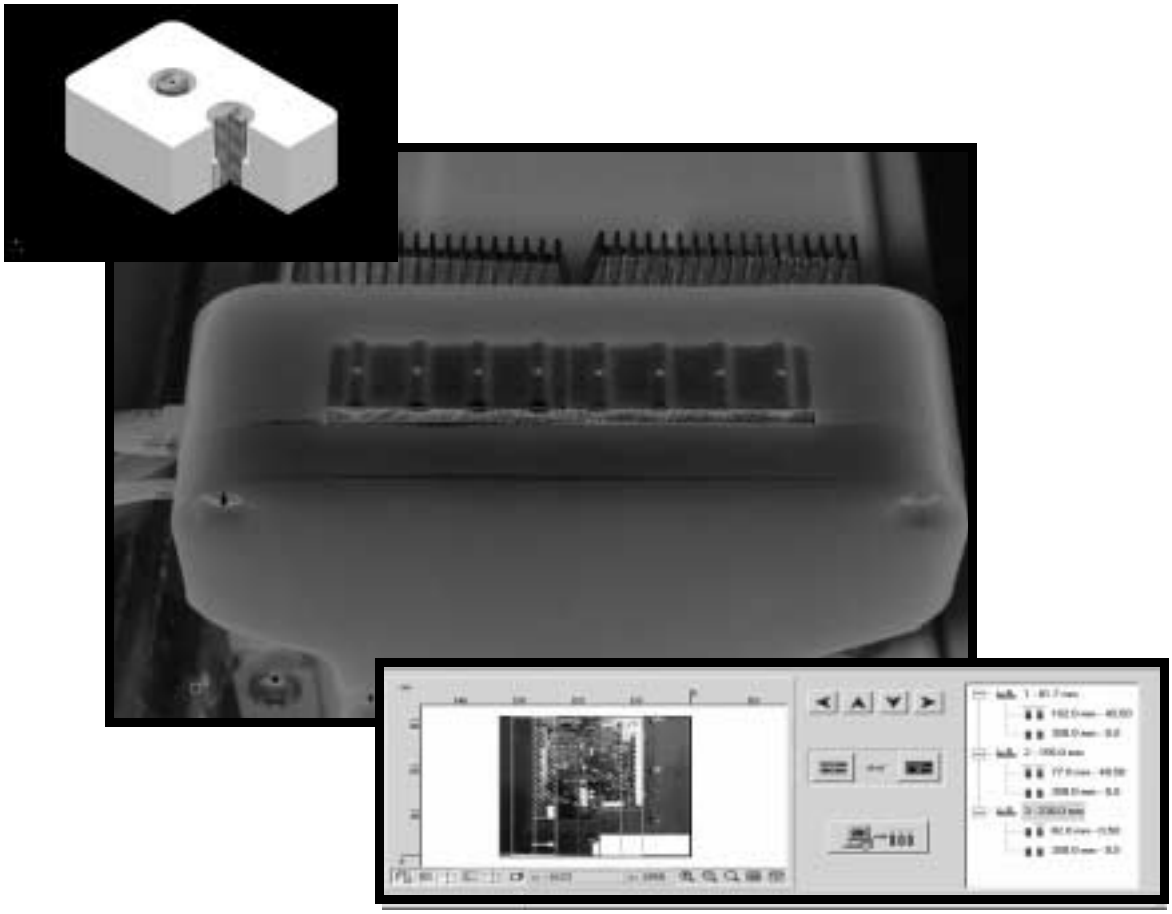
ServoJet™

System Guide



Speedline technologies

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Chapter 4. Actuator Maintenance

Chapter 5. Firmware

Chapter 6. Software

1

Functional Descriptions

Overview

Introduction

This chapter describes...

In this Chapter

The following is covered:

Pneumatic Regulator Panel

Introduction

The pneumatic regulator panel consists of several pressure regulators.

Descriptions

Refer to the following:

Part	Function
Inlet Air Pressure	Controls air pressure to Atomizing Pressure Regulator and Knife Pressure Regulator. It is the regulator that controls the pressure of the Air Purge portion of the Automated Atomizing Air Passage Cleaning Cycle. Typical Setpoint: 60 ps
Inlet N2 Pressure	Controls nitrogen pressure to the Flux Tank Pressure Controller (located within the Pneumatic Contol Box – controlled by the ServoJet Control Computer) and Solvent Tank Pressure Regulator (located on the Solvent Tank). Nitrogen is required as a pressurizing gas when using Alcohol based fluxes to comply with OSHA regulations. When water soluble fluxes are used, Air may be substituted for Nitrogen. Typical Setpoint:60 psi
Atomizing Pressure	Controls the air pressure used to atomize the Flux Droplet Stream and transport flux to the circuit board. Typical Setpoint:40 psi idle (35 psi when supplying air)
Knife Pressure	Controls the air pressure feeding air to the Air Knife used to aid in hole penetration and flux distribution. Typical Setpoint:20 psi

Tubing Connection Panel

Introduction

The tubing connection panel provides the connection points for the tubing connected to the pneumatic regulator panel.

The tubing color code is as follows:

Flux Air/Liquid	Yellow
Cleaning Solvent Air/ Liquid	Red
Atomizing Air	Blue
Air Knife	Clear
Air inlet	Clear
N2 Inlet	Green

Connections

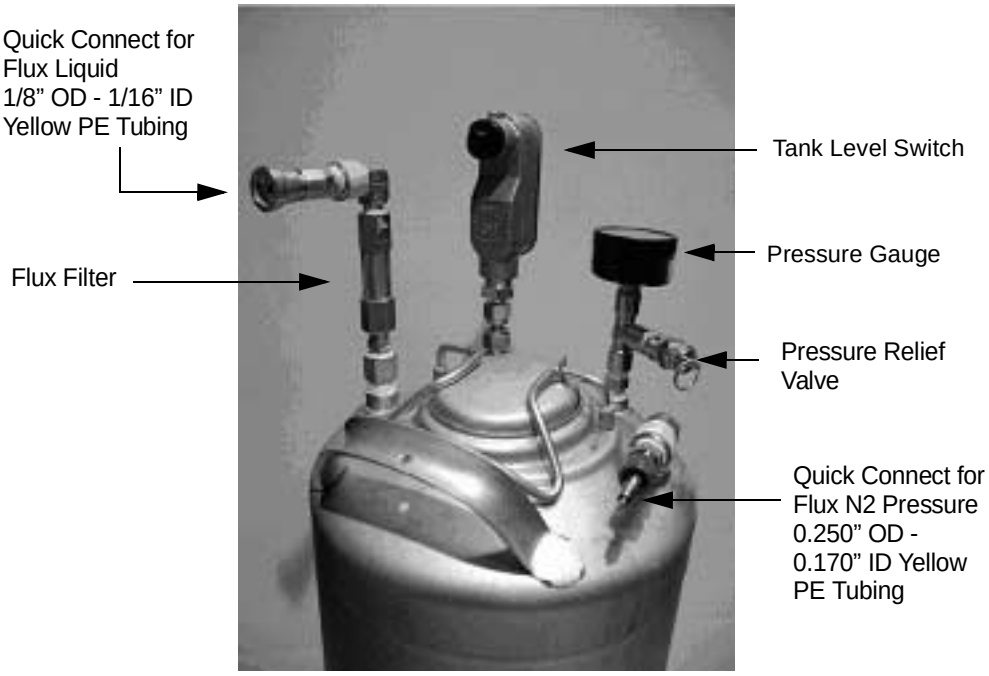
Make connections as described:

Atomizing Air	Connect Blue 0.250 / 0.170 inch polyethylene tubing to ServoJet Head
Air Knife	Connect Clear 0.250 / 0.170 inch polyethylene tubing to Air Knife
Flux Tank	Connect Yellow 0.250 / 0.170 inch polyethylene tubing with quick disconnect to Flux Tank
Cleaner Tank	Connect Red 0.250 / 0.170 inch polyethylene tubing with quick disconnect to Cleaner Tank
Air Inlet	Connect Clear 0.250 / 0.170 inch polyethylene tubing to Wave Solder Machine air supply
N2 Inlet	Connect Green 0.250 / 0.170 inch polyethylene tubing to Wave Solder Machine nitrogen supply (or Solder Machine Air Supply if using water based flux)

Five Gallon Flux Tank

Description

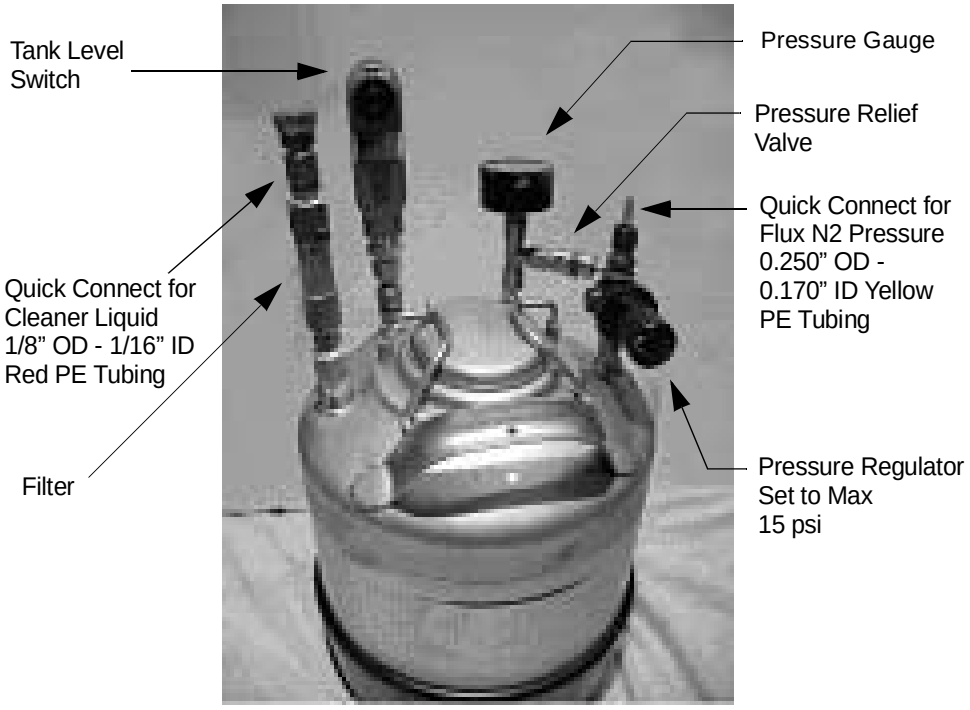
The five gallon flux tank consists of the following parts:



Two Gallon Cleaner Tank

Description

The two gallon cleaner tank consists of the following parts:



Pneumatic Control Panel

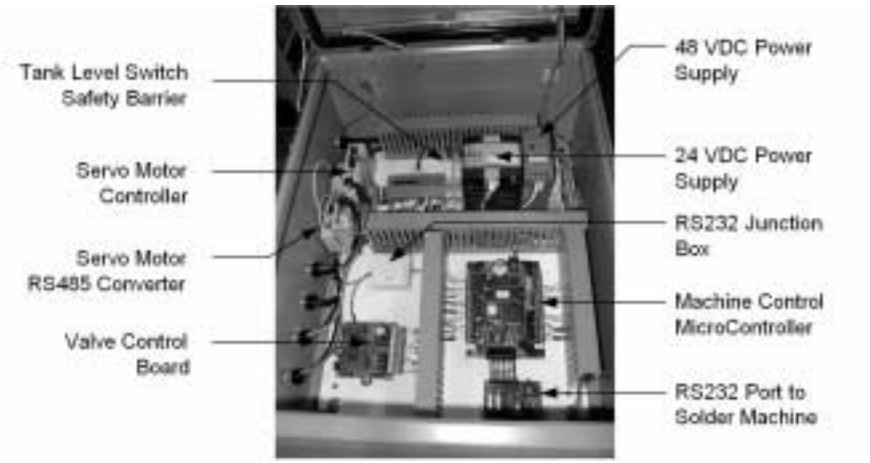
Description

The pneumatic control panel consists of the following parts:

Electrical Control Panel

Description

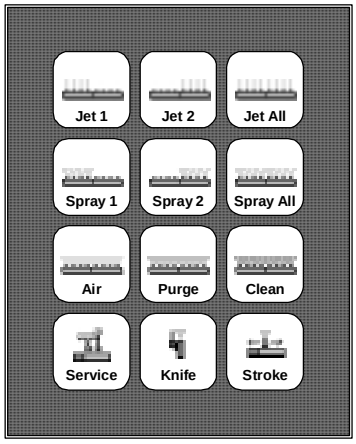
The electrical control panel consists of the following parts:



Manual Control Keypad

Introduction

The manual control keypad provides the operator interface.



Descriptions

Refer to the following:

Key	Function
Jet 1	Turn on ServoJet Valve 1 jetting flux through leading 4 nozzles
Jet 2	Turn on ServoJet Valve 2 jetting flux through trailing 4 nozzles
Jet All	Turn on ServoJet Valve 1 and 2 jetting flux through all 8 nozzles
Spray 1	Turn on ServoJet Valve 1 and Atomization Air to spray flux from leading 4 nozzles
Spray 2	Turn on ServoJet Valve 2 and Atomization Air to spray flux from trailing 4 nozzles
Spray All	Turn on ServoJet Valve 1 and 2 and Atomization Air to spray flux from all 8 nozzles
Air	Turn on Atomization Air to ServoJet head
Purge	Turn on high (line) pressure Air to the ServoJet head
Clean	Initiate a cleaning fluid injection cycle to clean atomizing air passage
Service	Move ServoJet head to service position
Knife	Turn on air to the Air Knife
Stroke	Initiate a fluxing stroke based on last programmed values

ServoJet Head Tubing External Connections

Description

Refer to the following:

Three Way Inert Solenoid External Connections

Description

Refer to the following:

ServoJet Head Internal Tubing

Description

Refer to the following:

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Theory of Operation

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Descriptions

Flux Dispense Head Transport

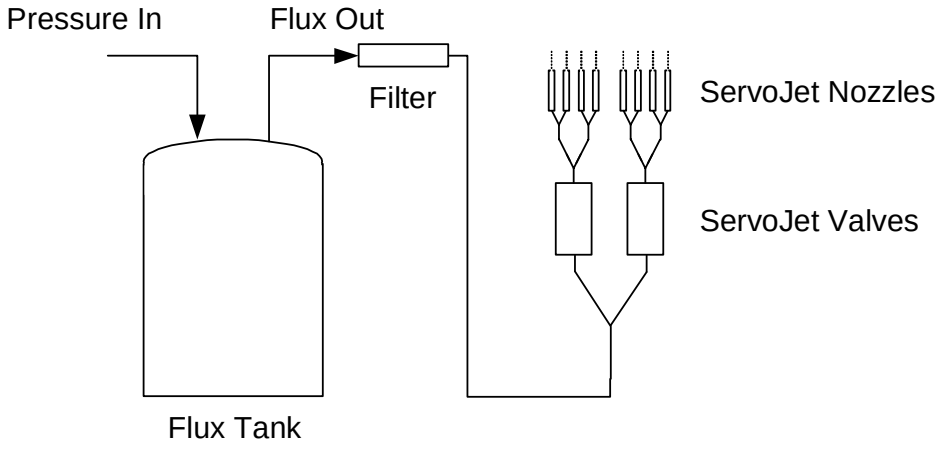
A ball-screw actuator driven by a Servo Motor traverses a Flux Dispense Head perpendicular to board travel in a Wave Solder Machine. Traveling at a programmable constant velocity, Flux is dispensed on the outgoing stroke at start and end points defined in the control computer. Slower Traverse Velocity (higher Stroke Factor) will dispense more flux, higher Traverse Velocity (lower Stroke Factor) will dispense less flux. The actuator returns to its home position at a high speed to prepare for the next stroke.

Board Detection / Tracking

A photocell located at the entrance of the fluxing zone detects the entry of a board. The ServoJet control computer tracks the progress of the board within the flux zone based on the indicated conveyor speed. When the leading edge of the board reaches the programmed fluxing start point, a flux traverse stroke is initiated. The ServoJet control computer continues to track the board. When a distance equal to the Flux Dispense Head Spray Width (approx: 3 inches) has passed, the next traverse stroke is triggered.

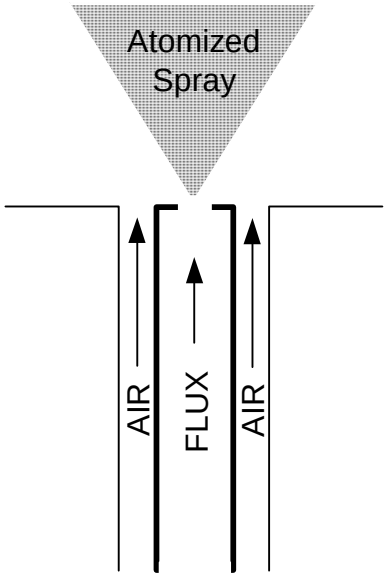
Flux Dispense

Programmable pressurized Nitrogen (or Air) enters into the Flux Tank, forcing flux through the filter and tubing to the ServoJet Valves located in the Dispense Head. Programmable electrical pulses rapidly open and close the high-speed ServoJet Valves jetting droplets of flux through the small aperature in the tip of the Dispense Nozzles. Shorter pulses create smaller droplets (less flux), longer pulses create larger droplets (more flux). Higher tank pressure creates larger droplets, lower tank pressure smaller droplets. Each valve feeds 4 Dispense Nozzles.



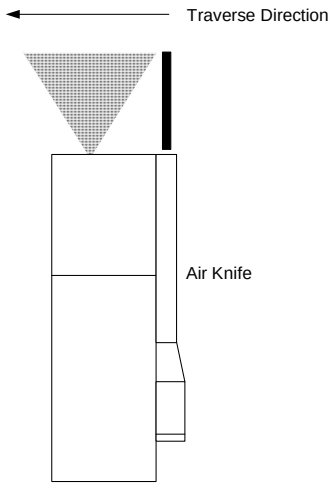
Flux Atomization

Pressurized air is forced through a small, concentric air passage surrounding each of the Flux Dispense Nozzles. This air breaks the droplet stream created by the pulsating ServoJet Valves into fine particles and carries them at a high velocity to the circuit board.



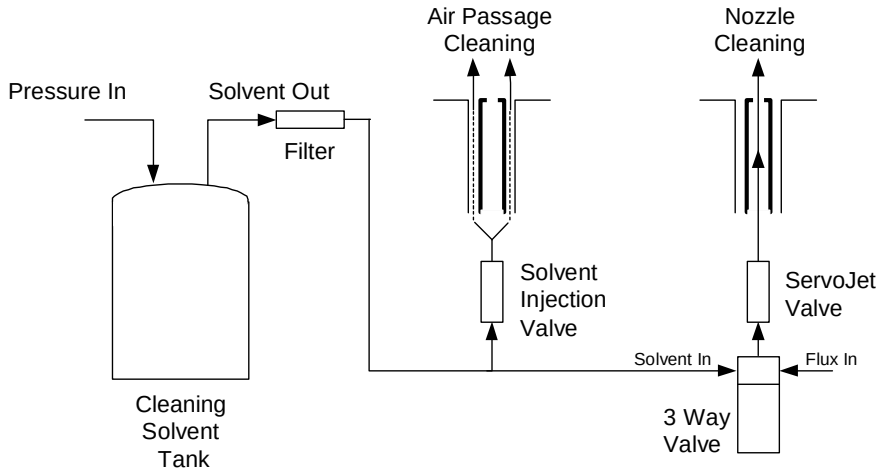
Air Knife

An Air Knife attached to the Flux Dispense Head follows the flux application aiding in hole penetration and flux distribution. The Air Knife may be activated or idle on a recipe-by-recipe basis. The Air Knife pressure is manually adjusted at the Pneumatic Regulator Panel. Typical pressure is 20 psi.



Cleaning Systems

Diagram



Atomizing Air Passage Cleaning

Flux residue can build up around the Dispense Nozzles over time hindering or blocking the Atomization Air Passages. An automatic cleaning solvent injection system injects Cleaning Liquid (alcohol or water depending on chosen flux chemistry) through a High Speed ServoJet Valve into the atomizing air manifold. Purge air at inlet pressure is ported to the manifold, forcing the Cleaning Liquid through each of the 8 Atomization Air Passages removing flux residue. This cleaning function is automatic and occurs after a programmable period (Cleaning Delay) when there are no boards in the fluxing zone. Cleaning Liquid Pulse time and Air Purge Duration are programmable variables.

During the Air Passage Cleaning cycle, the Air Purge siphons flux out of the nozzles through a venturi effect. In order to refill the nozzles, a programmable Nozzle Refill Pulse is generated at the detection of the next board.

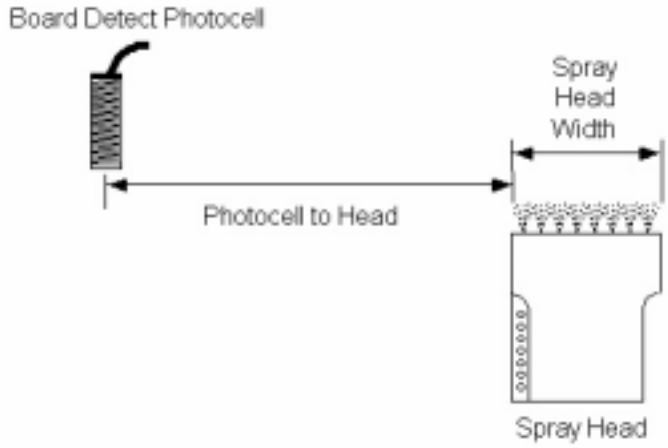
Flux Delivery Circuit Cleaning

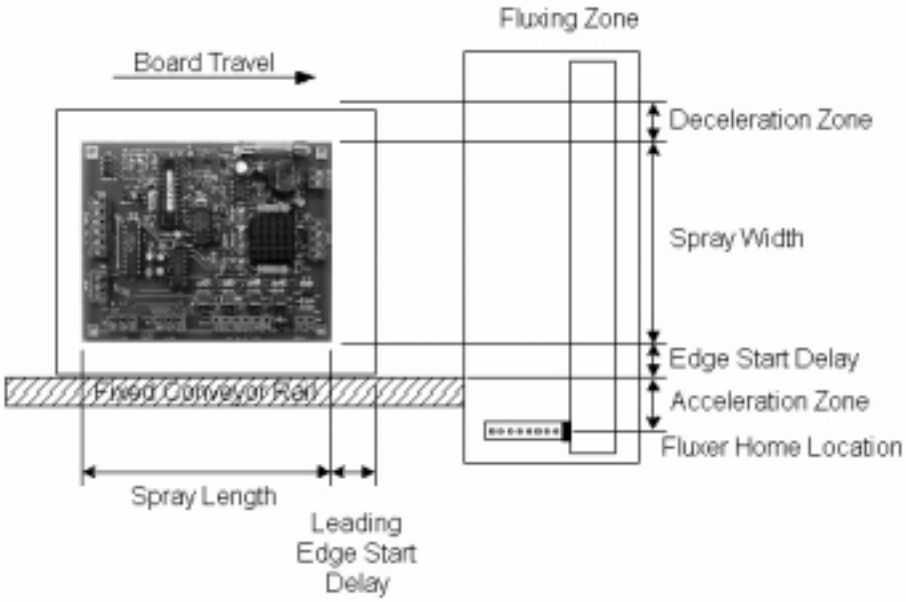
Flux left in the nozzles and ServoJet valves for long idle periods could dry and hinder the passage of flux. A semi-automatic cleaning solvent injection system injects Cleaning Liquid through the 2 ServoJet Valves and 8 Flux Dispense Nozzles displacing flux. A warning message appears after the programmable Nozzle Cleaning Delay expires indicating that a Solvent Purge is required. The operator must manually initiate the Nozzle Purge after confirming that there are no further boards requiring flux and that the fluxer will be idle for a coming period. The ServoJet Control Computer energizes the Inert 3 Way Solenoid porting Cleaning Solvent to the ServoJet Valves. The ServoJet Valves activate for the programmable Nozzle Purge Period cleaning the Flux Dispense Paths.

The ServoJet Control Computer memorizes that a Nozzle Purge cycle has been performed. The next time that the Fluxer is placed in operation, a Flux Purge cycle is initiated displacing the Cleaning Solvent with flux. The same programmable variables that control the Solvent Purge are used for the Flux Purge.

Machine Geometry

Refer to the following:





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RCP2 Maintenace

Maintenance Schedule

Introduction

Perform maintenance work according to the schedule below. The schedule is set assuming eight hours of operation a day. When the operation time is long such as 24-hour operation, shorten the maintenance intervals as needed.

Interval	Visual Inspection	Check Interior	Grease Supply
Start of Operation	X		
After 1 Month of Operation	X		
After 6 Months of Operation	X	X	
After 1 Year of Operation	X	X	X
Every 6 Months Thereafter	X		
Every 1 year	X	X	X

Visual Inspection of the Machine Exterior

What to Inspect

Check the following items when carrying out visual inspection.

Area	Inspect For...
Body	Loose mounting bolts?
Cables	Damage to cables or connection to connector box?
Stainless Sheet	Damage or foreign deposit?
General	Unusual noise or vibrations?

Cleaning

Procedure

Perform the following:

1. Clean the exterior as needed.
2. Wipe off dirt with a soft cloth.

Caution

Do not use strong compressed air on the actuator as this may force dust into the crevices.

Caution

Do not use petroleum-based solvent on plastic parts or painted surfaces.

3. If the unit is badly soiled, apply a neutral detergent or alcohol to a soft cloth, and wipe gently.

Interior Inspection

Introduction

Turn off the power, remove the side covers, and then visually inspect the interior. Check the following items during interior inspection.

Body	Loose mounting bolts?
Guides	Lubrication appropriate? Soiling?
Ball screw	Lubrication appropriate? Soiling?

Procedure

To inspect the interior:

1. Remove both side covers. With the SA5, SA6 SA7 or SS type, use an Allen wrench of 1.5 mm across flats. With the SM type, use an Allen wrench of 2 mm across flats.
2. Make a visual check of the interior to see if there is any dust or foreign matter in the unit and check the lubrication. Even if the grease you see around the parts is brown, the lubrication is fine as long as the traveling surface appears shiny.

3. If the grease becomes dirty and dull or if the grease has worn away due to extended operating time, lubricate the parts after cleaning them.
4. When the inspection/maintenance work is complete, install the side covers.

Tightening torque (SA5/SA6/SA7/SS):	Thin-head screw M3 x 6 – 87.2 NÞcm (8.90 kgfÞcm)
Tightening torque (SM):	Thin-head screw M4 x 6 – 204 N·cm (20.8 kgf·cm)

Attention

When installing the side covers, do not let them contact the end faces of the stainless sheet. It may damage or bend the stainless sheet, causing the sheet to deteriorate or wear quickly. To prevent this problem, insert a shim (approx. 0.1 to 0.2 mm) between the sheet and each cover to provide an allowance, and gently push in the cover.

Caution

When checking the interior, be careful not to bend or scratch the stainless sheet. Wear protective gloves when handling the stainless sheet, because it has sharp edges that may cause accidental cuts.The front cover is supporting the ball screw, so do not disassemble the front cover. If the front cover is misaligned, the shaft centers may become offset, thus increasing the traveling resistance, reducing the service life of each part, or generating noise.

Internal Cleaning

Procedure

Wipe off dirt with a soft cloth.

Caution

Do not use strong compressed air on the actuator as this may force dust into the crevices. Do not use petroleum-based solvent, neutral detergent or alcohol. Do not use flushing oil, molybdenum grease or anti-rust lubricant. When grease is soiled with large amounts of foreign substances, wipe off the dirty grease and then apply new grease.

Lubricating the Guides and Ball Screw

What Grease to Use on the Guides

The following grease is used when we ship the unit.

Idemitsu Kosan	Daphne Eponex Grease No.2

Other companies also sell a grease similar to this. If ordering from another maker, give the name of this product and request something comparable. Comparable products include the following:

Showa Shell Oil	Albania Grease No. 2
Mobil Oil	Mobilux 2

What Grease to Use on the Ball Screw

The following grease is used when we ship the unit.

Kyodo Yushi	Multemp LRL3

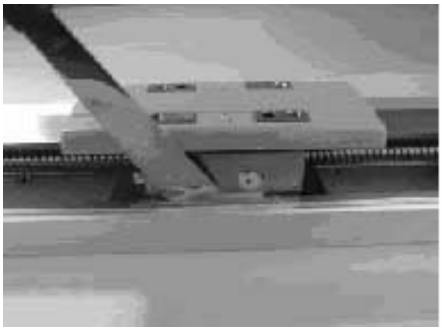
This grease offers excellent properties such as low heat generation, and is suitable for lubricating ball screws.

Caution

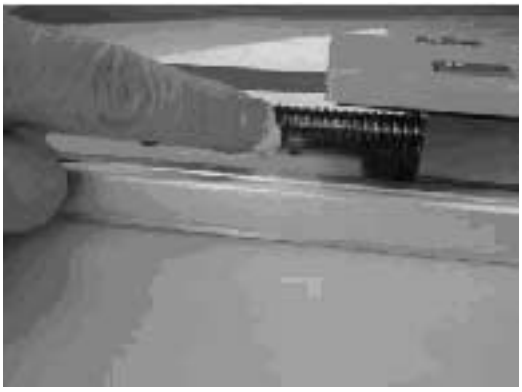
Never use any fluorine based grease. It will cause a chemical reaction when mixed with a lithium based grease and may cause damage to the actuator.

How to Apply Grease

1. When greasing the guide, use a spatula or grease applicator to squeeze or inject grease into the space between the slider and base, and then move the slider back and forth several times to let the grease spread evenly.
2. Apply grease on the guides on both sides.
3. Remove excess grease.



4. When greasing the ball screw, clean the ball screw, apply grease using a finger, and then move the slider back and forth several times to let the grease spread evenly. At this time, be careful not to deform the stainless sheet by accidentally touching the sheet. Remove excess grease.



5. Install the side covers:

Tightening torque (SA5/SA6/SA7/SS):	Thin-head screw M3 x 6 – 87.2 NÞcm (8.90 kgfÞcm)
Tightening torque (SM):	Thin-head screw M4 x 6 – 204 N·cm (20.8 kgf·cm)

Refer to step 4 of “Interior Inspection” on page 4 for information on installing covers.

Replacing/Adjusting the Stainless Sheet

Items Required for Replacement

The following items are required:

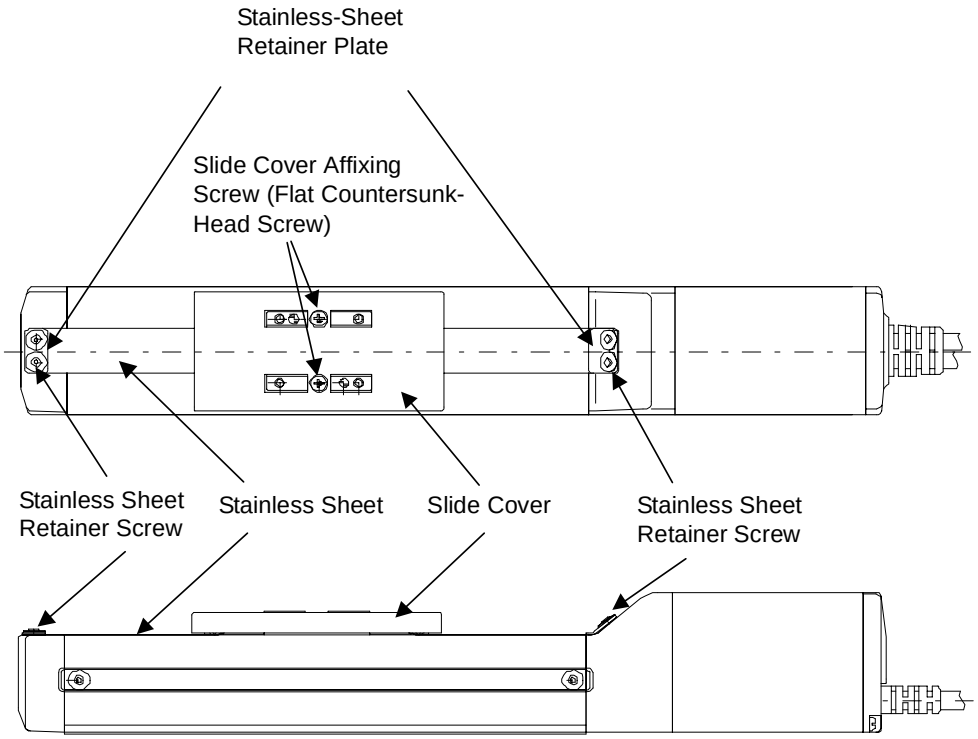
- Replacement stainless sheet
- Clearance-checking tool (a regular slider cover with holes). This tool is available from IAI's Sales Engineering Section. If you are replacing the stainless sheet, please contact us to make a rental arrangement or purchase the tool.
- Allen wrench set
- Phillips screwdriver
- Measure

Attention

Deterioration and wear of the stainless sheet is affected by its tension. If the stainless sheet is too tight, excessive clearances will be created between the sheet and slider covers and the sheet may undergo a fatigue failure. If the stainless sheet is too loose, the sheet will contact the back of the slider covers and generate shaving. Therefore, use a dedicated adjustment tool to properly adjust the tension of the stainless sheet so that the clearances between the stainless sheet and slider covers conform to the specified dimension.

Parts Identification

Refer to the following:

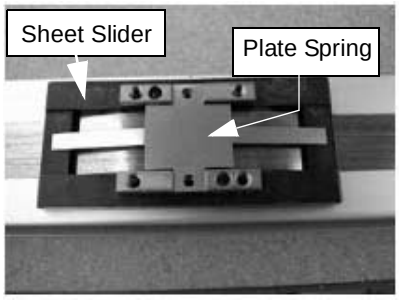


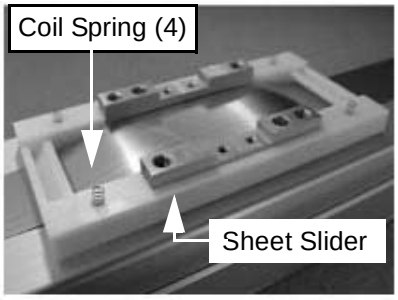
Procedure

Proceed as follows:

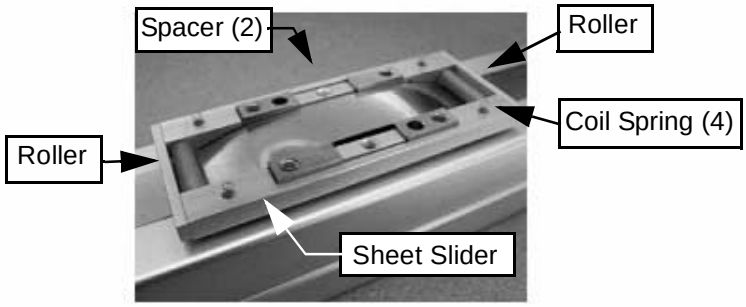
1. Remove the slider-cover affixing screws and remove the covers. After the slider covers have been removed

Standard Specification (Slider Structure)

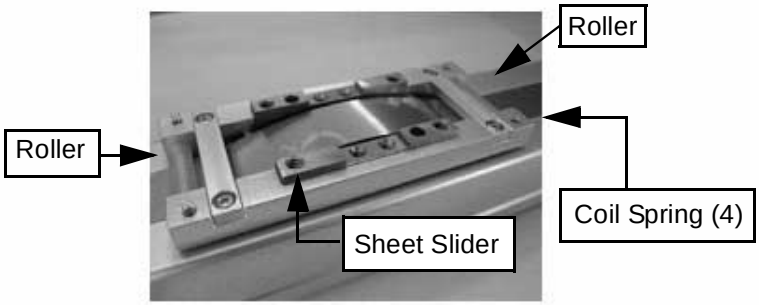




SR Specification (Roller Structure) SA5/SA6



SA7/SS/SM



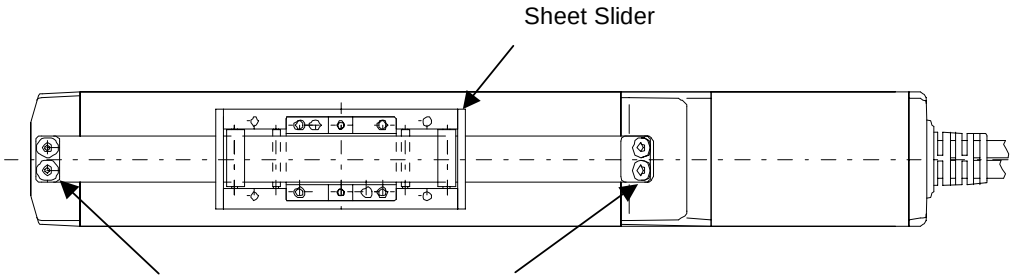
Caution

Remove the slider covers slowly and gently. If the actuator is installed on the ceiling or oriented vertically or horizontally on side, place a plastic bag, etc., underneath the slider covers so as not to lose the coil springs and spacers in case they drop off.

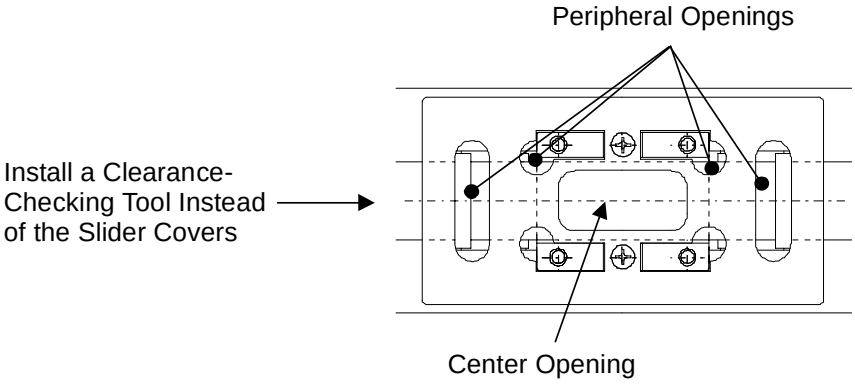
2. Remove the stainless-sheet retainer screws on both sides and pull out the stainless sheet.
3. Guide a new stainless sheet into the slider.

4. Hold the stainless sheet in place, and affix the retainer plates and screws.

   At this time, securely tighten the screws only on the motor side, and leave the screws on the counter-motor side loose.

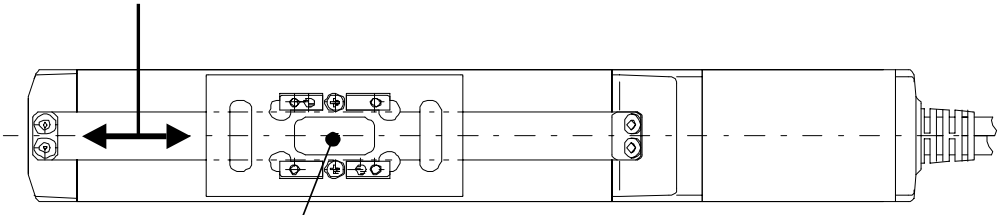


5. Install the clearance-checking tool.

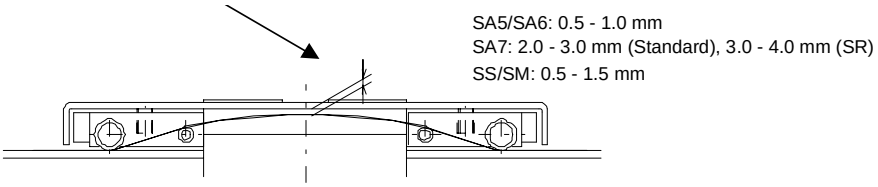


6. Adjust the tension of the stainless sheet. While looking through the center opening in the clearance-checking tool, move the stainless sheet on the loose end in the directions of arrows until the clearance between the top face of the stainless sheet and the back of the clearance-checking tool falls within the specified range.

Move the Stainless Sheet in the Direction of the Arrows to Adjust the Tension



While Looking Through the Center Opening, Check the Clearance Between the Top Face of the Stainles Sheet and the Back of the Clearance-Checking Tool. If the Clearance is within the Specified Tolerance Range, the Tension is Appropriate Even When the Clearance Varies Along the Entire Stroke or Between Right and Left

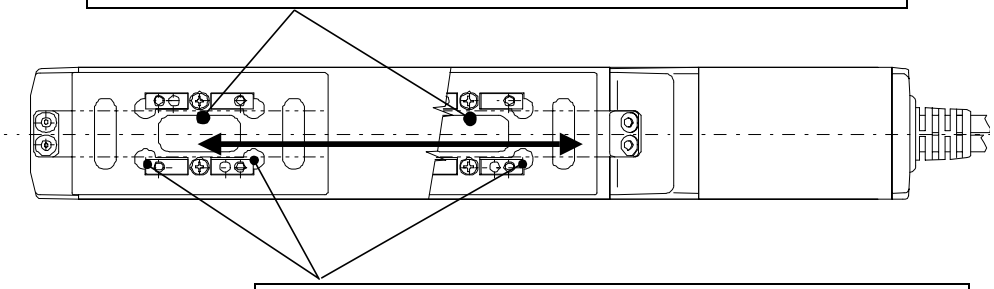


7. When the stainless sheet has been properly positioned, tighten the screws on the loose end to a level that the stainless sheet no longer moves.

8. Move the slider and check the tension of the stainless sheet along the entire stroke.

Checkpoint 1:

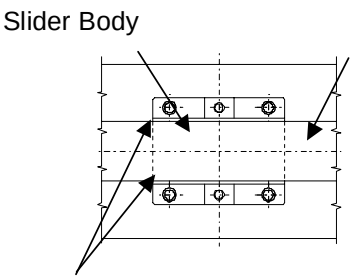
Check if the clearance between the top face of the stainless sheet and the back of the clearance-checking tool falls within the specified range along the entire stroke.



Checkpoint 2:

Look through the peripheral openings and confirm that the stainless sheet edges do not contact the slider body.
Move the slider back and forth at least three times over the entire stroke to ensure the edges do not contact the slider.
The sheet may move during the slider strokes, but slight movement is acceptable as long as the offset does not increase and the sheet does not contact the slider.
If the stainless sheet contacts the slider, repeat the adjustment from ?????????

The stainless sheet is not perfectly straight, but it bends to right and left slightly.
It is impossible to adjust the right and left clearances perfectly uniform.
Slight variation in clearance in the stroke direction or between right and left is acceptable, as long as the stainless sheet edges do not contact the slider body over the entire stroke.



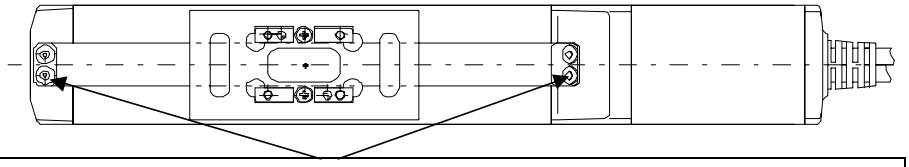
Clearance between stainless sheet edges and slider body

9. If the conditions in Checkpoints 1 and 2 are not satisfied, loosen the screws and readjust the position and tension of the stainless sheet again from À.

Attention

If the condition in Checkpoint 2 cannot be met after the readjustment, try installing the stainless sheet in the reverse direction or placing it upside down. If the stainless sheet is still not adjusted properly, replace it with a new sheet.

10. When proper clearances are obtained between the slider body and stainless sheet and an absence of contact between the two is confirmed, tighten the two screws on the loose end alternately, and then finally tighten all screws to a uniform torque to securely affix the stainless sheet. If the screws are not tightened uniformly, the sheet may meander or lift.



Apply additional torgue to the screws on both ends until the stainless sheet no longer moves. Tightening torgue:

SA5/SA6/SA7/SS: 87.2 N-cm (8.90 kgf-cm) (Reference Value)

SM: 204 N-cm (20.8 kgf-cm) (Reference Value)

11. Remove the clearance-checking tool and install the slider covers.

Attention

Again, pay attention not to lose the coil springs and spacers.

Reduction Belt [Motor Reversing Type]

Inspecting the Belt

Remove the pulley cover and visually inspect the belt. Durability of the reduction belt is affected significantly by the operating condition, and there is no standard guideline as to when the belt should be replaced.

Generally, the belt is designed to withstand several millions of flexing loads. As a practical guideline, replace the reduction belt when any of the following conditions is observed:

- The teeth and end faces of the belt have worn significantly.
- The belt has swollen due to deposits of oil, etc.
- Cracks and other damages are found on the teeth or back of the belt.
- The belt has broken.

Applicable Belt

Refer to the following:

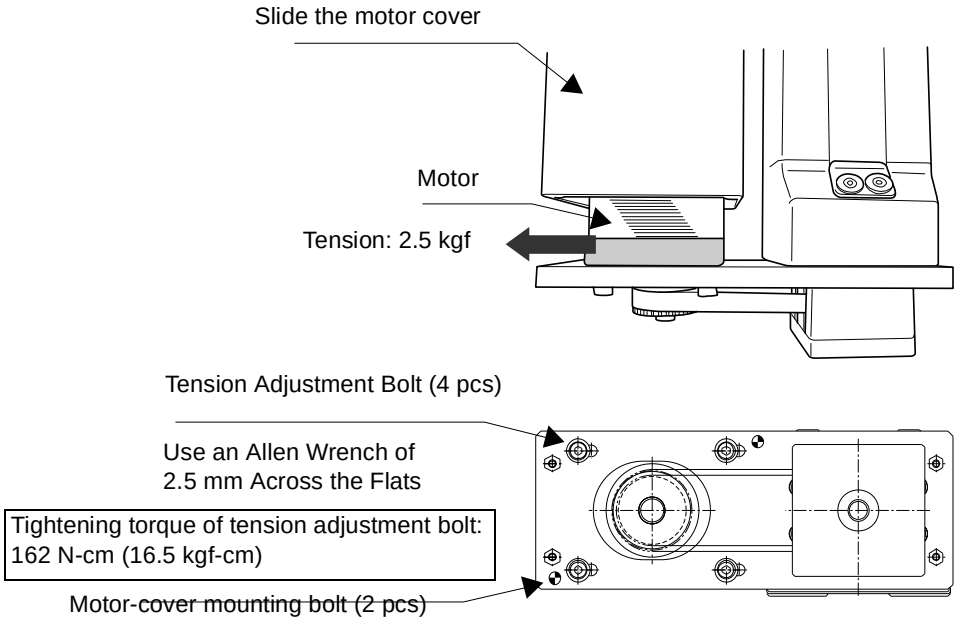
Manufacturer	Description	Specification	Application
Bando Chemical Industries	60S2M184U, 6mm Wide	Polyurethane Rubber	SA5R/SA6R
Bando Chemical Industries	150S3M255U, 15mm Wide	Polyurethane Rubber	SA7R
Bando Chemical Industries	100S3M219U, 10 mm Wide	Polyurethane Rubber	SSR
Bando Chemical Industries	150S3M252U, 15 mm Wide	Polyurethane Rubber	SMR

Adjusting the Belt Tension

Remove the pulley cover and loosen the four tension adjustment bolts. Slide the motor to the left to apply a tension to the belt, and then tighten the tension adjustment bolts.

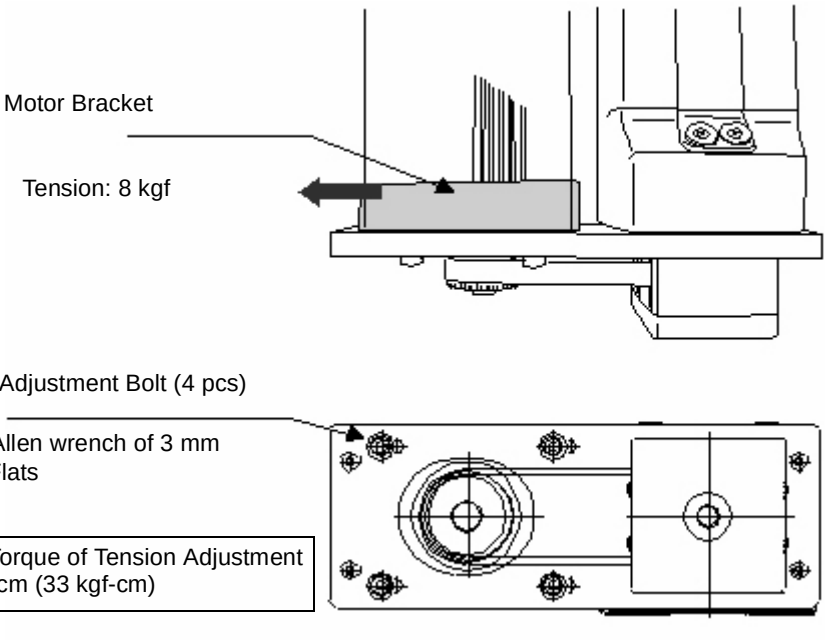
SA5R/SA6R

Refer to the following:



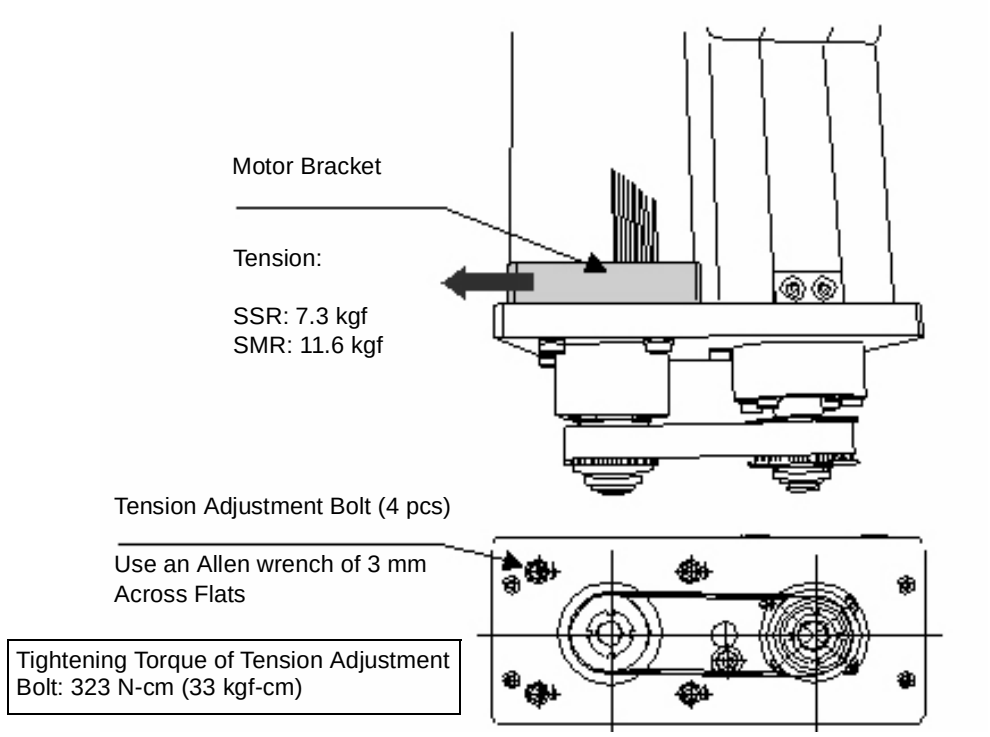
SA7R

Refer to the following:



SSR/SMR

Refer to the following:



Replacing the Belt (SA5R/SA6R)

Items for Replacement

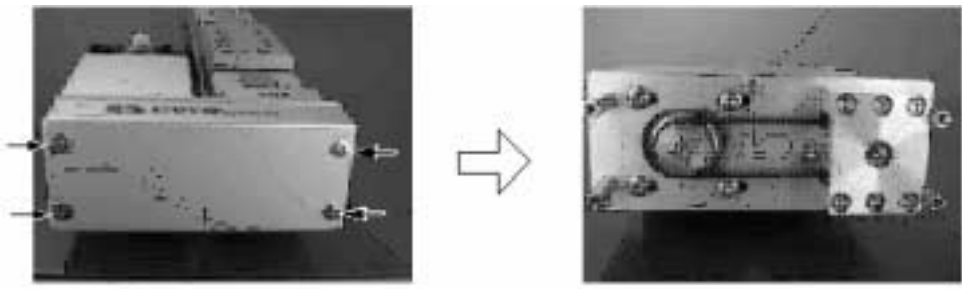
Ensure that you have the following:

- Replacement reduction belt
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 3 kgf or more)
- Strong string or long tie-band

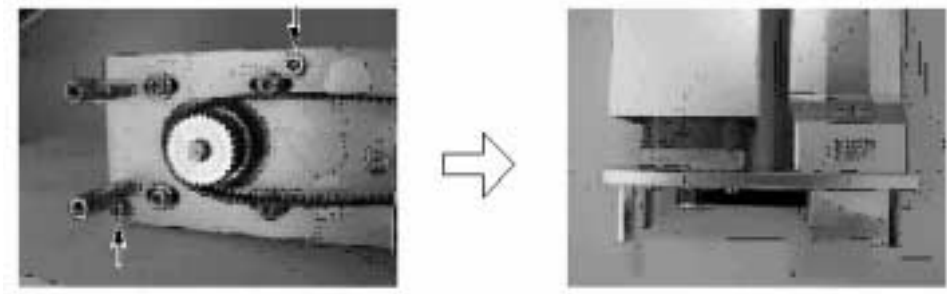
Procedure]

To replace the belt:

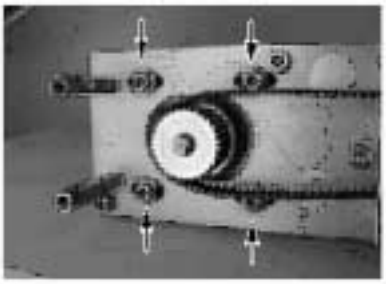
1. Remove the pulley cover. Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.



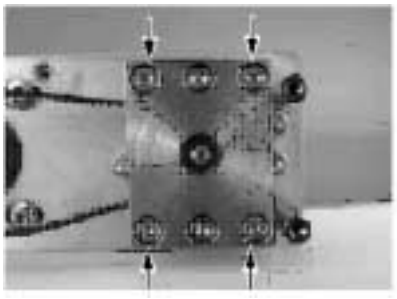
2. Remove the two motor-cover mounting bolts and move the motor cover by approx. 20 mm. (Use an Allen wrench of 2.5 mm across flats).



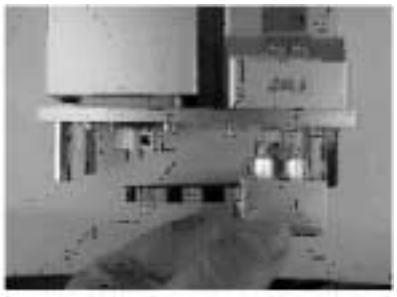
3. Loosen the four tension adjustment bolts to loosen the belt.
4. Remove the belt from the pulleys (Use an Allen wrench of 2.5 mm across flats).



5. Remove the pulley assembly.

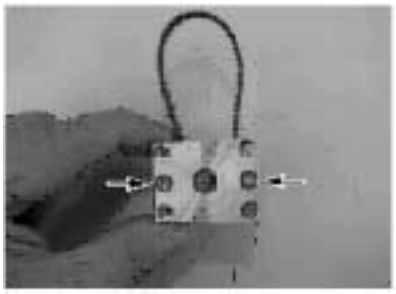


Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats

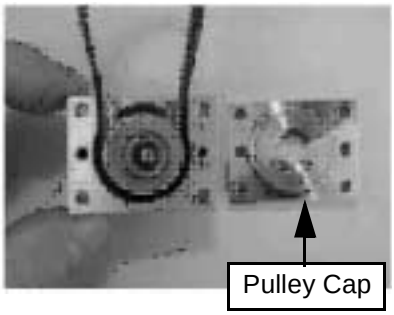


Pull out the assembly with a hand.

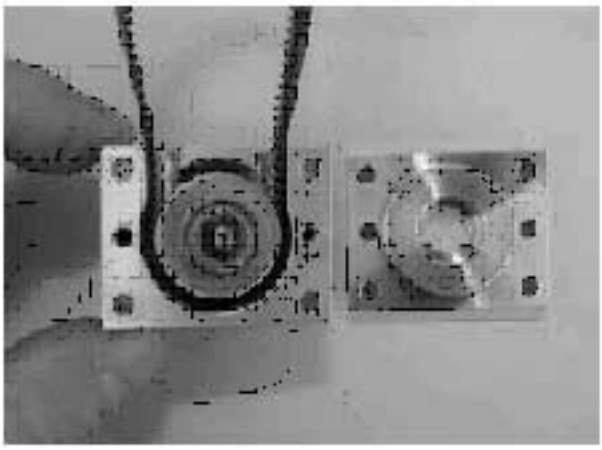
6. Remove the pulley cap.



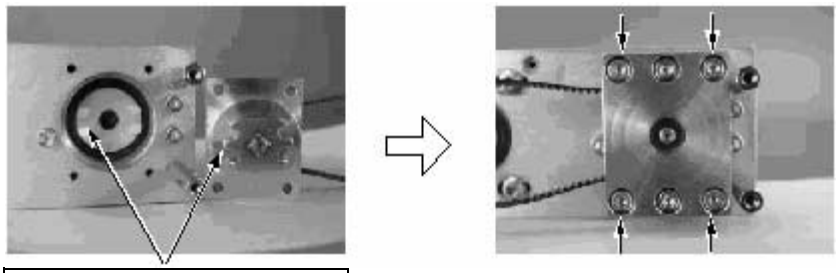
Remove the two mounting bolts using an Allen wrench of 2.5 mm across flats.



7. Pull out the belt and insert a new belt.



8. Install the pulley cap. Tighten the hexagon socket-head bolts (M3 x 8, 2 pcs) using a 2.5 mm Allen wrench across flats.Tightening torque: 83 N·cm (8.47 kgf·cm).
9. Install the pulley assembly.
   - Align the angles of projections and depressions on the couplings.
   - Tighten the hexagon socket-head bolts (M3 x 22, 4 pcs) using an Allen wrench of 2.5 mm across flats.

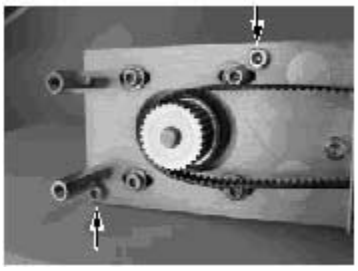


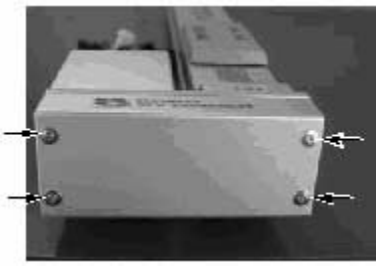
Align the Angles of Projections and Depressions

10. Pass the belt around the pulleys.

11. Hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M3 x 10, 4 pcs). (Use an Allen wrench of 2.5 mm across flats.)

12. Install the pulley cover.
    - Tighten the hexagon socket-head bolts (M3 x 12, 2 pcs) using an Allen wrench of 2.5 mm across flats.
    - Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.





Replacing the Belt (SA7R)

Items for Replacement

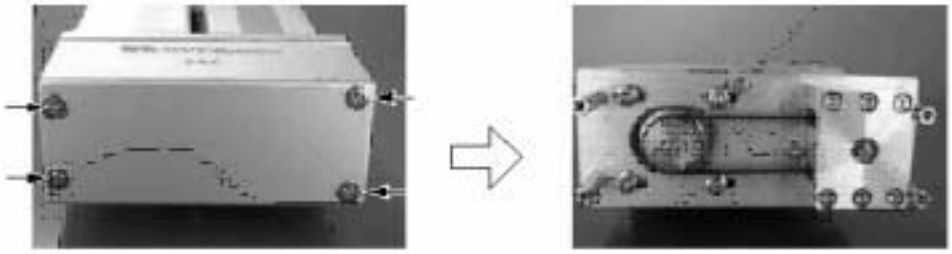
Ensure that you have the following:

- Replacement reduction belt
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 8 kgf or more)
- Strong string or long tie-band

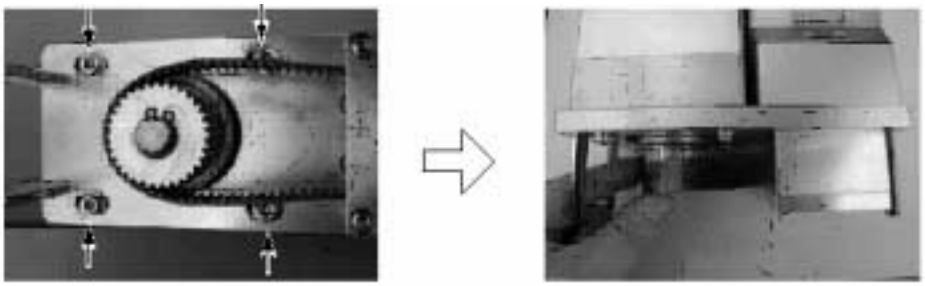
Procedure

To replace the belt:

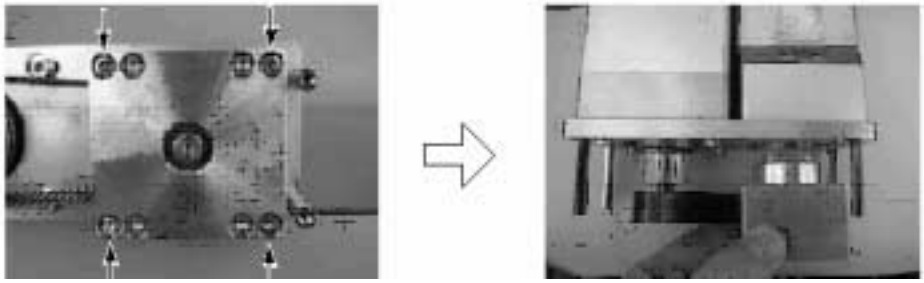
1. Remove the pulley cover. Remove the four thin-head mounting screws using an Allen wrench of 1.5 mm across flats.



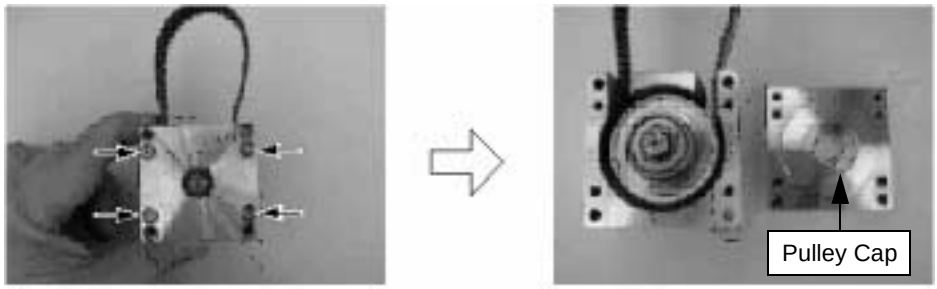
2. Loosen the four tension adjustment bolts to loosen the belt. (Use an Allen wrench of 3 mm across flats).
3. Remove the belt from the pulleys.



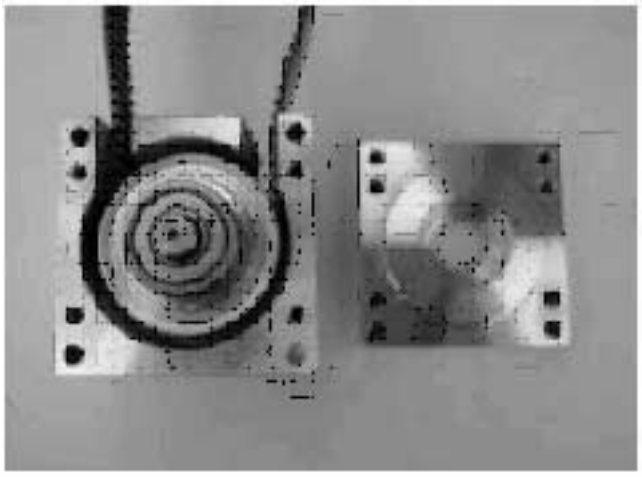
4. Remove the pulley assembly.
   - Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats.
   - Pull out the assembly by hand.



5. Remove the pulley cap. Remove the four mounting bolts using an Allen wrench of 2.5 mm across flats.

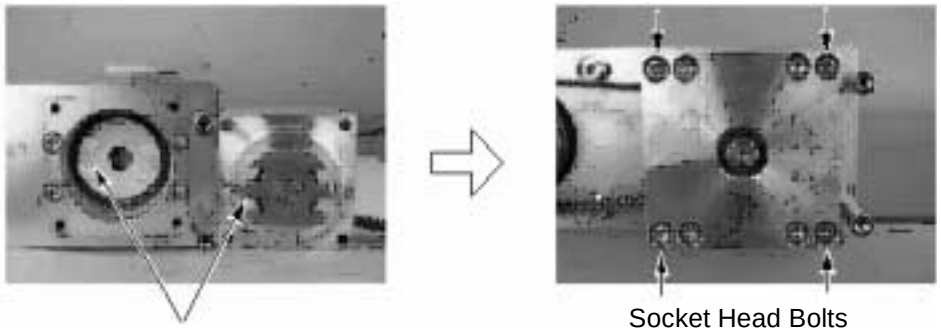


6. Pull out the belt and insert a new belt.

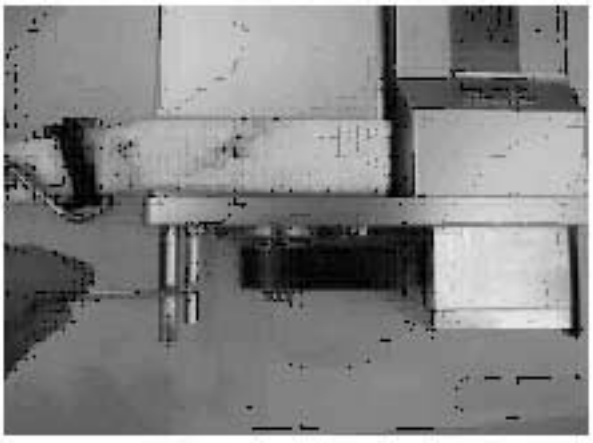


7. Install the pulley cap.
   - Tighten the hexagon socket-head bolts (M3 x 10, 4 pcs) using an Allen wrench of 2.5 mm across flats.Tightening torque: 83 N·cm (8.47 kgf·cm)

8. Install the pulley assembly:
   - Align the angles of projections and depressions on the couplings.
   - Tighten the hexagon socket-head bolts (M3 x 40, 4 pcs) using an Allen wrench of 2.5 mm across flats.



9. Pass the belt around the pulleys.
10. Hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs). (Use an Allen wrench of 3 mm across flats.)



11. Install the pulley cover. Tighten the thin-head screws (M3 x 6, 4 pcs) using an Allen wrench of 1.5 mm across flats.

Replacing the Belt (SSR/SMR)

Items for Replacement

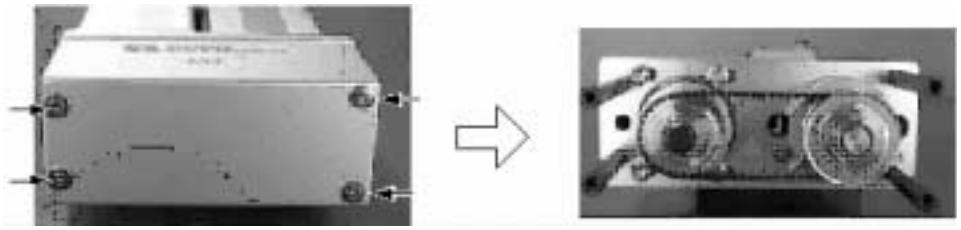
Ensure that you have the following:

- Replacement reduction belt
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 12 kgf or more)
- Strong string or long tie-band

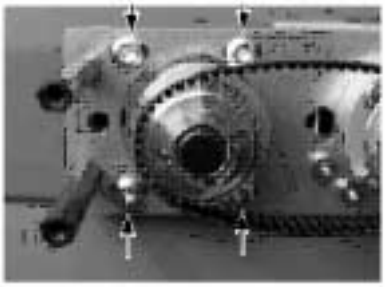
Procedure

To Replace the belt:

1. Remove the pulley cover. Remove the four thin-head mounting screws using an Allen wrench of 2 mm across flats.

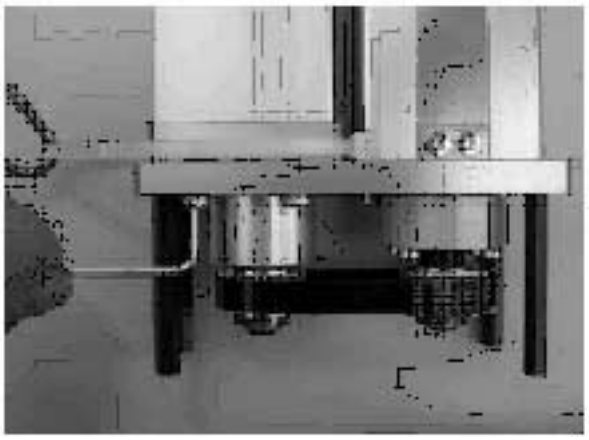


2. Loosen the four tension adjustment bolts to loosen the belt (Use an Allen wrench of 3 mm across flats.)
3. Remove the belt from the pulleys.



4. Pass a new belt around both pulleys.

5. Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs).



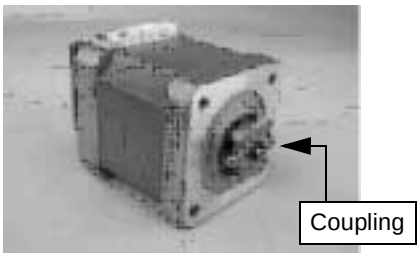
6. Install the pulley cover. Tighten the thin-head screws (M4 x 6, 4 pcs) using an Allen wrench of 2 mm across flats.

Replacing the SA5/SA6 Motor

Items for Replacement

Ensure that you have the following:

- Replacement motor (with a coupling on the motor shaft; see the photograph below)

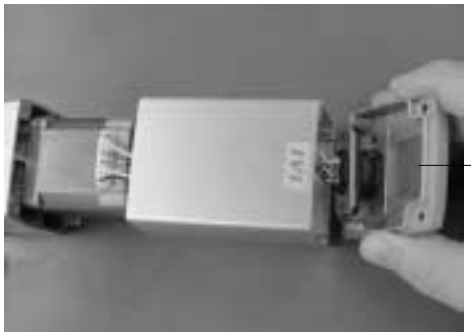


- Allen wrench set
- Phillips screwdriver
- Grease (Kyodo Yushi's Multemp LRL3 or equivalent)

Procedure

To replace the motor:

1. Remove the flat countersunk-head screws (M3 x 8, 2 pcs) affixing the cable ends on the motor-end cap, and then remove the pan-head screws (M3 x 80, 4 pcs) affixing the motor-end cap.
2. Push in the cable-end molding to create a slack along the inner cable.



3. Pull out the motor connector.
4. Pull out the encoder connector.

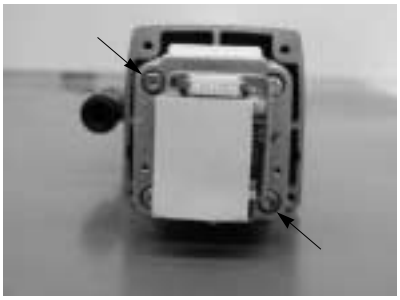
Caution

Be careful not to touch the encoder directly when applying force.

5. Remove the motor.
   - Remove the affixing bolts (M3 x 50, 2 pcs) using an Allen wrench of 2.5 mm across flats.
   - Pull out the motor by hand.

6. Apply grease to the coupling on the actuator side.

7. Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M3 x 50, 2 pcs) (Use an Allen wrench of 2.5 mm across flats).



Tightening Torque: 59 N-cm (6 kgf-cm)

Caution

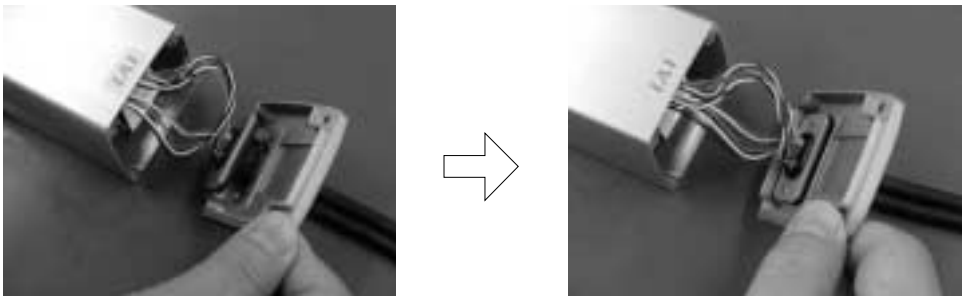
Be careful not to touch the encoder directly when applying force.

8. Connect the encoder and motor connectors.

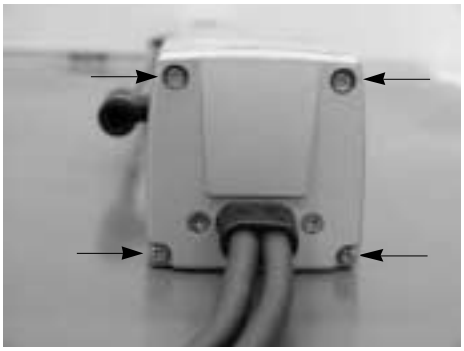
Encoder Connector

Motor Connector

9. Replace the cable-end molding in the original position, and affix it with the flat countersunk-head screws (M3 x 8, 2 pcs).



10. Affix the motor-end cap with the pan-head screws (M3 x 80, 4 pcs). At this time, pay attention not to pinch the cables.



Tightening Torque: 61.5 N-cm (6.3 kgf-cm)

Replacing the SA7 Motor

Items for Replacement

Ensure that you have the following:

- Replacement motor (with a coupling on the motor shaft
- Allen wrench set
- Phillips screwdriver
- Grease (Kyodo Yushi's Multemp LRL3 or equivalent)

Procedure

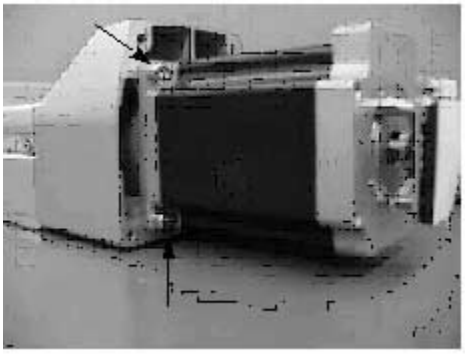
To replace the motor:

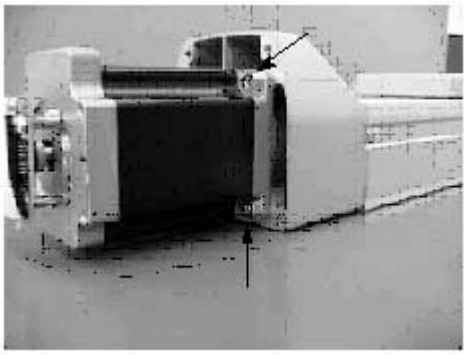
1. Remove the flat countersunk-head screws (M3 x 8, 2 pcs) affixing the cable ends on the motor-end cap, and then remove the pan-head screws (M3 x 105, 4 pcs) affixing the motor-end cap.
2. Push in the cable-end molding to create a slack along the inner cable.
3. Pull out the motor connector.
4. Pull out the encoder connector.

Caution

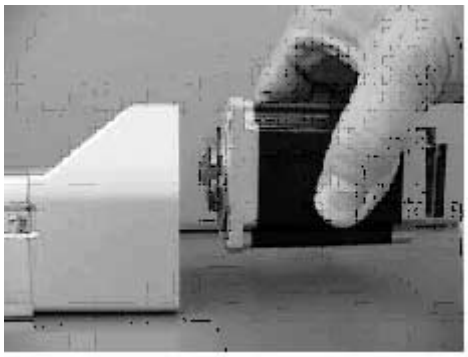
Be careful not to touch the encoder when applying force.

5. Remove the motor. Remove the affixing bolts (M4 x 15, 4 pcs) using an Allen wrench of 3 mm across flats.

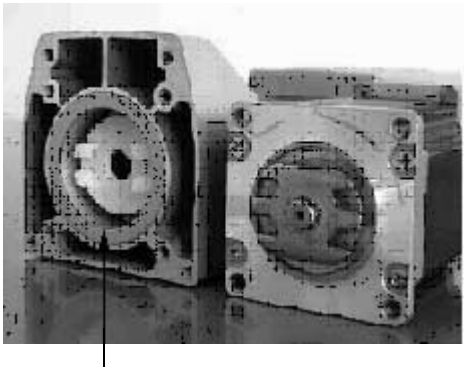




6. Pull the motor by hand:



Decoupled motor and actuator

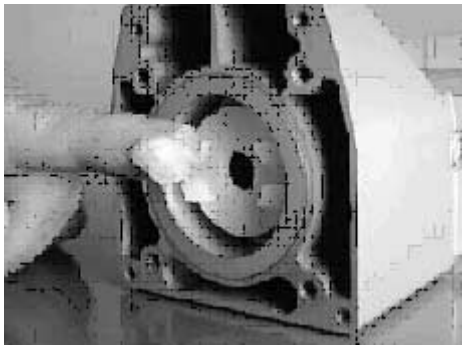


Pilot alignment metal. If this metal is attached on the decoupled motor, move it back to the pilot on the actuator side.

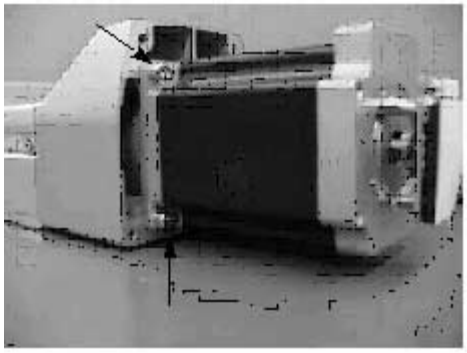
7. Apply grease to the coupling on the actuator side.

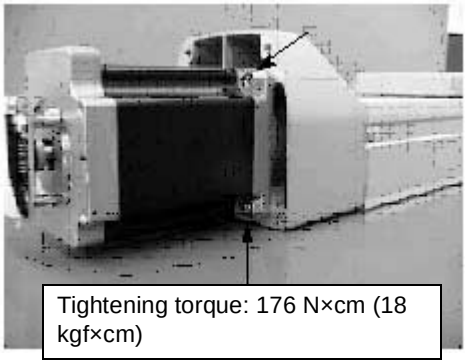
Attention

Kyodo Yushi's Multitemp LRL3 was applied before shipment. Never use flouride grease. It will chemically react with lithium grease and cause damage to the machine.



8. Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M4 x 15, 4 pcs). (Use an Allen wrench of 3 mm across flats.)





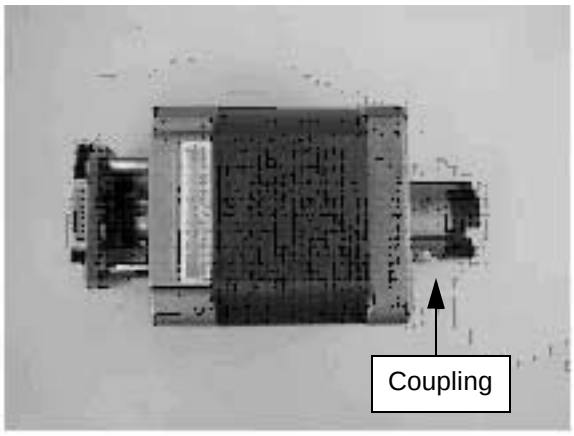
9. Connect the encoder connector.
10. Connect the motor connector.
11. Replace the cable end molding in the original position, and affix it with the flat countersunk head screws (M3 x 8) (2 pcs).
12. Affix the motor-end cap with the pan-head screws (M3 x 105, 4 pcs). At this time, pay attention not to pinch the cables.

SS

Items for Replacement

Ensure that you have the following:

- Replacement motor (with a coupling on the motor shaft):



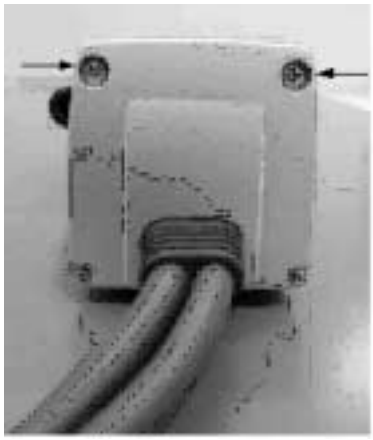
- Allen wrench set
- Phillips screwdriver
- Plastic hammer

Procedure

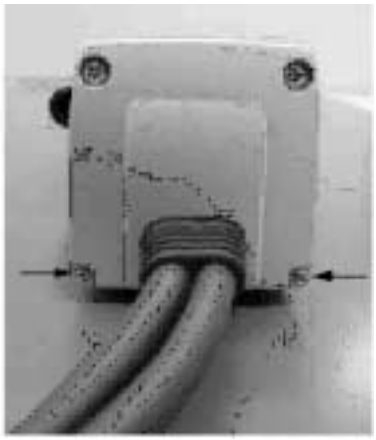
To replace the blower:

1. Remove the pan-head screws affixing the motor-end cap.

Pan-head screws (M3 x 95)
(2 pcs)



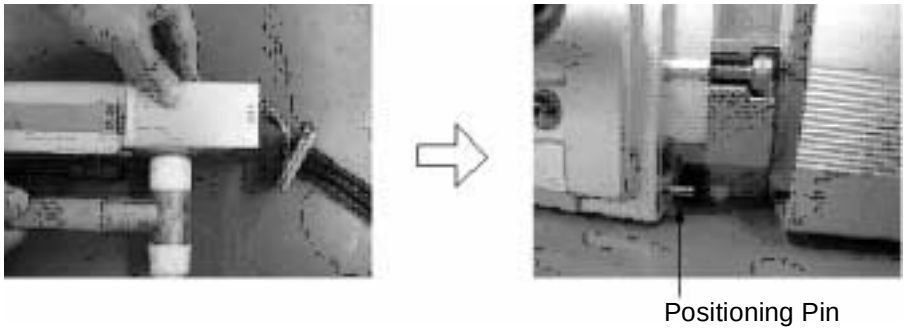
Pan-head screws (M2 x 10)
(2 pcs)



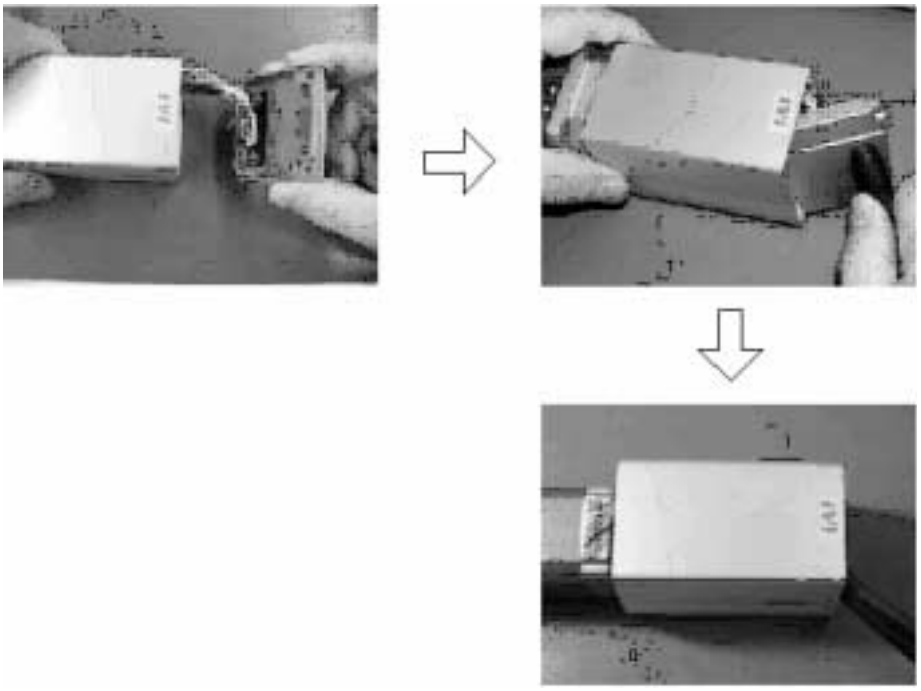
2. Remove the motor cover.

Attention

The motor cover is engaged with a positioning pin. If the cover does not come off easily, use a plastic hammer to gently tap the motor cover from side, and pull out the cover.



3. Push in the motor-end cap into the motor cover.



4. Pull out the motor connector and the encoder connector.

Motor Connector

Encoder Connector

Caution

Be careful not to touch the encoder when applying force.

5. Remove the motor:
   - Remove the affixing bolts (M3 x 15, 2 pcs/M3 x 18, 2 pcs) using an Allen wrench of 2.5 mm across flats.
   - Pull the motor out using your hand.
   - Remove the motor flange by removing the attaching bolts (M3 x 8, 4 pcs) using a 2.5 mm Allen wrench across the flats.
6. Install a new motor:
   - Tighten the motor flange with the affixing bolts (M3 x 8, 4 pcs).
   - Confirm that the angles of projections and depressions on the couplings are aligned.

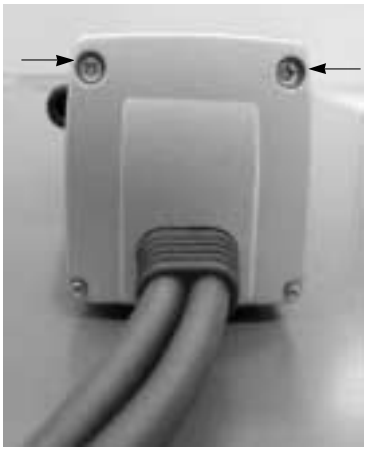
Attention

Tightening torque of the M3 bolt is 83 N-cm (8.5 kgf-cm).

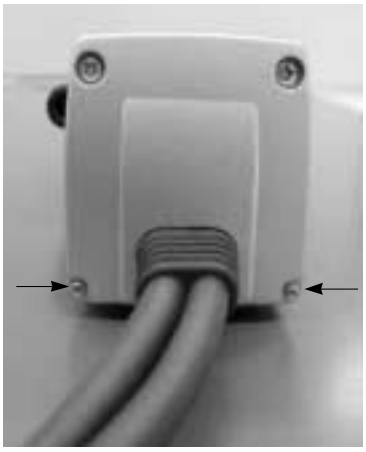
- Uniformly tighten the upper affixing bolts (M3 x 15, 2 pcs).
- Uniformly tighten the right and left attaching bolts (M3 x 18, 2 pcs).
- Connect the encoder and motor connectors. Be careful not to touch the encoder when applying force.

7. Pull out the motor-end cap from the motor cover and affix it with the pan-head screws. At this time, pay attention not to pinch the cables.

8. Affix the motor cover. If the positioning pin does not go in smoothly, gently tap the motor-end cap using a plastic hammer.



Pan-head screws (M3 x 105, 2 pcs)
Tightening torque: 61.5 N-cm
(6.3 kgf - cm)



Pan-head screws (M2 x 10, 2 pcs)
Tightening torque: 16.9 N-cm
(1.7 kgf - cm)

SM

Items for Replacement

Ensure that you have the following:

- Replacement motor (with a coupling on the motor shaft)
- Allen wrench set
- Phillips screwdriver
- Plactic hammer

Procedure

To replace the blower:

1. Remove the pan-head screws (M3 x 10, 4 pcs) affixing the motor-end cap.
2. Remove the pan-head screws (M3 x 10, 2 pcs) affixing the motor cover.
3. Remove the motor cover. The motor cover is engaged with a positioning pin. If the cover does not come off easily, use a plastic hammer to gently tap the motor cover from side, and pull out the cover.
4. Push the motor-end cap into the motor cover.
5. Pull out the motor and encoder connectors. Be careful not to touch the encoder when applying force.
6. Remove the motor.
   - Remove the affixing bolts (M4 x 15, 4 pcs) using an Allen wrench of 3 mm across flats.
   - Pull the motor out by hand.
7. Install a new motor.
   - After confirming that the angles of projections and depressions on the couplings are aligned, assemble the motor, and then tighten the affixing bolts (M4 x 15, 4 pcs). (Use an Allen wrench of 3 mm across flats.)

Attention

Tightening torque is 176 N - cm (18 kgf - cm)

8. Connect the encoder and motor connectors. Be careful not to touch the encoder directly when applying force.
9. Pull out the motor-end cap from the motor cover and affix it with the pan-head screws (M3 x 105, 4 pcs). At this time, pay attention not to pinch the cables.
10. Affix the motor cover.
    - If the positioning pin does not go in smoothly, gently tap the motor-end cap using a plastic hammer (as shown above).
    - Tighten the pan-head screws (M3 x 10, 2 pcs) (shown above).

Motor Reversing Type SA5R/SA6R

Items for Replacement

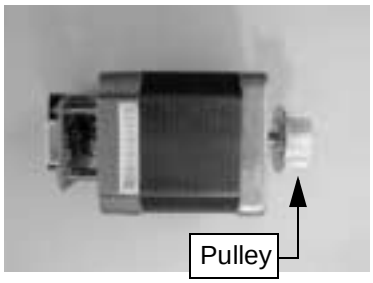
Ensure that you have the following

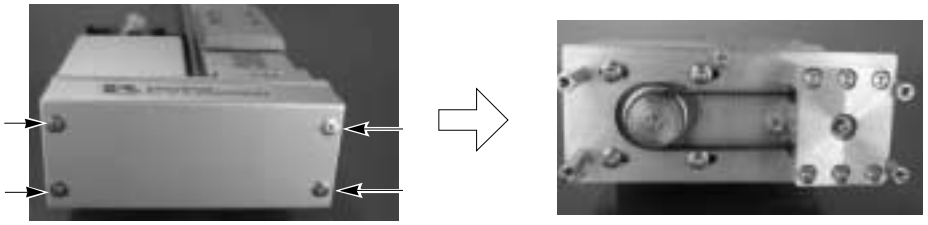
- Replacement motor (with a pulley on the motor shaft; see the photograph below)
- Allen wrench set
- Phillips screwdriver
- Tension gauge (capable of applying a tensile load of 3 kgf or more)
- Strong string or long tie-band

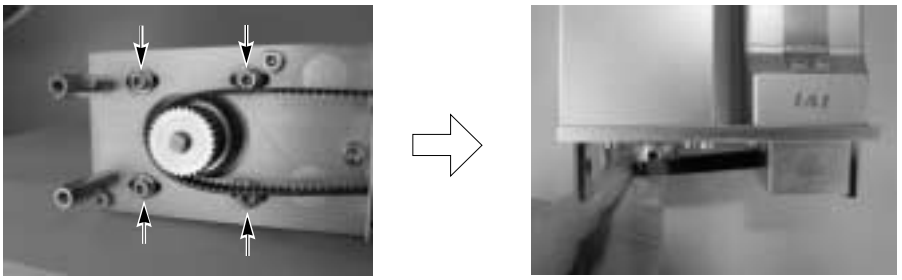
Procedure

To replace the motor:

1. Remove the pulley cover.
   - Remove the four thin-head mounting screws using a 1.5 mm Allen wrench across flats.

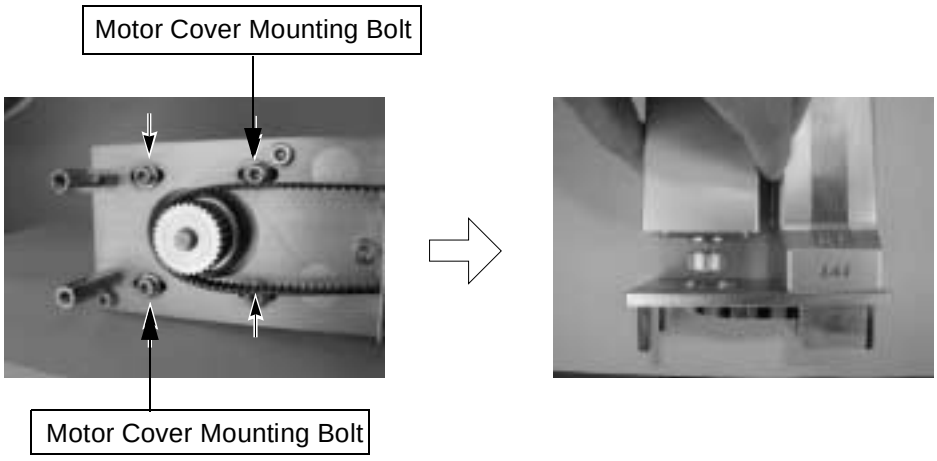


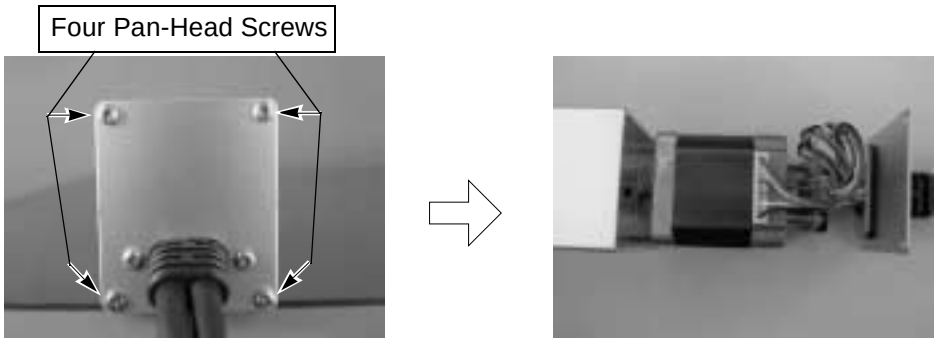


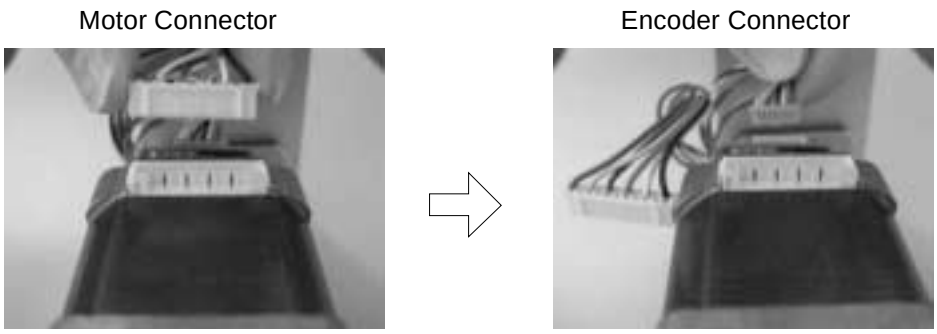


2. Loosen the tension adjustment bolts to loosen the belt (Use an Allen wrench of 2.5 mm across flats).
3. Remove the belt from the pulleys.

4. Pull out the four tension adjustment bolts and two motor-cover mounting bolts, and then remove the motor unit.





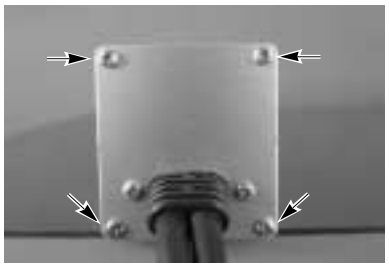


5. Remove the four pan-head screws mounting the motor-end cap on the motor unit, and then pull out the motor.
6. Pull out the motor and encoder connectors. Be careful not to touch the encoder directly when removing the connector.

7. Connect the encoder connector and motor connector to a new motor. Be careful not to touch the encoder directly when removing the connector.

Encoder Connector

Motor Connector



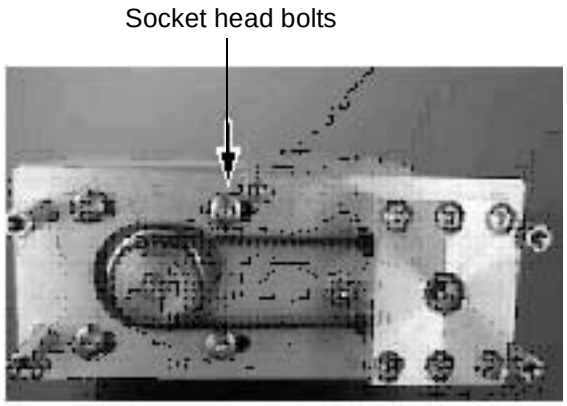
Tightening torque: 61.5 N - cm
(6.27 kgf - cm)

8. Connect the motor cover and motor-end cap using the pan-head mounting screws (M3 x 6, 4 pcs). Be careful not to pinch the cables.
9. Loosely affix the motor in place using the tension adjustment bolts (hexagon socket-head bolt with washer M3 x 10, 4 pcs), and then pass the belt. In this condition, hook a looped strong string (or long tie-band) on the flange at the base of the motor, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (Use a 2.5 mm Allen wrench across flats).

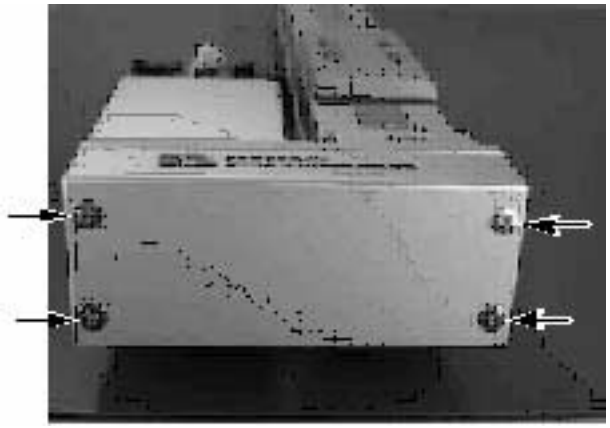
Attention

Tensile force = 2.5 kgf. Tightening torque of adjustment bolt is 162 N - cm (16.5 kgf - cm).

10. Install the motor cover. Tighten the hexagon socket-head bolts (M3 x 12, 2 pcs) using a 2.5 mm Allen wrench across flats. Tightening torque is 83 N - cm (8.47 kgf - cm)



11. Install the pulley cover. Tighten the thin-head screws (M3 x 6, 4 pcs) using a 1.5 mm Allen wrench across flats. Tightening torque is 87.2 N - cm (8.90 kgf - cm).



Motor Reversing Type SA7R

Items for Replacement

Ensure that you have the following:

- Replacement motor unit (see the photograph below)
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 8 kgf or more)
- Strong string or long tie-band

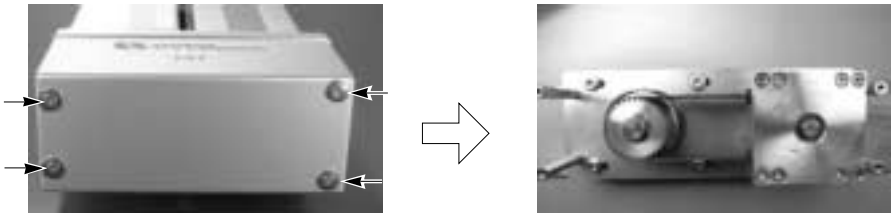
Procedure

To replace the motor:

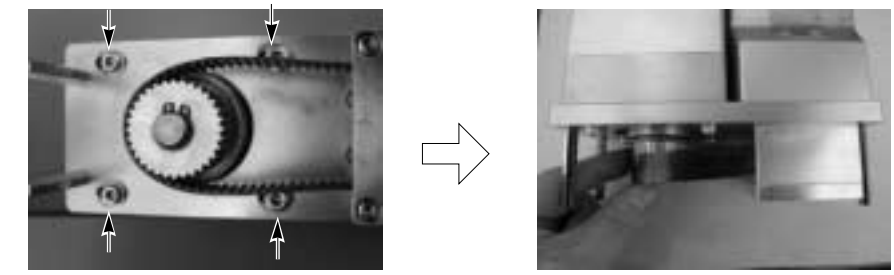
1. Remove the pulley cover (View B). Remove the four thin-head mounting screws using a 1.5 mm Allen wrench across flats.
2. Loosen the tension adjustment bolts to loosen the belt (View C). Use a 3 mm Allen wrench across flats.
3. Remove the belt from the pulleys.
4. Pull out the tension adjustment bolts and remove the motor unit (View D).

View A:

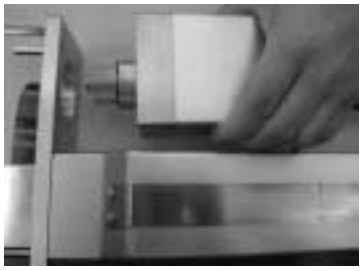
View B:



View C:

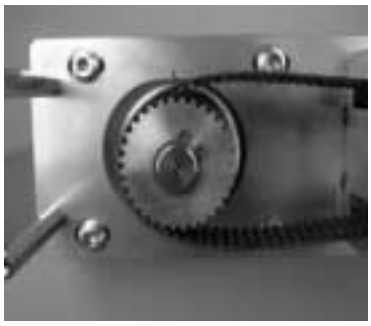


View D:



5. Install a new motor unit, and loosely tighten the tension adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs). In this condition, pass the reduction belt around the pulleys (View A below).

View A:



View B:

View C:

6. Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (View B above).

Attention

Tensile force = 8 kgf. Tightening torque of adjustment bolt is 323 N - cm (33 kgf - cm).

7. Install the pulley cover (View C above). Tighten the thin-head screws (M3 x 6, 4 pcs) using a 1.5 mm Allen wrench across flats. Tightening torque is 87.2 N-cm (8.90 kgf - cm).

Motor Reversing Type SSR/SMR

Items for Replacement

Ensure that you have the following:

- Replacement motor unit (see View A below)
- Allen wrench set
- Tension gauge (capable of applying a tensile load of 12 kgf or more)
- Strong string or long tie-band

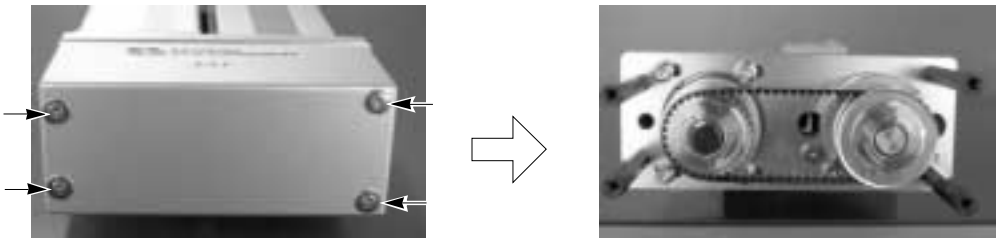
Procedure

To replace the motor:

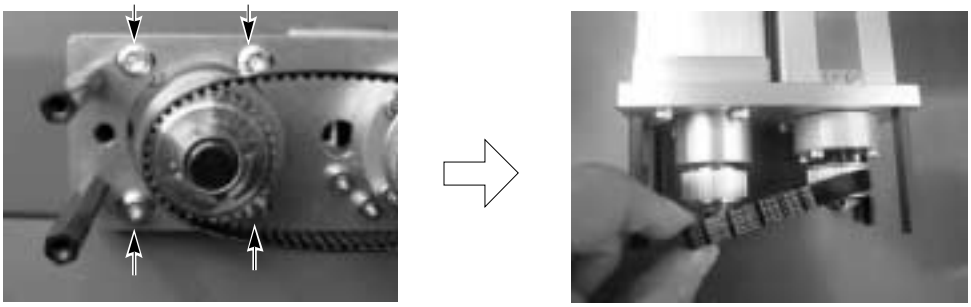
1. Remove the pulley cover (View B below). Remove the four thin-head mounting screws using an Allen wrench of 2 mm across flats.

View A:

View B:



View C:

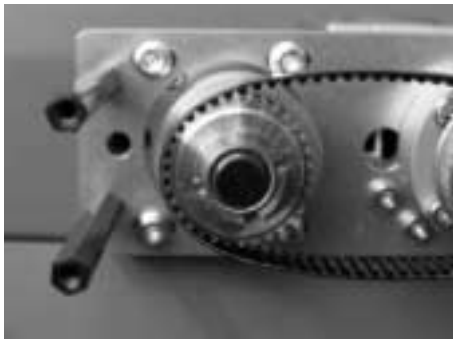


View D:

2. Loosen the tension adjustment bolts to loosen the belt (View C above). Use a 3 mm Allen wrench across flats. Remove the belt from the pulleys.
3. Pull out the tension adjustment bolts and remove the motor unit (View D above).

4. Install a new motor unit, and loosely tighten the tension adjustment bolts (hexagon socket-head bolt with washer M4 x 20, 4 pcs) (View A below). In this condition, pass the reduction belt around the pulleys.

View A:



View B:

View C:

5. Hook a looped strong string (or long tie-band) on the motor bracket, pull the string with a tension gauge to the specified tension, and then securely and uniformly tighten the adjustment bolts (View B above).

Attention

Tensile force for SSR is 7.3 kgf and tensile force for SMR is 11.6 kgf. Tightening torque of adjustment bolt is 323 N-cm (33 kgf - cm).

6. Install the pulley cover (View C above). Tighten the thin-head screws (M4 x 6, 4 pcs) using a 2 mm Allen wrench across flats. Tightening torque is 204 N - cm (20.8 kgf - cm).

4

Actuator Maintenance

Maintenance Schedule

Description

Perform maintenance work according to the schedule below.

The schedule is set assuming eight hours of operation a day. When the operation time is long such as 24 hour operation, shorten the maintenance intervals as needed.

	Visual Inspection	Check Interior	Grease Supply
Start of operation	X		
After 1 month of operation	X		
After 6 months of operation	X	X	
After 1 year of operation	X	X	X
Every 6 months thereafter	X		
Every 1 year	X	X	X

Visual Inspection of the Machine Exterior

Procedure

Check the following items when carrying out visual inspection:

Body	Loose mounting bolts?
Cables	Damage to cables or connection to connector box?
Stainless sheet	Damage or foreign deposit?
General	Unusual noise or vibrations?

Cleaning

Procedure

Proceed as follows:

1. Clean the exterior as needed.
2. Wipe off dirt with a soft cloth.

Caution

Do not use strong compressed air on the actuator as this may force dust into the crevices.

Caution

Do not use petroleum-based solvent on plastic parts or painted surfaces.

3. If the unit is badly soiled, apply a neutral detergent or alcohol to a soft cloth, and wipe gently.

Interior Inspection

Introduction

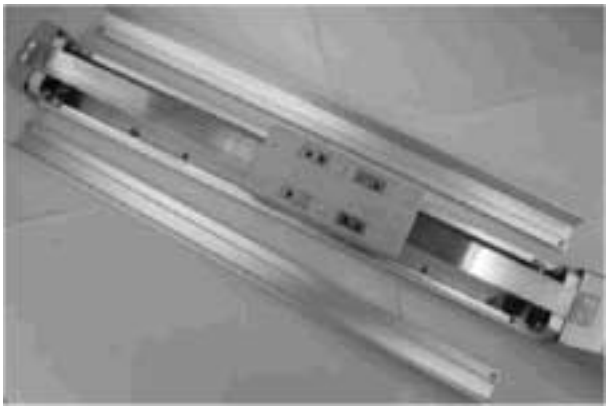
Turn off the power, remove the side covers, and then visually inspect the interior. Check the following items during interior inspection:

Body	Loose mounting bolts?
Guides	Lubrication appropriate? Soiling?
Ball Screw	Lubrication appropriate? Soiling?

Procedure

To inspect the interior:

1. Remove both side covers. With the SA5, SA6, SA7 or SS type, use an Allen wrench of 1.5 mm across flats. With the SM type, use an Allen wrench of 2 mm across flats.



2. Make a visual check of the interior to see if there is any dust or foreign matter in the unit and check the lubrication. Even if the grease you see around the parts is brown, the lubrication is fine as long as the traveling surface appears shiny.
3. If the grease becomes dirty and dull or if the grease has worn away due to extended operating time, lubricate the parts after cleaning them.
4. When the inspection/maintenance work is complete, install the side covers.

Tightening torque (SA6/SA7):Thin-head screw M3 x 6-87.2 N-cm (8.90 kgf-cm)

Attention

When installing the side covers, do not let them contact the end faces of the stainless sheet. It may damage or bend the stainless sheet, causing the sheet to deteriorate or wear quickly. To prevent this problem, insert a shim (approx. 0.1 to 0.2 mm) between the sheet and each cover to provide an allowance, and gently push in the cover.

Caution

When checking the interior, be careful not to bend or scratch the stainless sheet. Wear protective gloves when handling the stainless sheet, because it has sharp edges that may cause accidental cuts.

Attention

The front cover is supporting the ball screw, so do not disassemble the front cover. If the front cover is misaligned, the shaft centers may become offset, thus increasing the traveling resistance, reducing the service life of each part, or generating noise.

Internal Cleaning

Procedure

To clean the inside of the machine:

1. Wipe off dirt with a soft cloth.

Caution

Do not use strong compressed air on the actuator as this may force dust into the crevices.

Do not use petroleum-based solvent, neutral detergent or alcohol.

Do not use flushing oil, molybdenum grease or anti-rust lubricant.

2. When grease is soiled with large amounts of foreign substances, wipe off the dirty grease and then apply new grease.

Lubricating the Guides and Ball Screw

What Grease to Use on the Guides

The following grease is used when we ship the unit.

- Idemitsu KosanDaphne Eponex Grease No.2

Other companies also sell a grease similar to this. If ordering from another maker, give the name of this product and request something comparable. Comparable products include the following:

Showa Shell Oil	Albania Grease No. 2
Mobil Oil	Mobilux 2

What Grease to Use on the Ball Screw

The following grease is used when we ship the unit.

Kyodo Yushi	Multemp LRL3

This grease offers excellent properties such as low heat generation, and is suitable for lubricating ball screws.

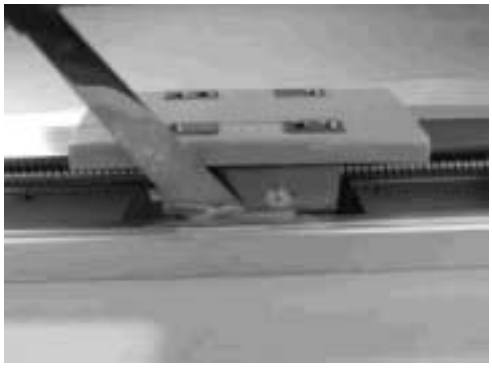
Caution

Never use any fluorine based grease. It will cause a chemical reaction when mixed with a lithium based grease and may cause damage to the actuator.

How to Apply Grease

To apply grease:

1. When greasing the guide, use a spatula or grease applicator to squeeze or inject grease into the space between the slider and base, and then move the slider back and forth several times to let the grease spread evenly. Apply grease on the guides on both sides. Remove excess grease.




2. When greasing the ball screw, clean the ball screw, apply grease using a finger, and then move the slider back and forth several times to let the grease spread evenly. At this time, be careful not to deform the stainless sheet by accidentally touching the sheet. Remove excess grease.

3. Install the side covers:
   - Tightening torque (SA6/SA7) Thin-head screw M3 x 6 - 87.2 N-cm (8.90 kgf-cm)
   - Refer to step 4 of “Interior Inspection” on page 4 for notes on installing the side covers.

Flux / Cleaner Filter Replacement

Disconnect Air and Flux Connections from the Tank

Remove Pressure from the Tank

Pull on the Pressure Relief Valve to remove pressure from the tank. Ensure that the tank pressure has reached 0 psi before opening the tank.

Open Tank Lid

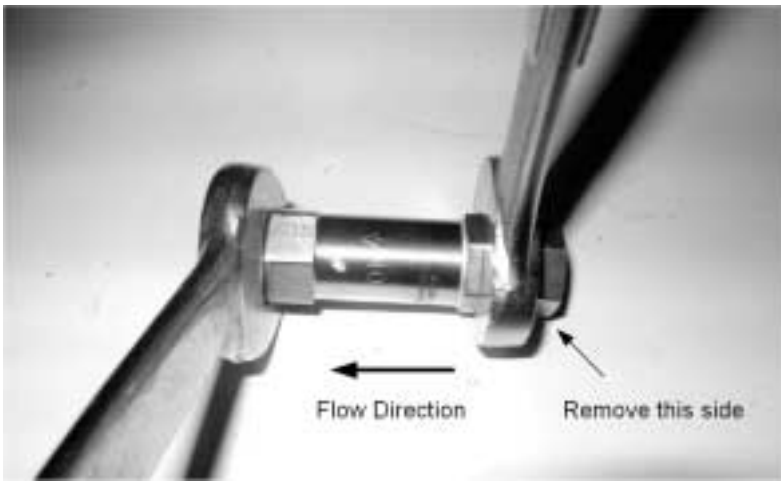
Open the tank to ensure that there is no pressure in the tank before removing the filter.

Remove Flux Filter from the Tank

Using a ¾" Wrench (19 mm) remove the flux filter assembly from the Tank.

Open Flux Filter

Identify the flow direction and then open the flux filter to expose the filter element.

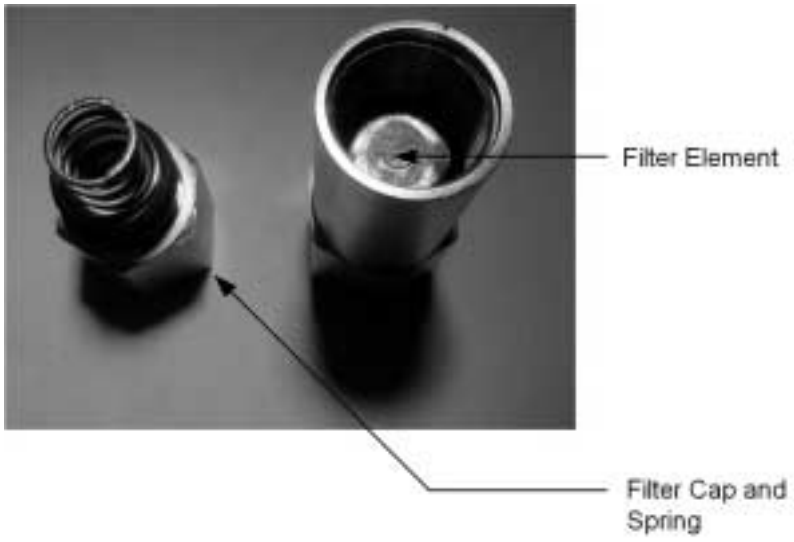


Remove the Filter Element

The filter breaks into 2 parts:

- filter cap and spring
- filter barrel and element

The 40 micron filter element sits within the filter barrel. It often needs to be GENTLY nudged to free it from the barrel. Take care to nudge with a blunt tool. Sharp edges may damage the filter screen.



Clean / Replace the Filter

Thoroughly clean all parts of the filter. It is recommended that the filter element be changed each time the filter is opened (though it may be cleaned in the event a replacement element is not available).

40 Micron Filter Assembly:	Swagelok SS-4F4-40
40 Micron Filter Element:	Swagelok SS-4F-K4-40

Re-assemble Filter Element

Reverse the above steps to re-assemble and re-install the cleaned filter.

Attention

It is recommended that the tubing to the ServoJet head be disconnected at the Head and the tubing purged thoroughly prior to resuming operation. See “Purging Liquid and Air Tubing” on page 12.

Purging Liquid and Air Tubing

Introduction

The nozzles and air passages at the ServoJet head have very tight clearances and can be easily plugged if any particulate enters the system. As such, any time the system has been moved, disconnected, thoroughly cleaned, filter cleaned or replaced, tubing or fittings replaced (ie: any major disturbance) the tubing should be disconnected from the head and ample quantities of liquid and air should be flushed through the tubing to clean out any particulate matter.

Procedure

Proceed as follows:

1. Disconnect Flux and Cleaner lines from the Tanks:

2. Ensure Tanks are Pressurized.
3. Remove Tubing from the ServoJet Head.
4. Prepare a Vessel to Collect Flushed Fluid.
5. Connect the Flux / Cleaner Line to force fluid through the tubing:

6. Disconnect the Flux / Cleaner Line.
7. Reconnect Tubing at ServoJet Head.

8. Disconnect Air Tubing at ServoJet Head.

9. Press Purge on the Manual Control Keypad to Flush high pressure air through the tubing.
10. Reconnect Air Tubing.

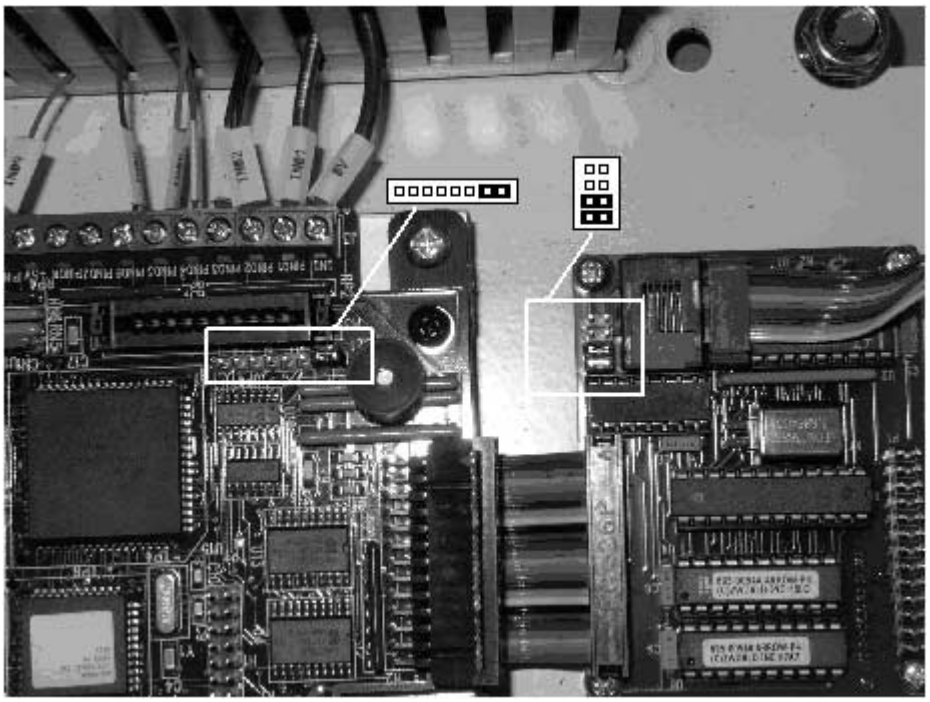
5

Firmware

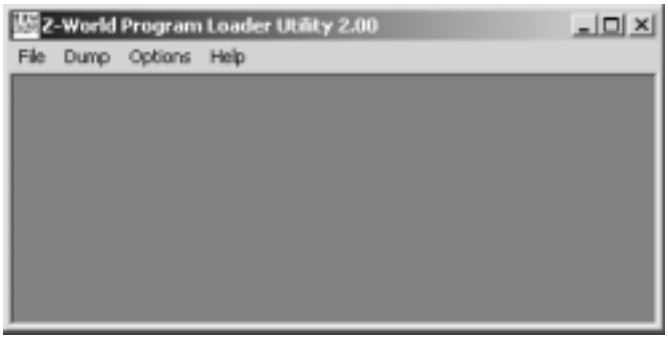
Upgrade Procedure

Proceed as Follows

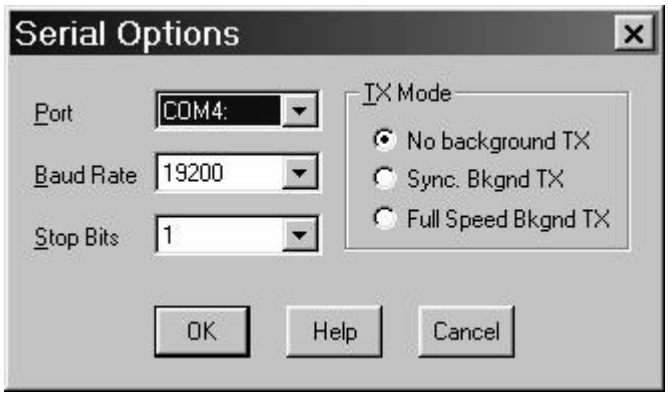
1. Power Down ServoJet Unit via Power Plug or Circuit breaker found inside electrical box
2. Set Up Microcontroller Jumpers to Program Mode. Refer to Electrical Drawing as well.



3. Power Up ServoJet unit. Microcontroller Should beep 3 times.
4. Close ServoJet PC Control Program
5. Start ZWorld Program Loader from ServoJet Start Folder



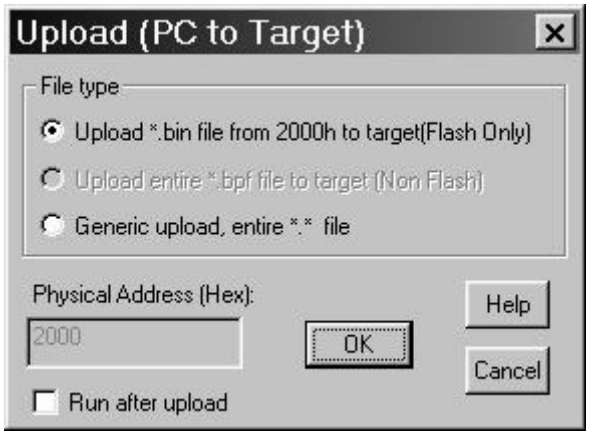
6. Setup Comm Port from the Options Menu (usually Com8 – Same as ServoJet PC Program)



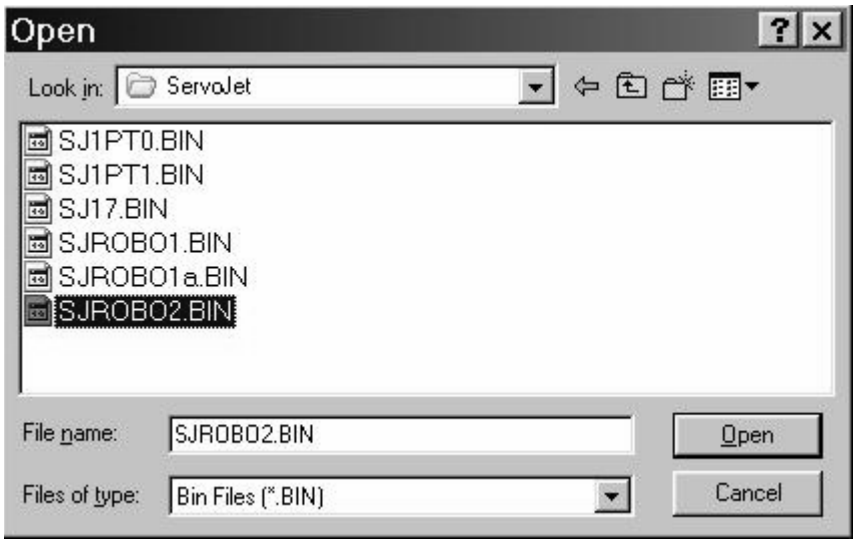
Attention

COM4 is shown as an example. Normally this is: Internal Fluxer: COM6 External Fluxer: COM8

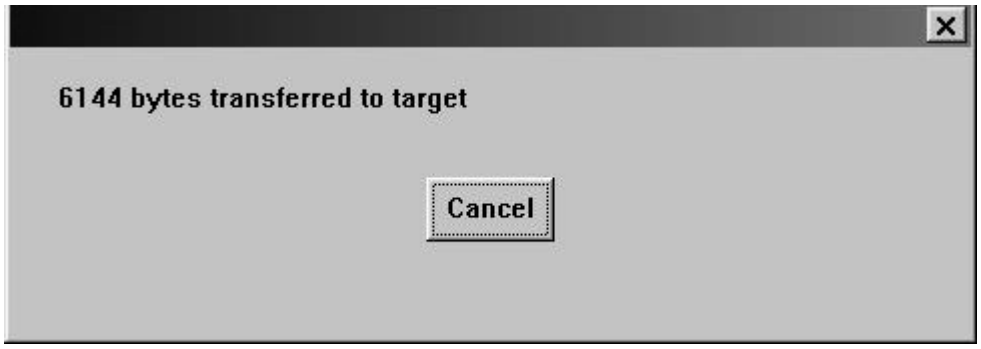
7. Select Upload function from File Menu:



8. Select New Binary File.

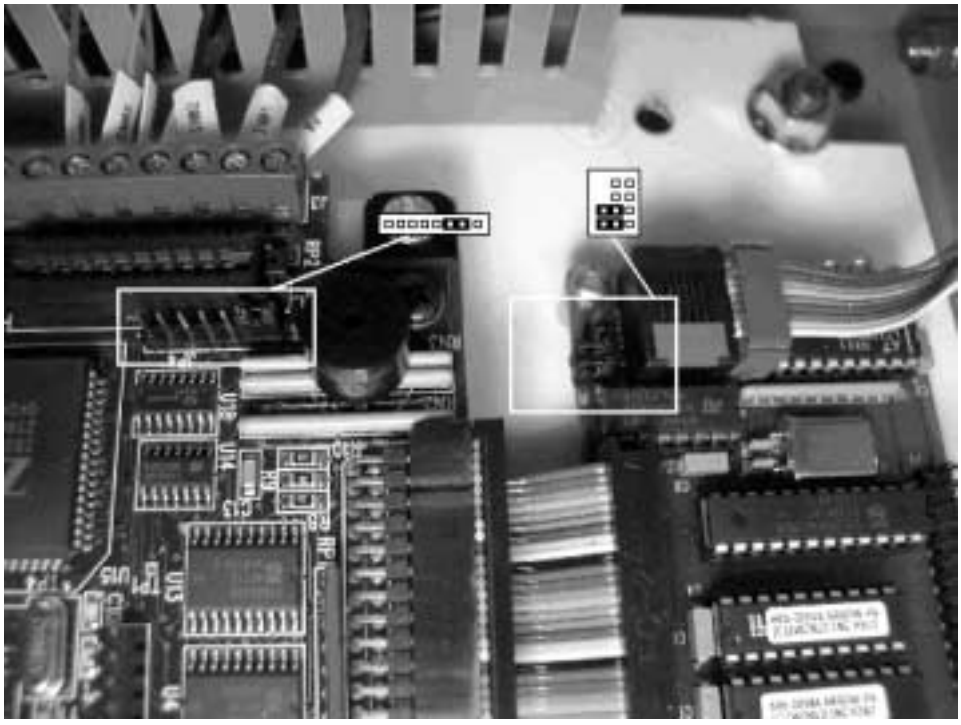


9. Wait for File Transfer to Complete.



10. Quit ZWorld Program Loader Software.
11. Power Down ServoJet System.

12. Install Jumpers for Run Mode.



13. Power Up ServoJet Unit.
14. Start ServoJet PC Software.

ServoJet™ Software

6

Overview

Introduction

The ServoJet™ software controls are integrated into the wave soldering system machine control software. This section provides information on the configuration and process use of the ServoJet™ as it appears in the software. Mechanical functions are detailed in earlier sections. Refer to those sections if needed for issues not related to software.

Topics

The following topics are discussed in this section:

Initial Fluxer Configuration

Overview

The ServoJet™ is available as either an external option or an internal option. The option is configured at the factory. To verify the configuration or when reinstalling the software, refer to the following procedure.

Initial Fluxer Configuration Procedure

Ensure that the wave soldering system is Stopped. (Press the red square on the right of the screen to stop the system.)

Select “Configuration > Modules” from the Menu Bar at the top of the screen.

Select the “Fluxers” Tab and verify that the correct fluxer is selected. Note that one column is labeled for External Fluxer and the other is labeled for Internal Fluxer. It is possible to have both, although most systems with a fluxer option are configured with one or the other.

Note

The Actuator and Nozzle are configured in the “Modules > Fluxers” Window as indicated in the next topic.

Acceptable Parameter Ranges

The ServoJet™ parameter ranges in the Configuration > Modules > Fluxers Tab are depicted in the table below:

	External	Internal
Fluxer Dist. From Sensor	0.0–3124.2 mm (123.0 in.)	same
Spray Segment Width	-	-
Minimum Board Length	25.4–127 mm (1.0–5.0 in.)	same
Cleaning Duration	-	-
Washdown Rate	-	-
Auto Shutdown	-	-
Home to Fixed Rail	-	-
Flux Line Purge Time	-	-
Tank A Orifice Size	-	-
Tank B Orifice Size	-	-

Note

The selections “FDC” and “Flux Level” are grayed out (on the right side of the window). These selections are not available with a ServoJet™ fluxer.

Flux Distance from Sensor

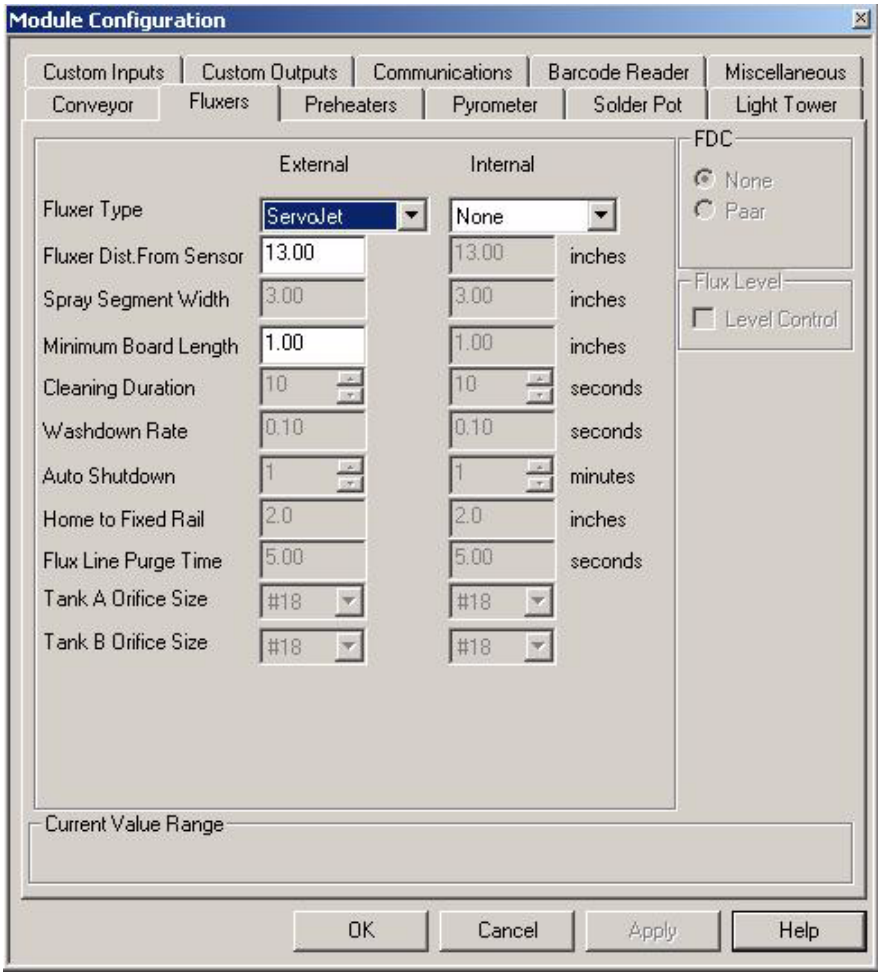
The “Flux Distance from Sensor” parameter is the distance between the Incoming Board Detect Sensor and the Spray Head. The default value is 330.2 mm (13.0 in.).

Minimum Board Length

The "Minimum Board Length" parameter sets the minimum board length allowed with the use of the photocell. A board that is equal to or less than the minimum board length value is ignored by the wave solder system and flux is not applied. The default value is 25.4 mm (1.0 in.).

Configuration > Modules > Fluxers Window

The window below illustrates the external ServoJet™ selected. The selectable parameters for the internal ServoJet™ are the same.



ServoJet™ Machine Control Software for Process Use

Accessing the Fluxer Module Window

Ensure that the wave soldering system is Stopped. (Press the red square on the right of the screen to stop the system.)

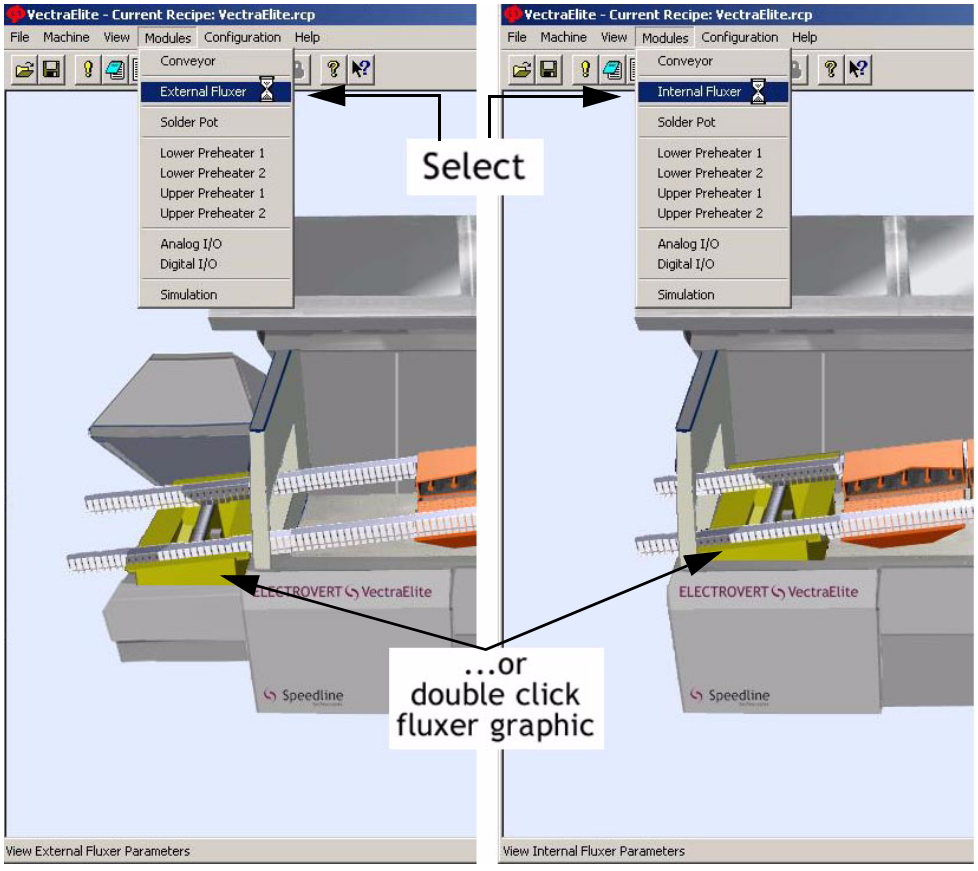
Select “Modules > [Internal] or [External] Fluxer” from the Menu Bar at the top of the screen.

Alternately, double click on the depiction of the fluxer in the graphics process control screen.

A Spray Fluxer Window displays. Process operation of the ServoJet™ is controlled using parameters configured within the pages of the six (6) tabs displayed in the fluxer window: Configuration - Actuator, Configuration - Nozzle, Operation, Maintenance, Maintenance Timers and Troubleshooting.

Fluxer Module Window Access

The follow graphic depicts access of the fluxer window for process use:



Actuator Configuration

Overview

The Actuator Configuration is specific to the ServoJet™ Spray Fluxer, i.e., not specific to individual process recipes. Select “OK” to ensure that any changes are saved before exiting the page.

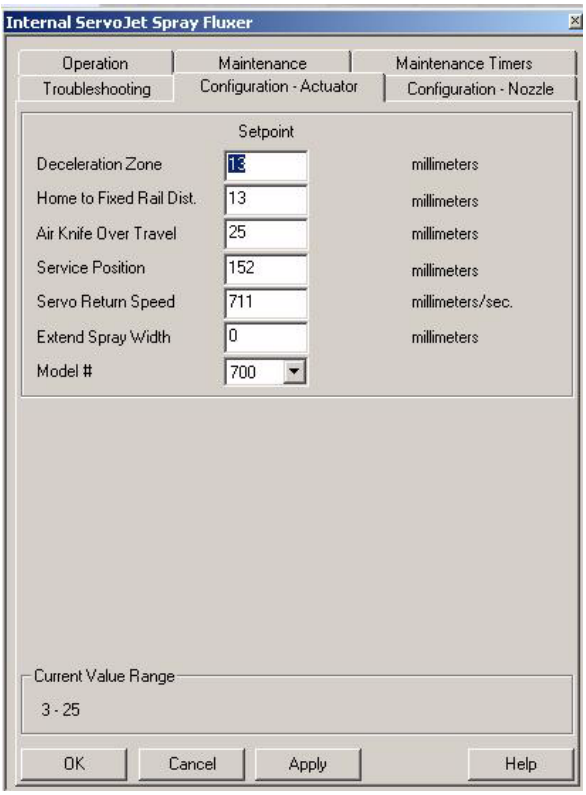
When the Module > Fluxer Window is displayed, select the “Configuration - Actuator” Tab.

Range of Acceptable Parameters

The ServoJet™ parameter ranges in the Modules > Fluxer> Configuration - Actuator are depicted in the table below:

	Setpoint Range
Deceleration Zone	3.0–25.0 mm (0.1–1.0 in.)
Home to Fixed Rail Dist.	3.0–51.0 mm (0.1–2.0 in.)
Air Knife Over Travel	13.0–51.0 mm (0.5–2.0 in.)
Service Position	25.0–635.0 mm (1.0–25.0 in.)
Servo Return Speed	254.0–711.0 mm (10.0–28.0 in.)
Extend Spray Width	0–25.0 mm (0.0–1.0 in.)
Model #	700 or 500

Actuator Configuration Tab



Deceleration Zone

The spray head travels out on an extend stroke and travels back on a return stroke. After reaching the stop point of each stroke, the spray head decelerates. The Deceleration Zone parameter sets the distance (at the end of each spray stroke) that the actuator moves during the deceleration process. The default value is 13.0 mm (0.5 in.). In order to maintain flux uniformity, spraying flux while accelerating or decelerating is not desirable. The deceleration zone is extra distance that is added to the flux actuator stroke to ensure that the deceleration at the end of the stroke occurs outside of the flux spray zone.

Home to Fixed Rail Distance

The Home to Fixed Rail Distance value determines the distance from the Home position to the inner edge of the fingers of the fixed rail or the location of the start of the flux zone. The default value is 13.0 mm (0.5 in.)

Air Knife Over Travel

The Air Knife Over Travel value determines the additional distance of travel required to the Deceleration Zone, allowing the air knife to fully contact the board. The default value is 25.0 mm (1.0 in.).

Service Position

The value entered in the Service Position field is the distance the spray head moves from Home Position when "Move to Maintenance Location" is selected on the Maintenance page of the Module > Fluxer window. Refer to "Move to Maintenance Location on page 23". The default value is 152.0 mm (6.0 in.).

Servo Return Speed

The Servo Return Speed value determines the return speed of the spray head after a spray stroke. The default value is 711.0 mm/sec (28.0 in./sec.).

Extend Spray Width

The value entered in this parameter is added to the Board Width value located on the Operation page of the Module > Fluxer window (refer to Board Width on page 17). This results in a wider spray width. The default value is zero (0).

Model Number

The ServoJet™ Spray Fluxer is either a 500 mm model or a 700 mm model. The model type correlates to the spray stroke length.

Nozzle Configuration

Overview

The Nozzle Configuration is specific to the ServoJet™ Spray Fluxer, i.e., not specific to individual process recipes. Select “OK” to ensure that any changes are saved before exiting the page.

Accessing the Nozzle Configuration Page

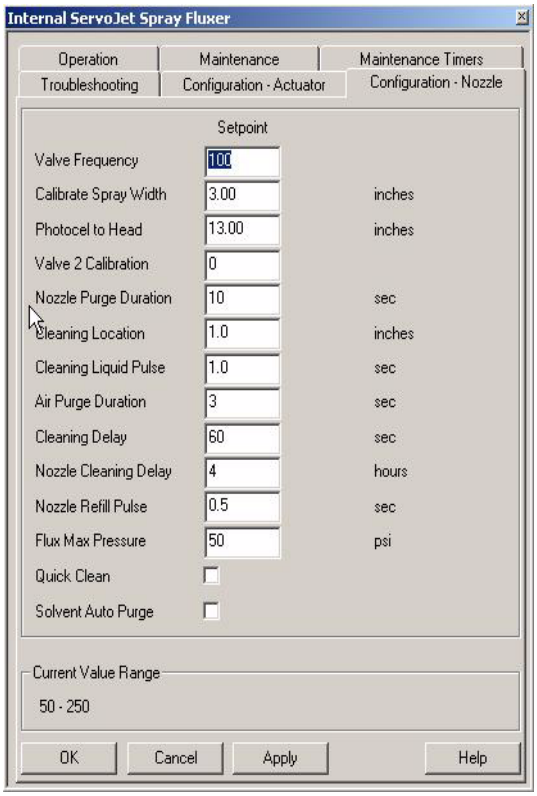
When the Module > Fluxer Window is displayed, as described on page 4, select the “Configuration - Actuator” Tab.

Range of Acceptable Parameters

The ServoJet™ parameter ranges in the Modules > Fluxer> Configuration - Nozzle are depicted in the table below:

	Setpoint Range
Valve Frequency	50–200
Calibrate Spray Width	50.8–152.4 mm (2.0–6.0 in.)
Photocell to Head	0.0–3124.2 mm (0.0–123.0 in.)
Valve 2 Calibration	–10 to 10
Nozzle Purge Duration	1 to 30 seconds
Cleaning Location	13.0–635.0 mm (0.5–25.0 in.)
Cleaning Liquid Pulse	0.1 to 9.9 seconds
Air Purge Duration	1 to 30 seconds
Cleaning Delay	5 to 1200 seconds
Nozzle Cleaning Delay	0 to 48 hours
Nozzle Refill Pulse	0.1 to 5.0 seconds
Flux Max Pressure	30–60 psi

Nozzle Configuration Tab



Valve Frequency

The Valve Frequency parameter sets the time in tenths of a millisecond, e.g., the recommended value of 100 is equal to 10.0 milliseconds. The Valve Frequency parameter represents the full period of a spray cycle.

The Valve Frequency parameter is affected by the Valve Factor parameter entered on the Operations page (refer to Valve Factor on page 17) The Valve Factor is a percentage value that is applied to the Valve Frequency to control “On” time of the spray pulse.

Table Illustrating Relationship between Valve Frequency and Valve Factor

The range of parameter values in the "Valve Frequency" field is from 50 to 250. The range of parameter values in the "Valve Factor" field is from 10% to 80%. The table illustrates a few possible combinations:

Valve Frequency results in Spray Period, which is multiplied by Valve Factor and creates the Spray "On" Period. After Time Before Next Spray "On" Period has elapsed, the cycle repeats. Note that "Spray Period","Spray 'On' Period", and "Time before Next Spray 'On' Period" are not directly configured, i.e., they are a result of the frequency and factor variables.

Valve Frequency[a]	Spray Period	Valve Factor[b]	Spray "On" Period	Time Before Next Spray "On" Period
50	5 ms	10% (0.1)	0.5 ms	4.5 ms
50	5 ms	50% (0.5)	2.5 ms	2.5 ms
50	5 ms	80% (0.8)	4.0 ms	1.0 ms
100	10 ms	10% (0.1)	1.0 ms	9.0 ms
100	10 ms	50% (0.5)	5.0 ms	5.0 ms
100	10 ms	80% (0.8)	8.0 ms	2.0 ms
250	25 ms	10% (0.1)	2.5 ms	22.5 ms
250	25 ms	50% (0.5)	12.5 ms	12.5 ms
250	25 ms	80% (0.8)	20.0 ms	5.0 ms

a. Parameter located on "Modules > Fluxer > Nozzle - Configuration" page
b. Parameter located on "Modules > Fluxer > Operations" page

Calibrate Spray Width

The "Calibrate Spray Width" value establishes the distance the board travels from the start ofa spray stroke until the next spray begins. This parameter is set so that each spray stroke merges with the previous spray stroke so that there is not an overlap where there is too much flux or a space between spray storkes where there is no flux. The default parameter value is 76 mm (3.0 in.) The ServoJet™ spray head is designed to spray a 76 mm (3.0 in.) flux stripe. As each individual head has unique characteristics due to the head construction and the specific choice of flux process parameters (atomizing air pressure, flux tank pressure, valve factor), the actual flux stripe width may be calibrated with this parameter. This parameter is chosen such that each spray stroke merges with the previous spray stroke. If chosen correctly, there is no flux stripe overlap and no space between spray strokes where there is no flux..

Photocell to Head

The "Photocell to Head" value is the distance measured from the fluxer board detect sensor to the spray head. The default value is 330 mm (13.0 in.). To reset the value, place board into the fluxer and begin a manual spray (from the Maintenance Page). Adjust the photocell until the spray begins at the leading edge of the board. If the spray begins before reaching the board, increase the value in the "Photocell to Head" field. If the spray does not begin until it is past the leading edge of the board, decrease the value in the "Photocell to Head" field.

Valve 2 Calibration

The value entered in the "Valve 2 Calibration" field uses the Valve Factor setting (see Valve Factor on page 17) to create an offset for Valve 2 (compared to Valve 1). The default value is zero (0).

The bank of nozzles located closest to the preheaters is Valve 1; the bank of nozzles located closest to the incoming board it Valve 2.

Generally, an offset is not used. If the spray pattern seems unbalanced, check the valves by turning Off the Atomizing Air Pressure (on the Maintenance Page), and turning the flux stream On at 15 psi (set psi on Configuration–Nozzle Page; turn flux On at the Maintenance Page). If Valve 2 is spraying heavier than Valve 1, enter a (-) Offset Value. If Valve 1 is spraying heavier than Valve 2, enter a (+) Offset Value.

Nozzle Purge Duration

The value entered in the "Nozzle Purge Duration" field sets a period of time that a Flux and Solvent Purge operates after being started from the Maintenance Page, or when automatically performed when the fluxer solvent auto purge is checked.The default value is ten (10) seconds.

The ServoJet™ flux nozzles may be cleaned by performing a nozzle purge. A nozzle purge routes cleaning solvent (water or alcohol, depending on the active flux) to the eight (8) ServoJet™ nozzles via a three (3) way cleaning valve. The nozzle purge duration sets thte period of time that the cleaning solvent flows through the valves and nozzles during a nozzle purge procedure. The procedure is initialized manually from the Maintenance Page ("tab") or automatically when the fluxer is turned off if the auto nozzle purge option has been selected. A nozzle purge should be performed anytime the fluxer will be idle for a significant amount of time (at the end of the last shift of the day or before a weekend shutdown for example).

Cleaning Location

The value entered in the "Cleaning Location" field determines how far the spray head travels from the Home position to perform the self-cleaning process. It is recommended to initiate the self-clean as close to the rail as possible. The recommended parameter is 25 cm (1.0 in.).The further the distance from the Home position this value is set, the more time is needed for the self-clean cycle to execute. In order to prevent flux residue buildup under the fixed or moving rails and to prevent finger contamination, a Nozzle Purge procedure or an Air Orifice Cleaning procedure is undertaken somewhere between the fixed and moving rail, allowing excess fumes to be extracted by the exhaust hood. The Cleaning Location value allows the user to select this location based on his machine setup and production environment.

Cleaning Liquid Pulse

The "Cleaning Liquid Pulse" value is the time in seconds the cleaning liquid valve is open allowing the cleaning fluid (either water or alcohol) to inject into the atomizing air line. After the cleaning liquid pulses, the liquid is ejected with purge air to clean the atomizing air orifices. The default value is 1.0 second.

Air Purge Duration

The value entered in the “Air Purge Duration” field indicates the period of time that a “Clean Air Line” function operates after initiated from the Maintenance Page. Use of the air purge is indicated when the spray pattern becomes distorted or when there is inadequate coverage.

Cleaning Delay

The “Cleaning Delay” value represents the time period between each cleaning cycle. The process does not occur if there are boards in the fluxer. If the delay time expires, but there are boards in the fluxer, the cleaning process delays until the board count is zero (0). The default value is 60 seconds. The Atomizing Air orifice that surrounds each of the 8 ServoJet flux nozzles is susceptible to blockage by dried flux residue. An internal Air Orifice cleaning system is designed into the ServoJet to keep these important air passages clear of flux residue buildup. Cleaning solvent (water or alcohol, depending on the active flux) is injected into the Atomizing Air supply line and then purged from the line with inlet pressure air, forcing solvent through the Atomizing Air orifice. This removes any dried flux residue buildup from the air passages. This cleaning procedure is automatic and repetitive. The Cleaning Delay value is the delay period (in seconds) between automatic Air Orifice cleaning events. Note that the Air Orifice cleaning procedure will not occur while boards are in the fluxing zone. If the Cleaning Delay period has timed out and a board is in the fluxing zone, the cleaning procedure will occur once the last active board leaves the fluxing zone.

Nozzle Cleaning Delay

The “Nozzle Cleaning Delay” parameter value defines the length of time in hours before initiating an alarm to perform the solvent purge of the nozzle. The default value is four (4) hours.

Nozzle Refill Pulse

The “Nozzle Refill Pulse” parameter is used when a clean air line cycle is performed. It indicates the time that flux is refilled into the flux line when a new board is scanned after a clean air line was performed. The default value is 0.5 seconds.During an Atomizing Air cleaning procedure, the purge air burst used to force the cleaning solvent out the Atomizing Air orifice creates a venturi effect on the ServoJet nozzles. This causes flux in the ServoJet nozzles to be siphoned out of the nozzles during the cleaning procedure. This flux needs to be replaced before the next flux stroke. The Nozzle Refill Pulse opens the ServoJet valves on the detection of the first board after a cleaning event to restore the flux removed during the cleaning.

Flux Max Pressure

The “Flux Max Pressure” value sets the value required for automatic flux pressure control. This value is located on the flux pressure controller located in the pneumatic box.The default value is 50 psi.

Quick Clean

When selected, the Quick Clean performs a short periodic self-clean. The Quick Clean function is designed for large process batches with minimal board spacing.

Solvent Auto Purge

When selected, the solvent purge occurs when the fluxer is turned from On to Off. The fluxer performs a flux purge the next time the fluxer is turned from Off to On after the solvent purge operates.

Operation Page – ServoJet ™ Software

Overview

On the Operation Page, parameters specific to operating the ServoJet™ Spray Fluxer can be entered or changed to meet the requirements of a particular recipe. The entries may be saved, either in the existing recipe or to a new recipe, or they may be applied to an individual board or boards, without saving.

Accessing the Operation Page

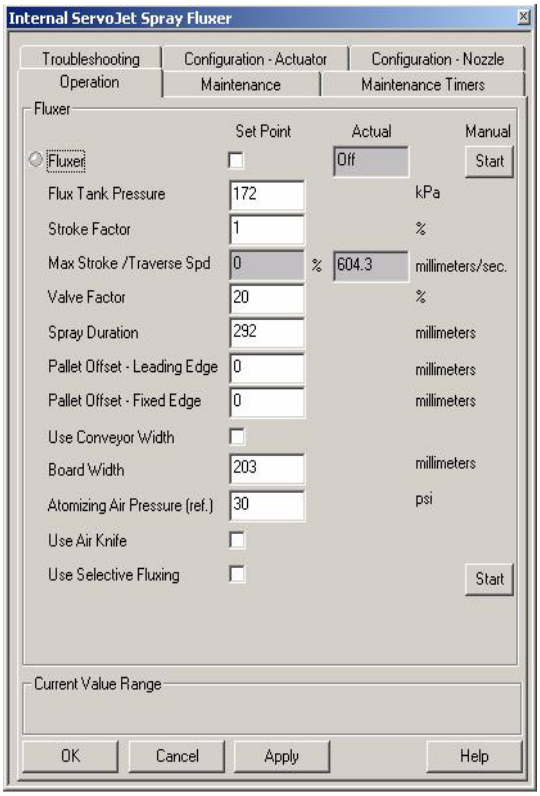
When the Module > Fluxer Window is displayed, as described on page 4, select the “Operations” Tab if it is not active.

Range of Acceptable Parameters

The ServoJet™ parameter ranges in the Modules > Fluxer> Operation page are depicted in the table below:

	Setpoint Range
Flux Tank Pressure	103–345 kPa (15 - 50 psi)
Stroke Factor	1–100%
Valve Factor	10–80%
Spray Duration	41–559 mm (1.6–22.0 in.)
Pallet Offset - Leading Edge	0–635 mm (0.0–25.0 in.)
Palled Offset - Fixed Edge	0–635 mm (0.0–25.0 in.)
Board Width	0–660 mm (0.0–26.0 in.)
Atomizing Air Pressure (ref.)	20–50 psi

Operation Tab



Fluxer

The Start/Stop toggle button is used to operate the fluxer in Manual Mode. The text box (in the "Actual" column) indicates the status of the fluxer. If the check-box under the "Set Point" column is selected, the fluxer is enabled for Auto Start operation.

Tank Pressure

The "Tank Pressure" value controls the pressure of the flux tank. The pressure of the flux tank affects the flow rate to the spray head. The pressure is adjusted by entering a value in the text box under the "Set Point" column. The default value is 25 psi. Flux tank pressure is set and maintained by an electronic Proportional Pressure Control (PPC) valve. The tank pressure can be controlled between 15 and 50 psi based on the Tank Pressure setpoint. The tank pressure controls the flow of flux to the ServoJet Nozzles. It is a very important parameter in controlling the flux volume delivered to the circuit board.

Stroke Factor

The "Stroke Factor" governs the traversing speed of the spray head. The higher the stroke factor value, the slower the traversing speed. The default value is 1%(fastest traversing speed).

Max Stroke / Traverse Speed

The “Max Stroke Factor” is a read-only value displaying the maximum allowable stroke factor as determined by the combination of all applicable influences such as conveyor speed, spray width, etc. The “Traverse Speed” is a read-only value that displays a calculated traverse speed using the current stroke factor setting.

Valve Factor

The "Valve Factor" variable works in conjunction with the "Valve Frequency" (see Valve Frequency on page 9) to determine the amount of time ("Spray 'On" Period") the valve operates. The Valve Factor is a percentage value. Increasing the number increases the amount of flux deposited on the board. The default value is 20%. Flux flow to the ServoJet nozzle is directly controlled by the high speed ServoJet Valves. There are 2 valves in the ServoJet head, each valve controls the flow to 4 nozzles. Flow is controlled by pulse width modulation (PWM). The valve is opened for a period of time within a frequency period (see Valve Frequency on page 9). A typical parameter setpoint would be 20% with a Valve Frequency of 100. This means that the ServoJet valve is open for 2.0 msec and then closed for 8.0 msec. This cycle is continually repeated while flux flow is commanded. Increasing the Valve Factor increases the flux volume delivered to the circuit board.

Spray Duration / Board Length

The "Spray Duration / Board Length" value inputs the length of the process board, which allows the fluxer to determine how many spray passes to make using this value in combination with the spray width.The default value is 292 mm (11.5 in.).

Pallet Offset - Leading Edge

The value entered in "Pallet Offset - Leading Edge" represents the distance between the leading edge of the board and the position of the spray head when the fluxer begins to spray the board. The default value is zero (0).

Pallet Offset - Fixed Edge

The value entered in "Pallet Offset - Fixed Edge" represents the distance between the fixed rail proximity sensor and the location that the spray head begins to spray the board as it begins to traverse. The default value is zero (0).

Use Conveyor Width

If this check-box is selected, the board width parameter of the fluxer is automatically set to the current conveyor width (actual).

Board Width

If not applying the "Use Conveyor Width" function, enter the process width of the circuit board into the "Board Width" field.

Atomizing Air Pressure (ref.)

The atomizing air pressure is set manually on the fluxer control box. The value is displayed in this field as a reference for the operator.

Use Air Knife

Select the check-box in this field to use the air knife when the fluxer is in operation mode.

Use Selective Fluxing

When checked, the selective fluxing program is used, disabling duration, conveyor/board width and pallet offsets. The selective fluxing program is created using the ServoJet™ Selective program. Access the program by clicking the “Start” button to the right of the check-box.

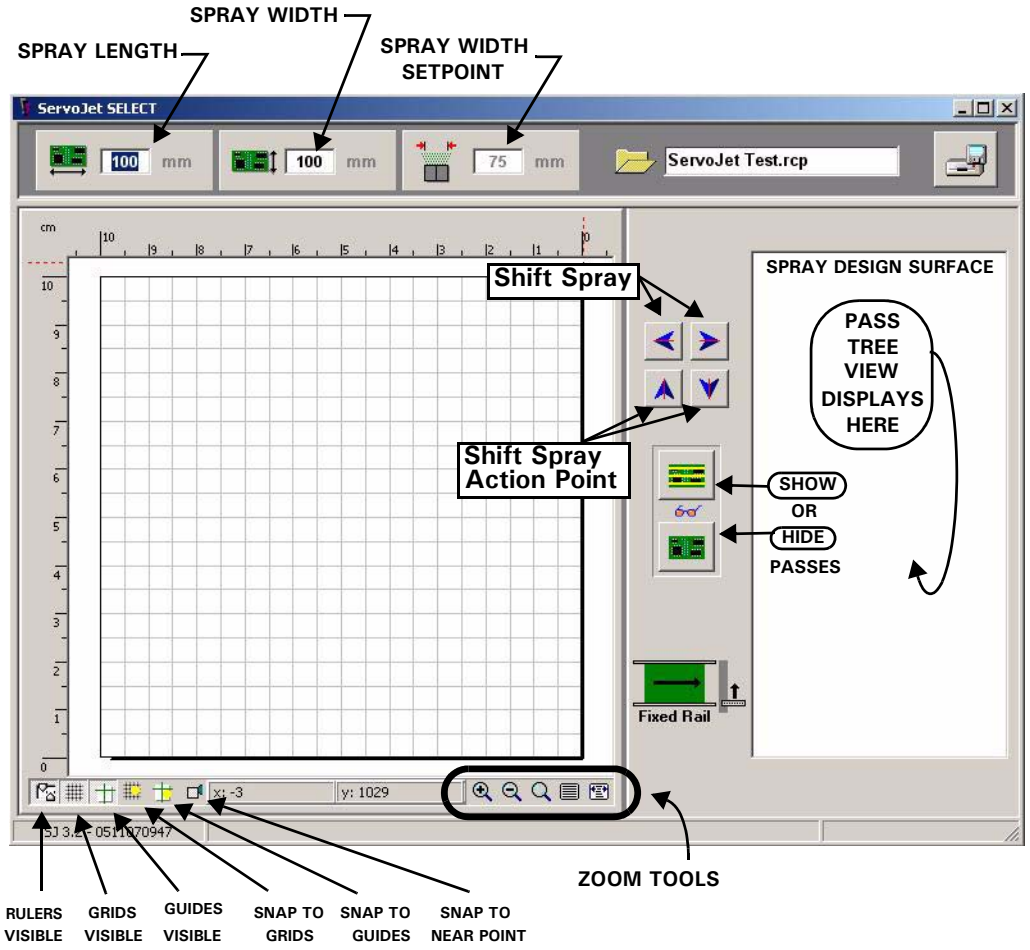
The selective start button is available in Manual Mode only. The user must have security access granted. The values displayed in the selective fluxing program are in metric, regardless of system configuration in other fields.

Selective Fluxing with the ServoJet™ Spray Fluxer

Overview

The system must be in Manual Mode to use the Selective Fluxing program. The program is accessed through first displaying “Modules > Fluxer > Operation” as illustrated on page 4. Ensure that the check-box next to “Use Selective Fluxing” is checked, then select “Start”. A new window appears titled “ServoJet Select”.

ServoJet Select Window



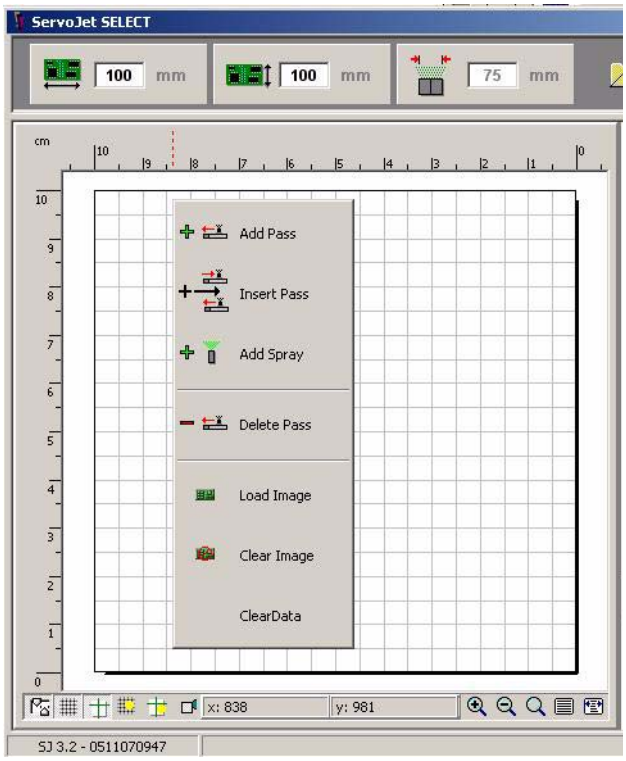
Select Selective Flux Mode and Board Dimensions

Once the Selective Flux mode is selected, the window (depicted above) displays for selective fluxing. Enter the width and length of the printed circuit board (PCB). This automatically creates a design surface in the software that reflects the board dimensions. Note that all design is created using metric units (millimeters) during the design process.

Add Board Image

A picture of the PCB may be overlaid on the spray design surface. Crop the image (of the PCB) so that only the full spray dimension is in the file. Right-click on the design surface to display the menu. Select “Load Image”. Browse to the image and select “Open”. The board image automatically stretches or shrinks to fill the full spray design surface.

Spray Design Surface and Menu Displayed



Add Spray Pass

Move the arrow selector to the desired starting point of the flux pass and right-click. Select “Add Pass” from the displayed menu. The edit box displays the starting point of the selection. Click “OK” to add to the pass tree view.

Add Spray Action Point

Select the location of a desired spray action point within the pass created when “Add Spray Pass” is selected.Right-click and select “Add Spray” from the menu. Select the Valve Factor for each of the valves and select “OK”.

Repeat for additional Spray Action Points.

Shift Spray Pass with Arrow Buttons

Any Spray Pass may be shifted using the Right / Left arrow buttons. Select the desired spray pass from either the spray design surface of the spray tree view using the mouse. Click the arrow button to move the pass 0.1 mm in the selected direction.

Shift Spray Action Point with Arrow Buttons

Any spray action point may be shifted using the Up / Down arrow buttons. Select the desired spray action point from the spray tree view using the mouse. Click the arrow button to move the action point 0.1 mm in the selected direction.

Edit Program from Pass Tree View

All data may be edited from the spray tree view. Move the mouse to the desired spray pass icon or spray action point icon and double click the mouse. The applicable edit window is displayed. Edit data as required.

Show or Hide Passes on Spray Design Surface

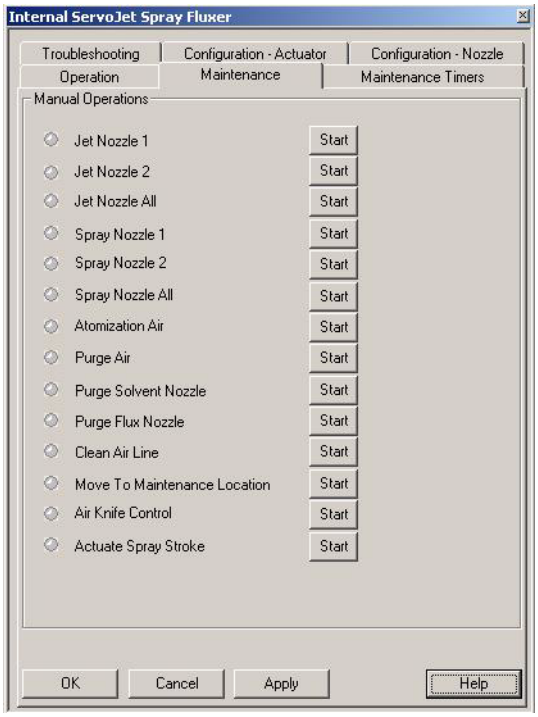
Show or hide passes on the spray design surface by selecting the show or hide icons. Individual passes may be displayed by hiding all passes and then selecting the individ8ual pass of interest from the spray tree view or by clicking on the area on the spray design surface.

Maintenance Page – ServoJet™

Overview

The Maintenance Page contains manual override buttons, specifically for maintenance functions. These features should be limited to use by maintenance personnel only. To access the functions on the Maintenance Page, the system must be in Manual Mode.

Maintenance Page



Jet Nozzle (1, 2, ALL)

Turns On or Off the nozzle(s) associated with the (toggle) button.

Spray Nozzle (1, 2, ALL)

Turns On or Off the bank of nozzles with atomizing air associated with the (toggle) button. Spray Nozzle 1 is the bank of nozzles closest to the preheater. Spray Nozzle 2 is the bank of nozzles closest to the incoming board.

Atomization Air

Turns On or Off the atomizing air to the nozzle.

Purge Air

Turns On or Off the purge air.

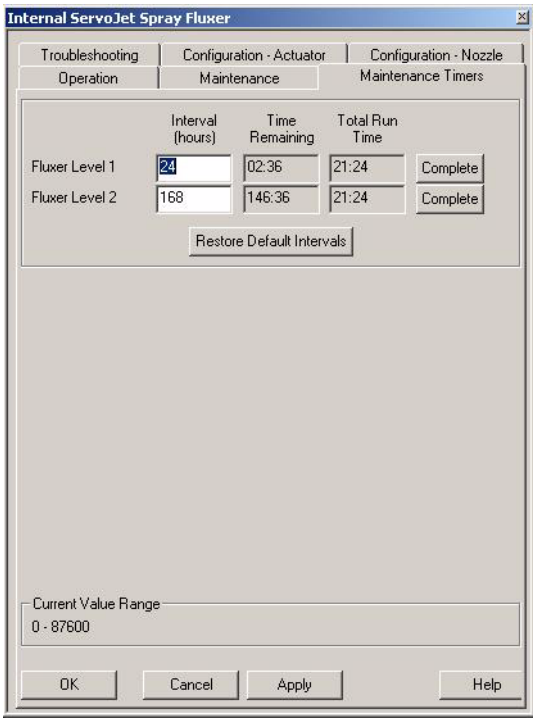
Purge Solvent Nozzle	Turns On or Off the solvent purge to the nozzle for the period of time set on the nozzle configuration page.
Purge Flux Nozzle	Turns On or Off the flux purge to the nozzle for the period of time set on the nozzle configuration page.
Clean AIr Line	The “Clean Air Line” selection forces a cleaning cycle to the air line for a period of time which is set on the nozzle configuration page.
Move to Maintenance Location	This selection moves the spray head to the desired service location (as defined in the configuration actuator page).
Air Knife Control	Toggling the “Air Knife Control” button either turns On or Off the air knife.
Actuate Spray Stroke	Selection of the “Actuate Spray Stroke” button initiates a single flux spray stroke.

Maintenance Timers

Overview

The Maintenance Timers are available to use as a guide to know when to perform maintenance on a specific module. Each maintenance timer screen contains two different types of times. The maintenance timer associated with a specific device only runs while the device is On. The maintenance timer level 1, 2, 3, etc., are free-running timers and do not stop when the device is Off. These timers are used for setting up a maintenance schedule with regard to time period, e.g., daily, weekly, or monthly.

Maintenance Timers Page



Interval (hours)

The expected interval time in hours is entered for maintenance to be scheduled on the particular module.

Time Remaining

The text box labeled “Time Remaining” displays the time until maintenance is due for the particular module. When time expires, the message “Maintenance Required” is displayed in the status bar.

Total Run Time

The actual time that the particular module has been On since installation.

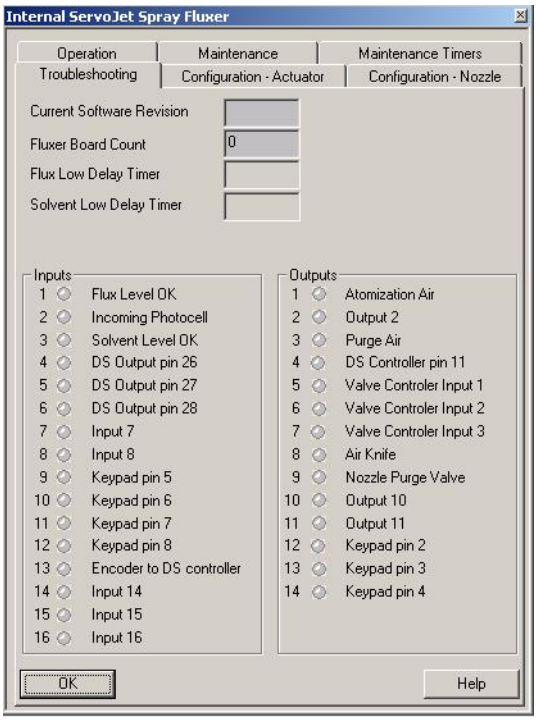
Complete	Click on this button when maintenance operation for the particular module is complete.
Restore Defaults Intervals	Selecting the button restores the default interval values.

Troubleshooting Page

Overview

The troubleshooting page contains features specifically aimed toward corrective measures. The page displays internal machine parameters and fluxer debug information. If there is a functionality issue with the fluxer, the values provided here may give an indication as to what may be causing the problem.

ServoJet™ Troubleshooting Page



Current Software Revision

The current fluxer controller software information is displayed.

Board Count

The current number of boards being tracked by the fluxer is displayed.

Inputs / Outputs

The inputs and outputs of the fluxer are displayed with the fluxer I/O designation and title. The LED is green when active (otherwise it is gray).

Cleaning the System and Auto Clean Functions

Overview

Manual cleaning of the system consists of wiping excess flux residues from the surfaces of the base and the head. Use a solvent that is compatible with the flux (water, alcohol). Care should be taken with the top of the head where the nozzles and air orifices are located. Never use a brush to clean this area. The best method is to spray a solvent (water, alcohol) on the top surface of the head to dissolve the flux and blow off with an air gun. The air stream should be across the surface of the head. Never blow straight down on the head. Blowing down on the head could force flux into the air orifice or nozzle causing them to clog.

There are 2 separate and unique auto/manual cleaning functions that are required to keep the system clean and operating at is best.

Air Orifice Cleaning

This function addresses only the cleaning of the air orifice around each jet nozzle. To manually perform this function the fluxer must be in the off mode. When the Clean Air Line button is pressed on the Maintenance page the spray head moves to the cleaning location and solvent is injected into the air line and purge air is turned on to blow the solvent out of the air line through the air orifices. This cleans any flux build up in and around the atomizing air orifices.

The amount of solvent injected, the length of time the purge air is turned and the frequency of the cleaning is controlled by the Cleaning Liquid Pulse, Air purge Duration and Cleaning Delay parameters found on the Configuration-Nozzle page.

When the fluxer is "on" the Air Line Cleaning is performed automatically. After the fluxer has seen a board and operated for the length of time indicated by the Cleaning Delay the system will perform an Air Line Cleaning the first time there is a zero board count. The delay counter is then reset and the system will perform another Air Line Cleaning at the end of the delay time and there is a board count of zero. This will continue until the fluxer is turned off or there are no boards being processed.

For systems running very high production rates where the boards are back to back or so close together that the automatic Clean Air Line function does not get a chance to operate there is a supplemental Air Line Cleaning function called Quick Clean. The Quick Clean check box is located on the Configuration-Nozzle page. When checked the system will perform a short clean cycle under the fixed rail when the head is in the home position and waiting for the next spray stroke. This helps to keep the air orifices clean till there is a zero board count and the system can perform a full Air Line Clean operation.

Nozzle Purge

This function addresses only the cleaning of the flux valves and jet nozzle itself.

To manually perform this function the fluxer must be in off mode. Then go to the maintenance tab and there are 2 buttons labeled Purge Solvent Nozzle and Purge Flux Nozzle. The Purge Solvent Nozzle will move the head to the cleaning position and activate a 3-way valve that purges the flux valves and nozzles with solvent for the period of time entered on the Configuration -Nozzle page as the Nozzle Purge Duration.

The Purge Flux Nozzle will move the head to the cleaning position and purge flux through the flux valves and nozzles for the same period of time putting the fluxer ready to spray flux. This function will automatically be performed anytime a Purge Solvent Nozzle has been performed and the fluxer has been turned on.

If the Solvent Auto Purge check box is checked on the Configuration-Nozzle page the Purge Solvent Nozzle will automatically be performed each time the fluxer is turned to off. As before, the system will automatically perform the Purge Flux Nozzle when the fluxer is turned on.