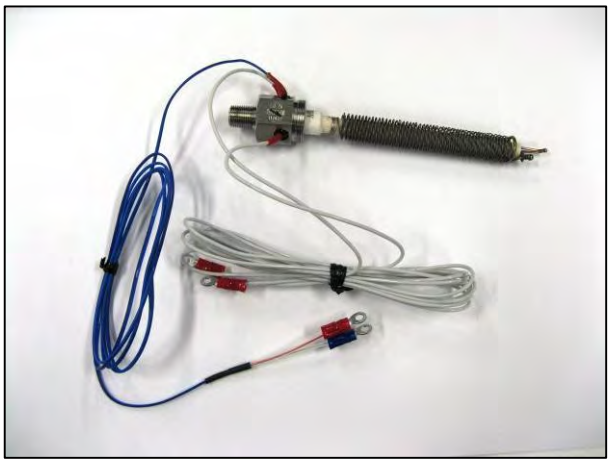


(2) Remove the air piping of the upper hot air unit.



(3) Loosen bolt of lower hot air heater where heater wire is located, and remove the wiring and uninstall the heater.





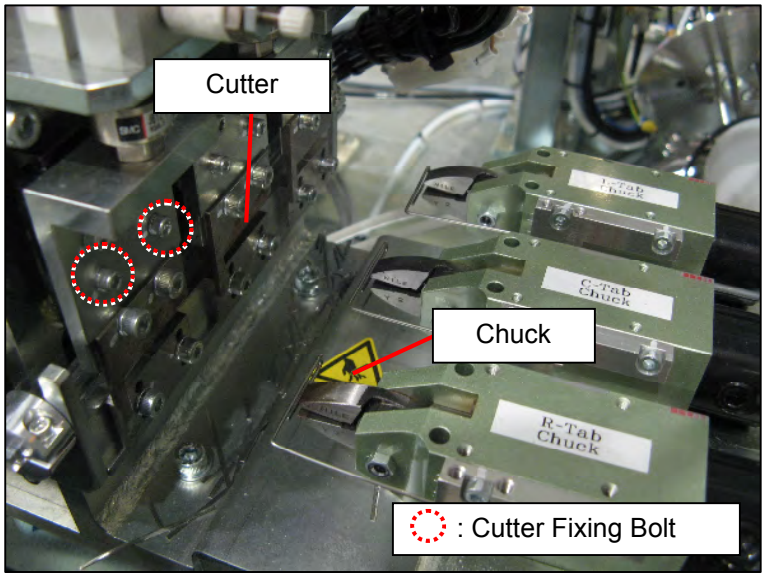
Heater itself

(4) Install a new heater with opposite procedures.

3-15. Tab Cutter

3-15-1. Replacement

Cycle	When the nipper's blade has any chip or dent, also the cutting edge is blunt.
Procedure	(1) Bring the cutter to its open position. (2) Remove the fixing bolts. (3) Disengage the cutter from place. (4) Set the head of a new cutter in bump place and clamp it with tab cutter fixing bolts. *** When the bottom plate is found chipped or dented, replace it in the same manner as cutter replacement.**



Tab Cutter

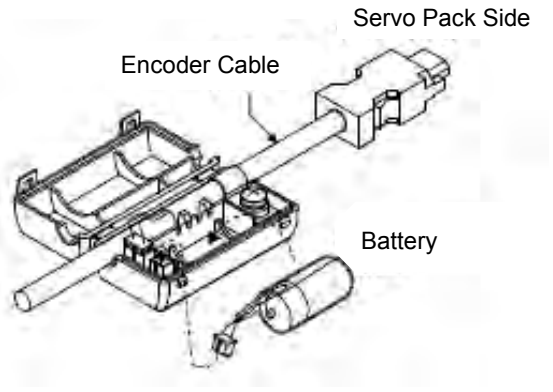
3-16. Encoder Cable with Absolute Value Specification

3-16-1. Outline

If the battery voltage drops to approximately 2.7V, battery alarm “encoder buttery alarm (A.830)” or “encoder battery warning (A.930)” will be displayed on the servo motor’s display. If an alarm or warning is displayed, immediately replace the batteries following procedure below.
To avoid losing absolute encoder’s memory, be careful not to turn off the servo pack’s power before replacing the battery.
In case that the machine left unused for about one year after shipment, check the residual power quantity of the battery with tester. The battery is usable if the result is 3.6V or more.

3-16-2. Replacement

(1) Turn on only SERVOPACK control power supply
(2) Open the battery case cover.
(3) Remove old battery and mount the battery (JZSP-BA01) as shown in the drawing below.
(4) Close the battery case cover.
(5) After replacing the battery, turn OFF the SERVOPACK power to cancel the absolute “encoder battery alarm (A.830)”.
(6) Turn ON the SERVOPACK power back again.
(7) Check that error display is cancelled and it operates without any problems.



Encoder Cable (Cover Opened)

	If the servopack control power supply is turned OFF and the battery and/or encoder cable is disconnected, the absolute encoder data will be deleted.

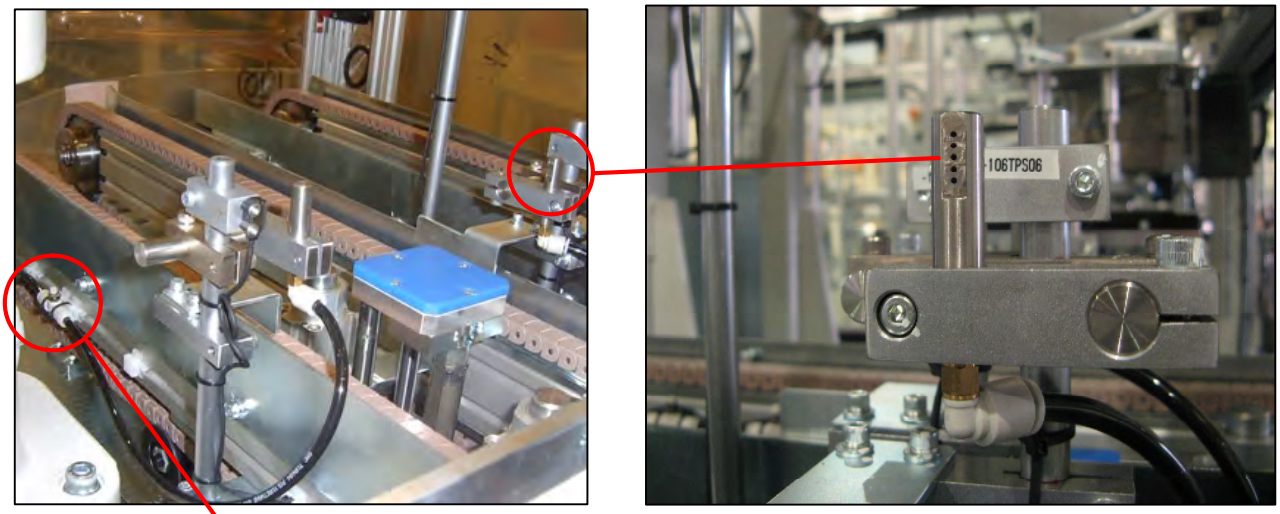
3-17. Air Purge

3-17-1. Adjustment

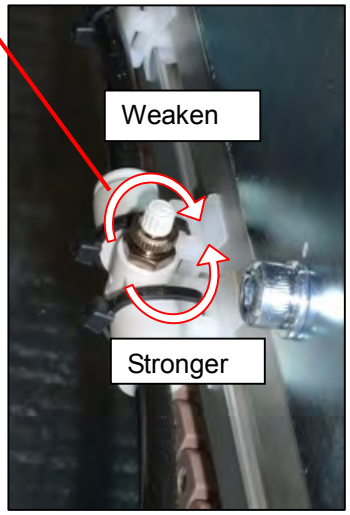
Air purge is set to separate the cell in the magazine. Air purging force is adjustable.

(1) There is an adjustment knob as shown in the following pictures.

(2) Turn the knob to the right or left to adjust the force.



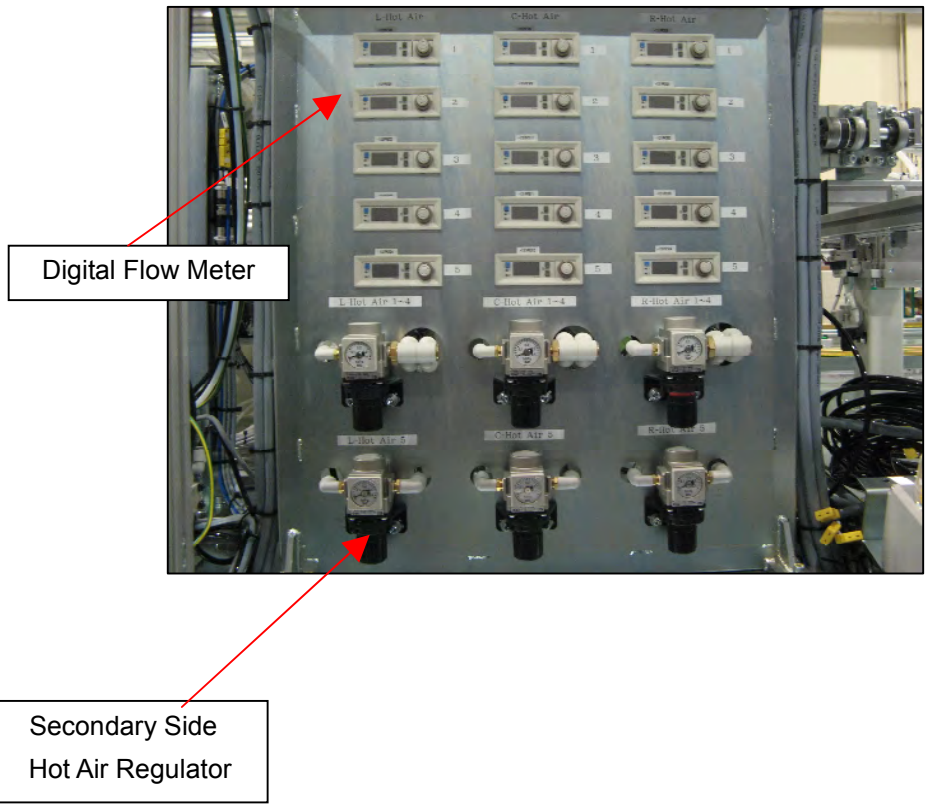
Blower



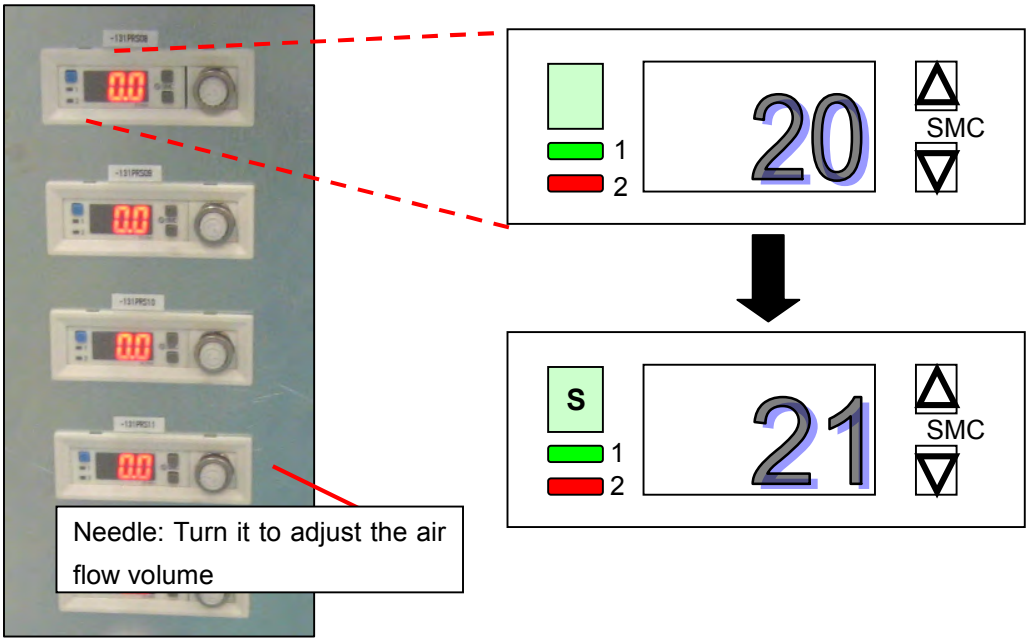
Adjustment Knob for Cell Separation Blower

3-18. Hot Air Flow volume

3-18-1. Outline



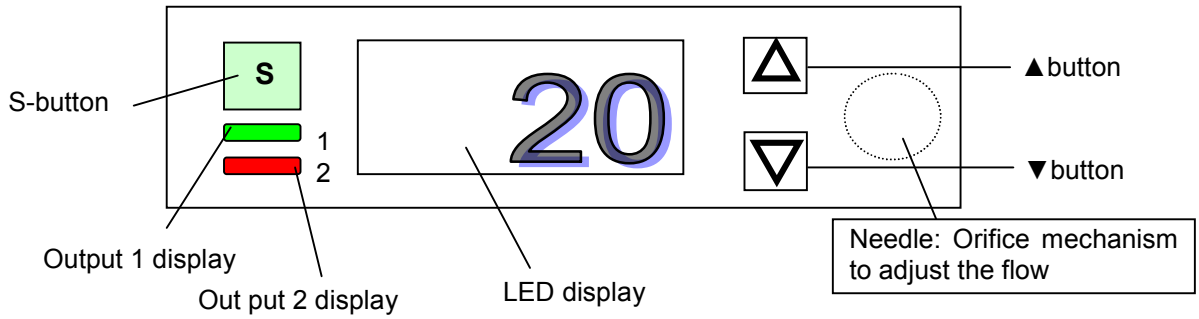
*** Air Flow volume should be over 20L/min.**
If the Air flow volume is less than 20L/min, the air heter will burn.



Hot Air Flow Volume Digital Switch

3-18-2. Hot Air Control Value

A digital flow switch allows adjustment of the hot air flow volume.



*** The controller will be activated for output during adjustment.**

3-18-3. Adjustment

(1) Push the [S] button once in the measurement mode. (in this mode, the panel DOESN'T indicate any function selection mode like [F_××]) Press the [S] button for over 2 seconds, and the display will switch between measurement mode and function mode.

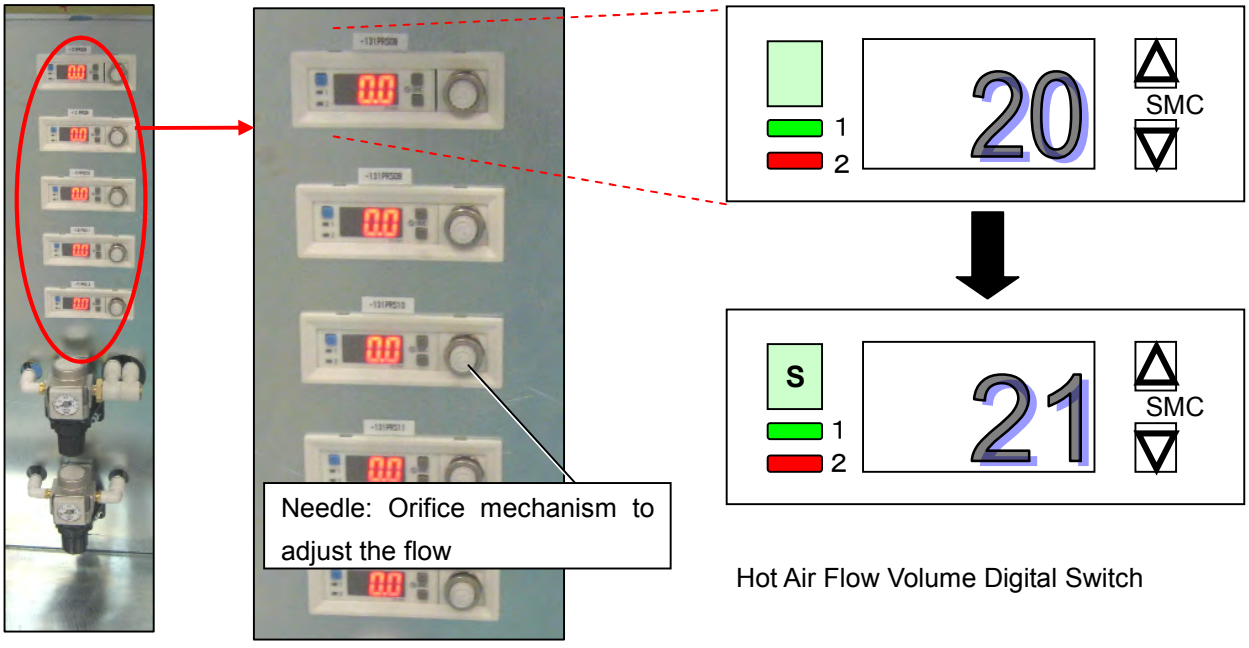
(2) [P__1]and a set value will be displayed alternately.

(3) Press either [▲] button or [▼] button to change setting values. Numeric values will increase with the [▲] button and decrease with the [▼] button.

(a) Numeric value will increase one by one every time the [▲] button is pressed. Keep pressing it will continue the increment.

(b) The [▼] button operates in the same manner.

(3) Press the [S] button to complete the setting. If 2 output type is in use, [P_2] will be displayed.



Hot Air Flow Volume Digital Switch

4. How to Identify the Parts

A machine is composed of mechanical parts and electrical parts. The mechanical parts are shown on the mechanical drawing, and the electrical parts are shown on the electrical drawing.
Among those parts, the parts which will be possibly changed are listed in the mechanical and the electrical lists, as consumable parts (those may be changed during the warranty period, which is one or two years, or those estimated to be changed earlier) and recommended parts (those estimated to be changed within five years). The following section describes how to specify the model, name, and the manufacturer of the used parts in case of machine failure.

4-1. Mechanical Parts

(1) Check the part number and group number.
In the mechanical drawing, part number is contained to specify the parts. The group number is indicated on the bottom right of the drawing. Check the last five digits of the group number.
In some cases, group number and part number are shown together in a balloon like 700-00 N006
In this case, the group number is “700-00”, NOT the number on the bottom right.

(2) Specify the model, name, and the manufacturer of the parts from the mechanical parts list with previously checked group number and part number.
The line where the group number and the part number match shows the detail of the appropriate part.

4-2. Electrical Parts

The electrical parts are NOT sorted by the group number. The group numbers of all the parts are indicated “900-00” in the electrical parts list.
Instead, specify the part with the device number. The device number is labeled on the electrical part of the machine. Specify the line where the device number matches.
Alternatively, the part can be specified with the device number shown on the electrical drawing.

In the following pages, the specific examples of specifying mechanical and electrical parts are given.

4-3. An example of specifying the mechanical part

<Vacuum pad>

(1) At first, check the group number and the part number of the vacuum pad in the mechanical drawing. The part number is indicated “N09” in Figure 1 and the group number is indicated “030-00” in Figure 2.

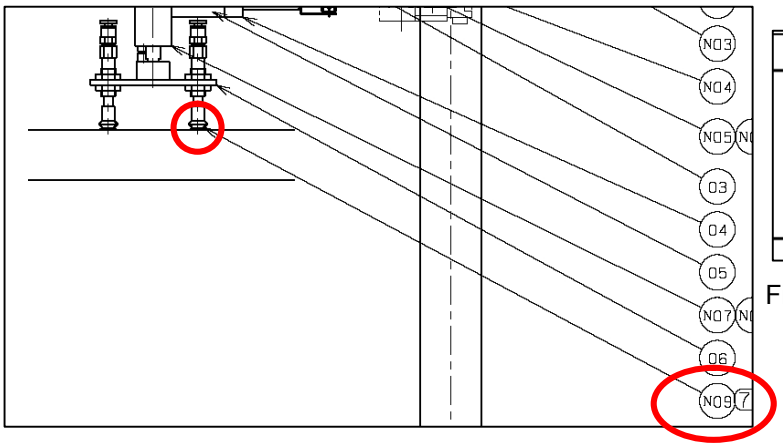


Figure 1: mechanical drawing (detail)

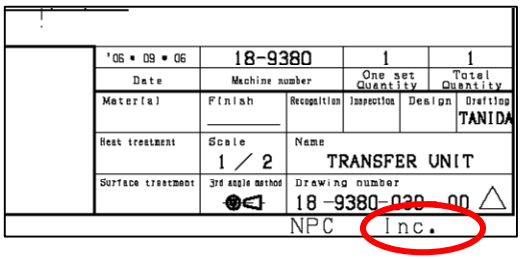


Figure 2: mechanical drawing (bottom left)

(2) Specify the part from the mechanical parts list, using previously checked group number and the part number. Look for the line where the group number is “030-00” and the part number is “N009”. The detail of the vacuum pad is shown in the line of list number 16, which is redlined in the mechanical parts list shown below.

.

list no.	group no.	part no.	type	品
1	020-00	N001	4LB45N-2	リニアヘッド
2	020-00	N002	4IK25GN-SWM	電磁ブレーキ付モーター
3	020-00	N003	CDM2L32-250-C73	エアシリンダ
4	020-00	N005	RB2015S	ショックアブソーバ
5	020-00	N006	SSR20XW2UU+640L	LMガイド
6	020-00	N007	SM13GUU	スライドブッシュ
7	020-00	N011	EE-SX872P	フォトマイクロセンサ
8	020-00	N012	E3T-ST14	光電スイッチ
9	020-00	N013	E39-S63	スリット
10	020-00	N017	AS1001F-06	スピードコントローラ(インライン)
11	020-00	N018	AS2201F-01-06S	スピードコントローラ(エルボ)
12	030-00	N005	KR45H20A+440L5E-1XX0	LMガイドアクチュエータ
13	030-00	N006	SGMAS-02ACA21	サーボモータ
14	030-00	N007	CXSL15-30R-Z73	デュアルロッドシリンダ
15	030-00	N008	AS1301F-M5-04	スピードコントローラ(ユニバーサル
16	030-00	N009	ZPT08BSJ6-04-A8	吸着パッド
17	040-00	N001	KR45H20A+440L5E-1XX0	LMガイドアクチュエータ
18	040-00	N002	SGMAS-02ACA21	サーボモータ

Figure 3: mechanical parts list (detail)

4-4. An example of specifying the electrical parts

<Emergency stop button>

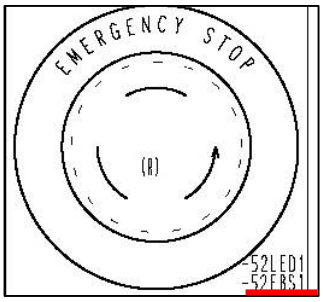


Figure 4: electrical drawing

(1) At first, check the device number of the electrical part. The device number is labeled on the electrical part of the machine body, as shown in Figure 4. The device number of the emergency stop button is indicated “-52EBS1” in Figure 4.

(2) Specify the part from the electrical parts list, using previously checked device number. Look for the line where the device number (symbol number) is “-52EBS1”. The detail of the emergency stop button is shown in the line of list number 42, which is redlined in the electrical parts list shown below.

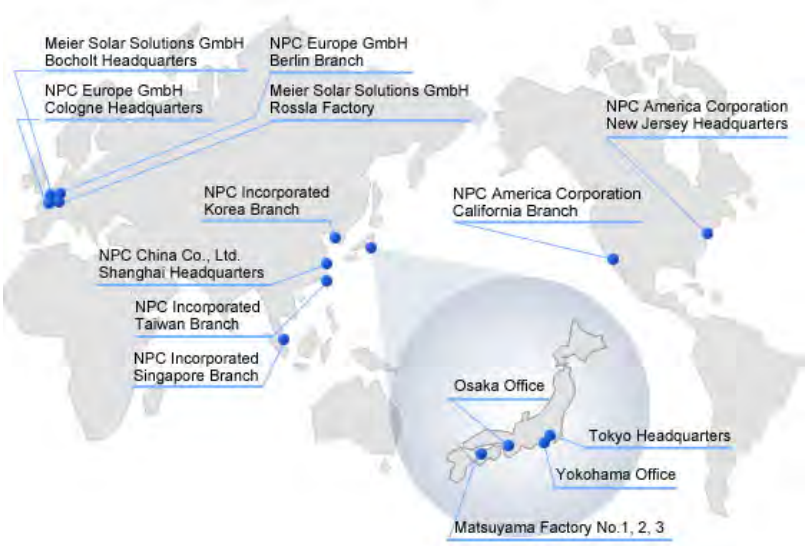
list no.	symbol no.	group no.	part no.	type	品名
1	-3DRV1S -4DRV1S -43DRV01S	900-00	N003	SGDS-02A12A	サーボパック
2	-20SIG1	900-00	N004	LOUT-24-3 R-Y-G	タワーライト
3	-4DRV2S	900-00	N005	SGDS-04A12A	サーボパック
4	-11PLC	900-00	N006	CJ1G-CPU45H	CPUユニット
5		900-00	N007	CJ1W-PA205R	電源ユニット
6	-11PLC	900-00	N008	CJ1W-NCF71	位置制御ユニット
7	-11PLC	900-00	N009	CJ1W-ID232	DC入力ユニット
8	-11PLC	900-00	N010	CJ1W-ID262	DC入力ユニット
9	-11PLC	900-00	N011	CJ1W-OD232	トランジスタ出力ユニット
10	-11PLC	900-00	N012	CJ1W-OD262	トランジスタ出力ユニット
11	-11PLC	900-00	N013	CJ1W-SRM21	CompoBus/Sユニット
12	00-(00),(06)	900-00	N014	SRT2-ID08-1	リモートI/Oターミナル
13	00-(04),(08),(10),(12),(14)	900-00	N016	SRT2-ID16T-1	リモートI/Oターミナル
14	00-(02),(03),(08),(10)	900-00	N017	SRT2-OD08-1	リモートI/Oターミナル
		900-00	N018		ートI/Oターミナル
		900-00			パワーサプライ
		900-00			
35	-19MC1 -58MC1 -58MC2			SC-0/GT 1a コイルDC24	
36	-1LED1		N050	AH164-ZTWM3	表示灯
37	-29COS00 -67COS10 -67COS10	900-00	N053	AR22JR-2A11A	キー付セレクタスイッ
38	-12BS1 -27BS01 -27BS02	900-00	N055	AH164-TLG11E3	照光式押しボタンスイッチ
39	-12BS2 -27BS03	900-00	N056	AH164-TLR11E3	照光式押しボタンスイッチ
40	-27BS00	900-00	N057	AH164-TLS11E3	照光式押しボタンスイッチ
41	-27BS04 -27BS05	900-00	N058	AH164-TLY11E3	照光式押しボタンスイッチ
42	-13EBS2 -52EBS1 -52EBS2	900-00	N059	AR22VOR-12E3R	照光式非常停止用押しボタンスイッチ
43	-33BZ06	900-00	N060	AH164-TX2BE	ブザー
44	-29BS01 -67BS11 -67BS111	900-00	N064	AR22E0L-10E3G	照光式押しボタンスイッチ
45	-14SFC1 -16SFC1 -17SFC1 -55SFC1	900-00	N065	G9SA-301 DC24V	セーフティリレーユニット
46	-12AXR1	900-00	N066	LY-4N DC24V	バイパワーリレー
47	CIMR-J7AA20P10	900-00	N069	CIMR-J7AA20P10	インバータ
48	-1FLT1	900-00	N070	3SUP-HL75-ER-6	ノイズフィルター

Figure 5: electrical parts list (detail)

MEMO

5. Contact

Network



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