2

Preventive Maintenance

Overview

Introduction

This chapter contains recommended preventive maintenance (PM) procedures for the AccuFlex printer. Itemized logs for the PM procedures are included, organized both by frequency of performance and by major assembly.

In this chapter

This chapter is divided into eight sections.

For information on…	See Section…
Before You Begin	A
Preventive Maintenance Itemized Logs	B
Preventive Maintenance - Daily	C
Preventive Maintenance - Weekly	D
Preventive Maintenance - Monthly	E
Preventive Maintenance - Semi-Annual	F
Preventive Maintenance - Annual	G
Troubleshooting Charts	H

Section A: Before You Begin

Overview

Introduction

This section contains information that must be read before performing preventive maintenance procedures.

Cleaning Work Surfaces

The following describes the importance of a clean work surface.

- Solder paste residue on the worktable and adjacent components reduces print quality.
- Cleanliness of internal working surfaces is critical for printing accuracy.
- The primary purpose of this manual is to provide instructions for inspecting, cleaning and lubricating those parts of the printer that if neglected, will reduce print quality and/or reduce machine longevity.
- Consult local HAZMAT codes and MSDS sheets on the appropriate use, storage, and disposal of suggested cleaning solutions within your facility.
- Read and comply with the warnings and cautions given with each PM routine for your own safety and the safety of the printer.

Ordering Speedline Replacement Parts

Some procedures may require Speedline replacement parts. Review each procedure before beginning work on the printer and determine if replacement parts are required. Replacement parts can be ordered from Speedline Global Service Group by calling 1-800-737-8110.

- For help identifying replacement parts, refer to the *Accuflex™ Drawings Guide*. This volume provides illustrated parts breakdowns (IPBs) and corresponding parts lists for each of the major printer assemblies.
  The parts list identifies part numbers, part descriptions, and the quantity of parts used in each assembly.
- Refer to the *Accuflex™ Repair Guide* for a list of available parts contained in the various spares kits. If you don't have the spare, contact Speedline Global Service Group at 1-800-737-8110.

Section B: Preventive Maintenance Itemized Logs

Overview

Introduction

The following tables are an itemized log of PM procedures to be performed on a scheduled basis. Copy the (blank) original logs and use copies for recording PM procedures as they are done.

It is strongly recommended that the initialed and dated PM log sheets be retained in a separate PM log book for future reference.

Daily (Operator)

Machine operator performs these procedures daily or at 3,000 cycles.

Assembly	Completed (Initial)	Date
Remove paste and debris from machine		
Clean top cover and monitor screen		
Inform technician if stencil wiper paper or solvent need replenishment.		
Inform technician of any problems		
Check stencil cleaner paper tension		
Verify wiper plenum pressure. Adjust regulator		

Daily (Technician)

Technician performs these procedures daily or at 3,000 cycles.

Assembly	Completed (Initial)	Date
Discuss any machine problems with operator		
Check / replace stencil cleaner paper		
Check / replace solvent		
Check / replace automatic paste dispenser, if installed		

Weekly (Technician)

Technician performs these procedures weekly or at 21,000 cycles.

Assembly	Completed (Initial)	Date
Complete daily action items.		
Visually check conveyor belts and board foil clamps		
Clean top and bottom edges of board supports		
Clean camera top and bottom prism lenses		
Check squeegee condition		
Clean individual board supports. Clean pickup heads (auto tooling option)		
Clean all electromechanical faces		
Check solvent tank for leaks		
Check wiper / plenum blade and solvent tube for paste deposits		
Inspect solvent tube		

Weekly Squeegee Maintenance (Technician)

Technician performs these procedures weekly or at 21,000 cycles.

Assembly	Completed (Initial)	Date
Check Squeegee blade contact with stencil.		
Adjust polyurethane squeegees, if installed		

Monthly (Technician)

Perform these procedures monthly or at 80,000 cycles.

Assembly	Completed (Initial)	Date
Perform weekly maintenance		
Wipe print carriage bearings with oil		
Wipe stencil cleaner and camera guide rails with oil		
Inspect stencil wiper plenum, solvent tubes, hoses, and solvent bar		

Semi-Annually (Technician)

Perform these procedures semi-annually or at 480,000 cycles.

Assembly	Completed (Initial)	Date
Re-grease Camera X Ball Screw		
Replace vacuum pump filter		

Annually (Technician)

Perform these procedures or at 960,000 cycles.

Assembly	Completed (Initial)	Date
Re-grease the camera rack and pinion		
Re-grease the printhead carriage bearings		
Re-grease the stencil cleaner bearings		
Re-grease the table rising bearings		
Re-grease the camera carriage		
Check squeegee drive belts		
Check and grease rising table actuator shaft		
Check conveyor belts		
Check squeegee bearing movement		
Replace hood gas struts		

Section C: Preventive Maintenance - Daily

Overview

Introduction

This section contains inspection and cleaning procedures to be performed daily or every 3,000 cycles, whichever occurs first.

Poison

Warning. Solder paste and other printing medium contain lead and are hazardous to your health and the environment. Always wear protective gloves and safety goggles when handling printing medium and make sure you properly dispose of all waste material according to manufacturer's instructions. Failure to comply could result in personal injury and/or damage to the environment.

Chemical Hazard

Caution. Solvent may cause severe burns. Always wear protective gloves and safety glasses when handling solvent, and be careful not to spill the solvent when filling the solvent tank. Review solvent's Material Safety Data Sheet before use. Failure to comply may result in personal injury.

Safety Glasses

Caution. Wear protective safety glasses when handling solvent. Solvent can cause burns to the skin and can damage plastic and painted surfaces.

Safety Gloves

Caution. Wear protective gloves when handling solvent. Solvent can cause burns to the skin and can damage plastic and painted surfaces.

In this Section

This section contains the following topics.

Topic	See Page
Operator	7
Technician	8

Operator

Introduction

The machine operator will perform these functions on a daily basis.

Estimated Completion Time

5 minutes

Tools, Equipment, and Materials

The following is needed to perform daily maintenance:

- Rubber gloves
- Speedline-approved solvent
- Clean lint-free cloths
- Protective goggles

Operator Actions

The following table lists operator daily maintenance action items.

Step	Action
1	Remove any paste or debris from the machine, paying special attention to the table area.
2	Clean the top cover and monitor screen. The paint and acrylic surfaces of the machine covers will tolerate most cleaning agents. However, do not use solvents.
3	Inform technician if stencil wiper paper or solvent need replenishment.
4	Inform technician of any machine operation problems.
5	Check the stencil cleaner paper tension.
6	Verify that the wiper plenum pressure gauge reads the value 25 -35 PSI (1.7 bars/170kPa - 2.4 bars.240kPa). Adjust the regulator pressure, if necessary.

Technician

Introduction

The technician will perform these functions on a daily basis.

Estimated Completion Time

5 - 20 minutes

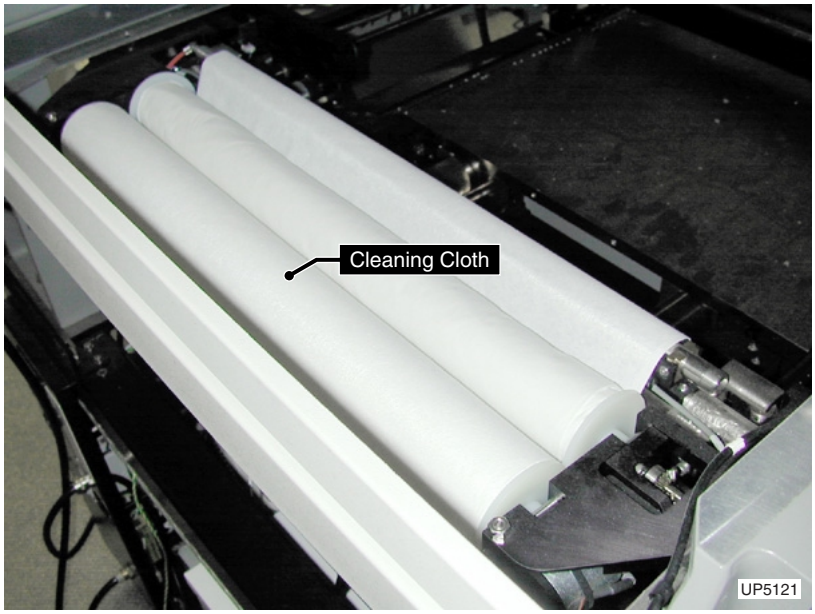
Tools, Equipment, and Materials

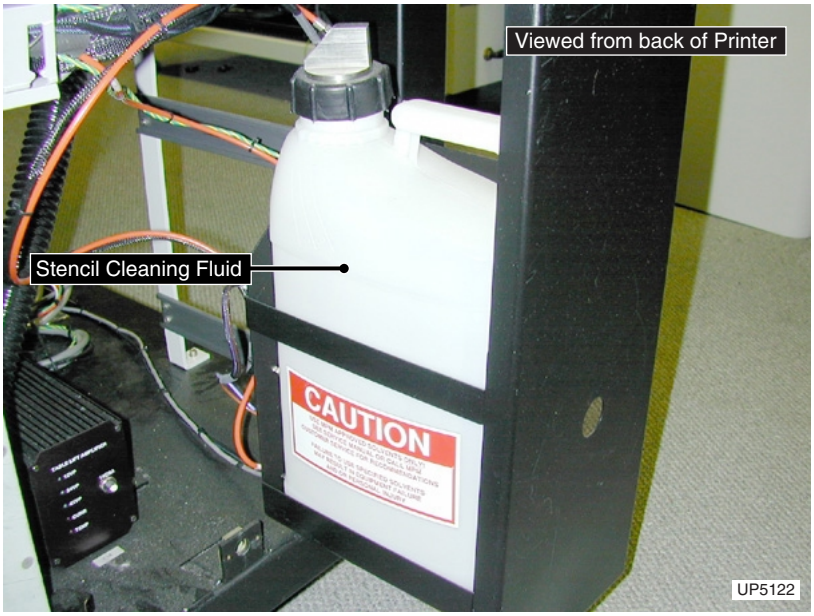
The following is needed to perform daily maintenance:

- Rubber gloves
- Speedline-approved solvent
- Clean lint-free cloths
- Protective goggles

Technician Actions

The following table lists technician daily maintenance action items.

Step	Action
1	Discuss any machine operation problems with the operator.
2	Check and replace the stencil cleaner paper, if necessary. A visual check of the wiper paper roll will show when the roll needs replacing. 

Step	Action
3	Check and replace the stencil cleaning solvent as necessary. Stencil cleaning solvent is stored in a container located at the rear of the machine. Unscrew the top of the container to check the level or replenish the liquid. 
4	If you have an automatic paste dispenser, replace the cartridge as necessary.

Section D: Preventive Maintenance - Weekly

Overview

Introduction

This section contains inspection and cleaning procedures to be performed weekly or every 21,000 cycles, whichever occurs first.

Tools, Equipment, and Materials

The following is needed to perform weekly maintenance:

- Clean lint-free cloths
- Cotton swabs
- Speedline-approved solvent
- Protective goggles
- Rubber gloves
- Inspection mirror and flashlight

In this Section

This section contains the following topics.

Topic	See Page
Technician	11
Squeegee Maintenance	13

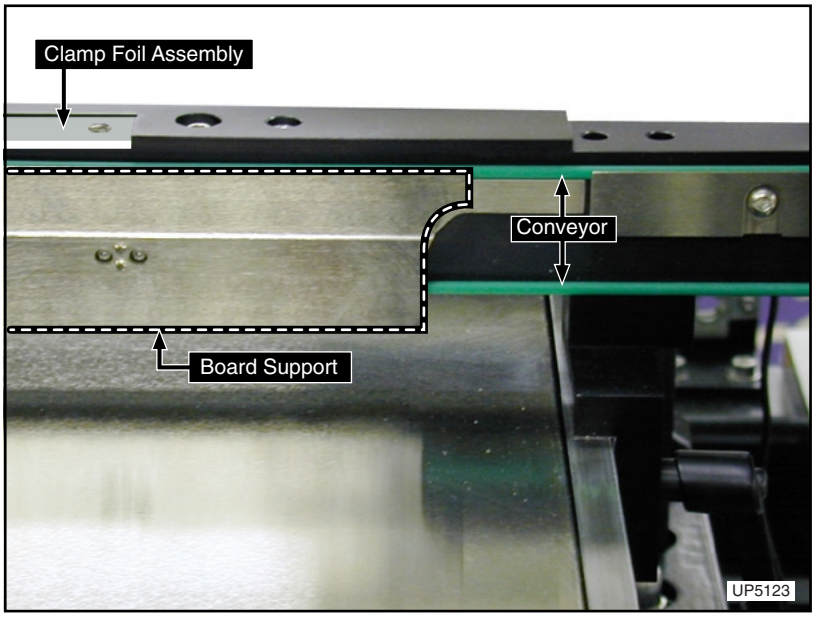
Technician

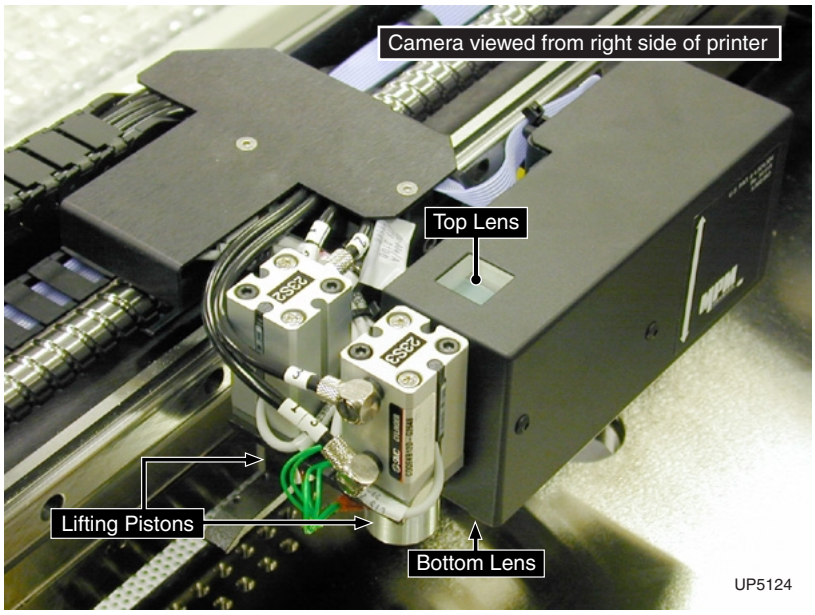
Introduction

In addition to the daily maintenance, the technician must perform the weekly procedures in this section.

Procedure

This table lists the technician's weekly action items.

Step	Action
1	Complete the daily action items.
2	Visually check conveyor belts and board foil clamps. 
3	Clean the top and bottom edges of the board supports shown in Step 2.

Step	Action
4	Clean camera top and bottom prism lenses using a non-abrasive clean cloth or cotton swab and an appropriate solvent, such as isopropyl alcohol. 
5	Check the condition of the squeegees.
6	Clean the individual board supports using isopropyl alcohol and a lint-free cloth. If you have the automatic tooling option, clean the pickup heads, lifting pistons and carousel slots.
7	Clean all electromechanical faces, such as the stencil cleaner - camera carriage connection, using isopropyl alcohol.
8	Check the solvent tank for possible leaks.
9	Check the wiper/plenum blade and solvent tube for paste deposits. Clean using a cloth and Speedline-approved solvent.
10	Inspect the solvent tube for signs of wear or damage. If replacement is necessary, contact Speedline Customer Service.

Squeegee Maintenance

Introduction

The squeegee pushes paste through the stencil. The squeegee angle of attack causes the paste to form a wave-like action in front of the squeegee. The condition of the squeegee is important in obtaining a uniform deposit over the print area.

Estimated Completion Time

5 minutes

Poison

Warning. Solder paste and other printing medium contain lead and are hazardous to your health and the environment. Always wear protective gloves and safety goggles when handling printing medium and make sure you properly dispose of all waste material according to manufacturer's instructions. Failure to comply could result in personal injury and/or damage to the environment.

Procedure

Perform the following squeegee maintenance on a weekly basis.

Step	Action
1	Check that the squeegee blade makes good contact with the stencil throughout its length. Present the work edge to a table surface or other suitable flat surface and inspect for any gaps.
2	Adjusting the squeegee mounting screws will cause a polyurethane squeegee blade to deform and this adjustment can correct local outages. Replace blades that cannot be made usable in this way. Metal blades are made to fine tolerances and usually present an extremely straight edge. No adjustment is needed. Replace blades when gaps or wear occurs.

Section E: Preventive Maintenance - Monthly

Overview

Introduction

This section contains inspection and cleaning procedures to be performed monthly or every 80,000 cycles, whichever occurs first.

Tools, Equipment, and Materials

The following is needed to perform monthly maintenance:

- Clean lint-free cloth
- Speedline-approved solvent
- Protective goggles
- Rubber gloves
- Light machine oil

In this Section

This section contains the following topics.

Topic	See Page
Technician	15

Technician

Introduction

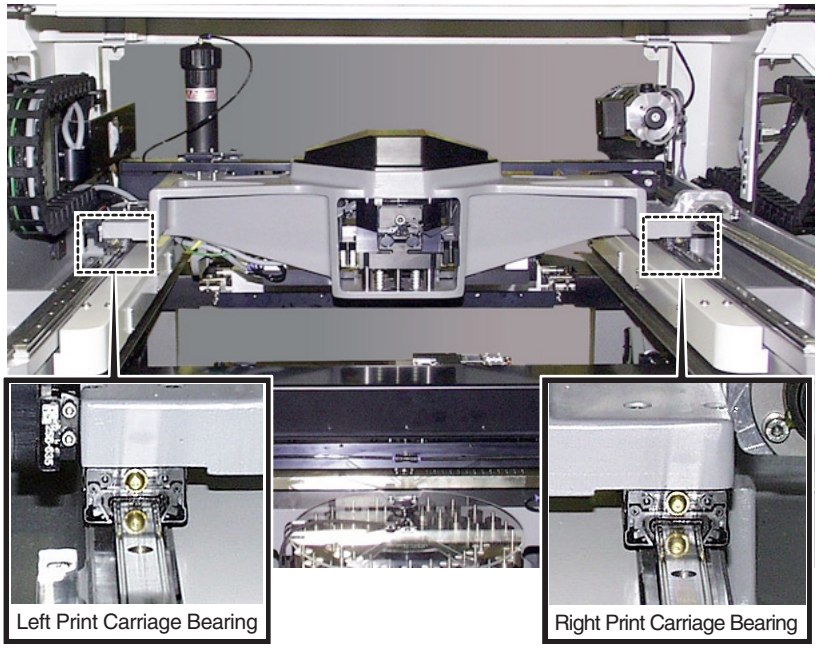
The technician will perform these operations on a monthly basis.

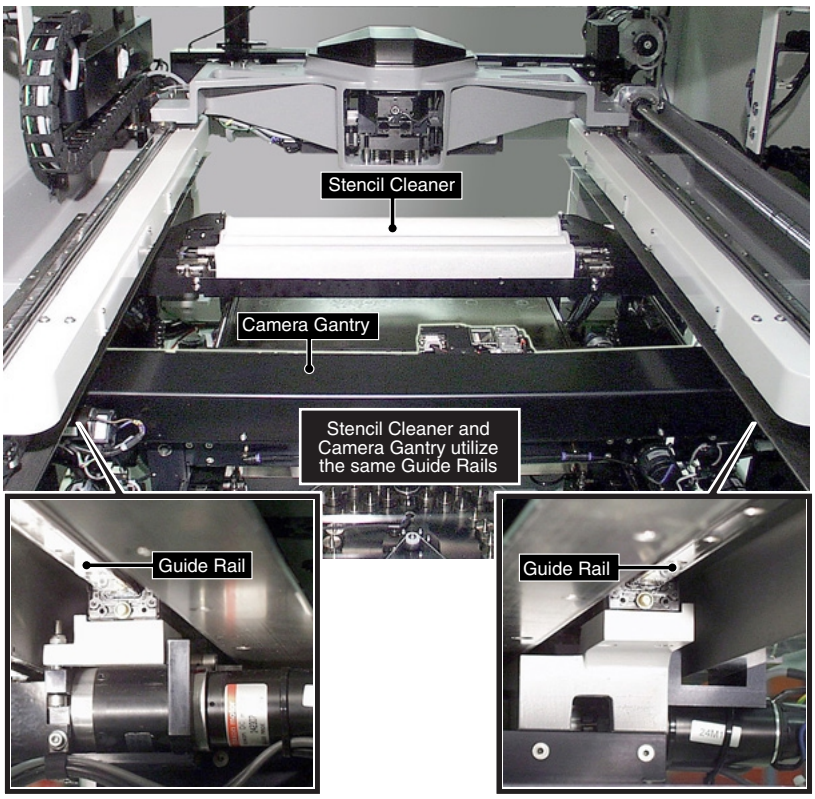
Estimated Completion Time

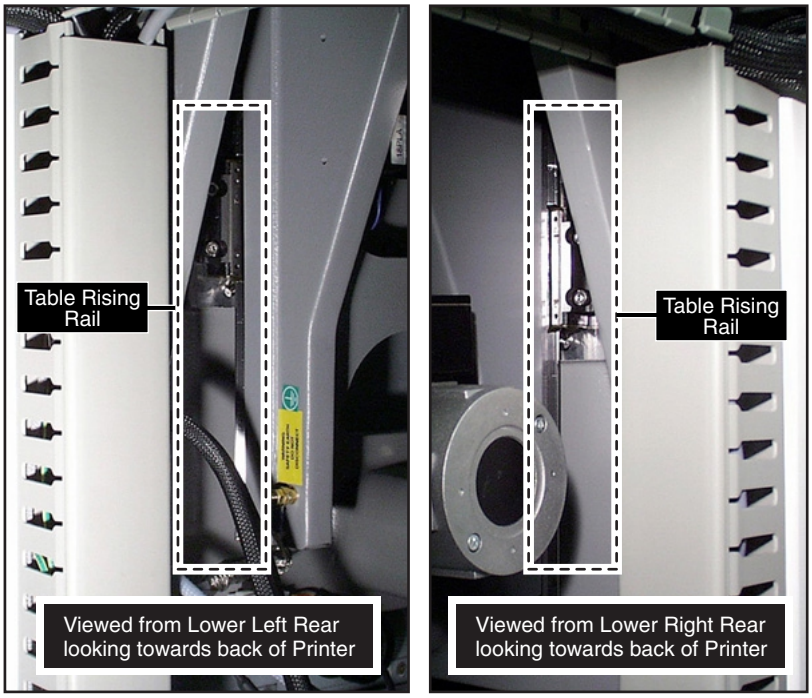
5 - 15 minutes

Procedure

Perform the following:

Step	Action
1	Perform weekly maintenance.
2	Wipe the print carriage bearings with a lint-free cloth and light machine oil.  UP5125

Step	Action
3	Wipe the stencil cleaner/camera guide rails with a lint-free cloth and light machine oil.  UP5126

Step	Action
4	Wipe front cover gas struts the with a lint-free cloth and light machine oil. These struts are accessible by raising the front cover.  UP5127
5	Inspect the stencil wiper plenum, solvent tubes, hoses, and solvent bar.

Section F: Preventive Maintenance - Semi-Annual

Overview

Introduction

This section contains inspection and cleaning procedures to be performed semi-annually or every 480,000 cycles, whichever occurs first. Perform these procedures in addition to the monthly preventive maintenance action items.

Tools, Equipment, and Materials

The following is needed to perform semi-annual preventive maintenance:

- Protective goggles
- light machine oil

In this Section

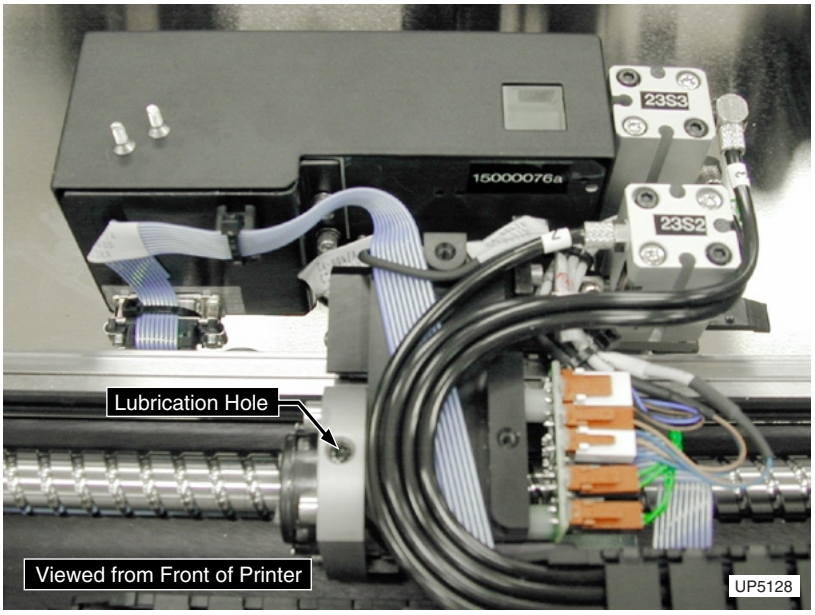
This section contains the following topics.

Topic	See Page
Re-grease the Camera X Ball Screw	19
Semi Annual Stencil Cleaner Maintenance	20

Re-grease the Camera X Ball Screw

Procedure

Re-grease the camera X ball screw as follows:

Step	Action
1	Remove the camera drive cover.
2	Remove the camera drive block cover.
3	Locate the lubrication hole in the top of the drive nut assembly. Using a lithium based grease gun (with grease such as Castrol LMX), pump grease into the lubrication hole. 
4	Replace the covers.

Semi Annual Stencil Cleaner Maintenance

Procedure

Replace the vacuum pump filter as follows:

Step	Action
1	Open the rear printer door.
2	Locate the two glass filter jars attached to the vacuum motors.
3	Unscrew the jars slowly, one at a time, to release any residual air pressure.
4	Remove the filter.
5	Position a new filter and secure it with the base plate.
6	Screw the jar securely to the top of the assembly.
7	Close the printer door.

Section G: Preventive Maintenance - Annual

Overview

Introduction

This section contains inspection and cleaning procedures to be performed annually or every 960,000 cycles, whichever occurs first. Perform these preventive maintenance steps in addition to the semi-annual action items.

Tools, Equipment, and Materials

The following is needed to perform the annual preventive maintenance:

- Clean lint-free cloth
- Speedline-approved solvent
- Protective goggles
- Rubber gloves

In this section

This section contains the following topics.

Topic	See Page
Annual Preventive Maintenance	22

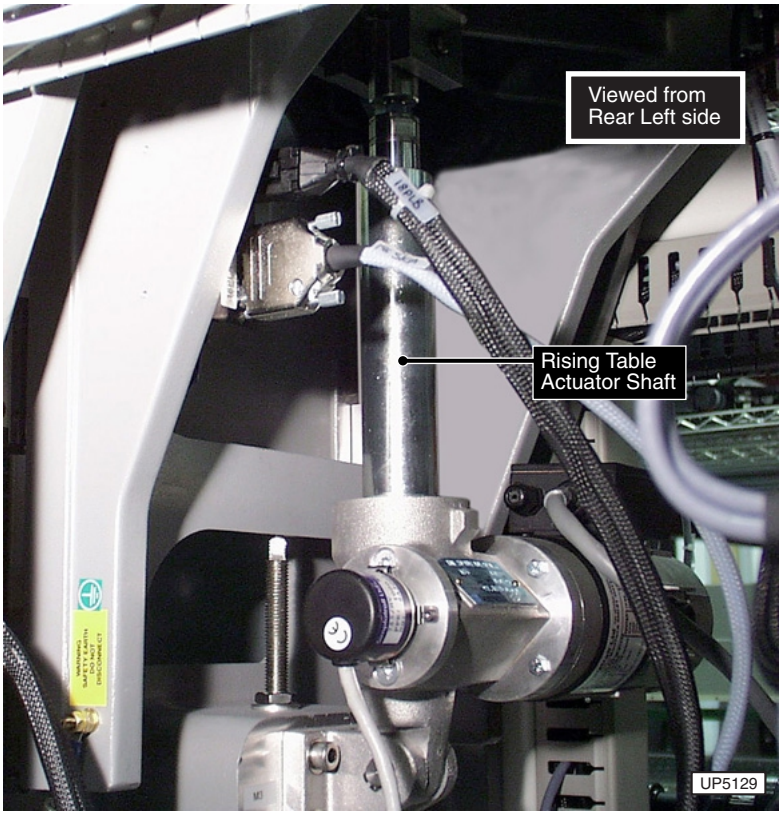
Hand Crush Hazard

Caution. Before performing maintenance procedures, you may need to reposition printer components to gain better access. Stay clear as components move. Failure to comply may result in personal injury.

Annual Preventive Maintenance

Procedure

Perform these maintenance steps annually:

Step	Action
1	Re-grease the camera rack and pinion.
2	Re-grease the printhead carriage bearings with a lithium-based grease, such as Castrol LMX.
3	Re-grease the stencil cleaner bearings with the lithium-based grease.
4	Re-grease the table rising bearings with the lithium-based grease.
5	Re-grease the camera carriage with the lithium-based grease.
6	Check the condition and tightness of the squeegee drive belts.
7	Check and grease the rising table actuator shaft. 
8	Check the condition of the conveyor belts. Replace if necessary. **ATTENTION** Edges of the board clamping foils are sharp. Keep hands clear. Apply foil safety covers before manually adjusting the rails, setting up, cleaning, or servicing the printer. Exercise caution when cleaning foils and rails.

Step	Action
9	Check to see that the squeegees move down easily on their bearings against their springs. Replace the bearings and springs if necessary.
10	Replace the hood gas struts yearly, or earlier if they exhibit wear. **ATTENTION** A falling hood can cause injury.

Section H: Troubleshooting Charts

Overview

Introduction

This section contains various charts to aid in troubleshooting your Accuflex™ printer.

In this section

The following is covered.

Topic	See Page
AccuFlex Motor List	25
Z Amplifier Troubleshooting Chart	26
AccuFlex Signal LEDs	27

AccuFlex Motor List

Motor	Motor Description	No./ machine	Motor Part No.	Standard/ Option	Crate Card Controlling Motor	Comments
M3	Speed enhanced Z motor	1	P7719	Hi Speed Option	X3-Feed	X77 - Pac Sci Amp/ Controller controls motor
M3	Standard Z motor	1	1008242	Standard	X3-Feed	X14 Amp
18M1, 18M2	Center transport belt motor	2	1006961-1 1006961-2	Standard	X3-Feed	
18M1, 18M2	Center transport belt motor	2	1008606-1 1008606-2	Triple track option	X3-Feed	1008606-7 is spare
18M4, 18M5	Left buffer transport belt motor	2	1008606-3 1008606-4	Triple track option	X5-left buffer	1008606-7 is spare
18M7, 18M8	Right buffer transport belt motor	2	1008606-5 1008606-6	Triple track option	X6 right buffer	1008606-7 is spare
18M3	Center powered rail motor	1	1006236-1	Powered rail option	X3-Feed	1006236-4 is spare
18M6	Left powered rail	1	1006236-2	Triple track option	X5-left buffer	1006236-4 is spare
18M9	Right powered rail	1	1006236-3	Triple track option	X6 right buffer	1006236-4 is spare
17M1, 17M2, 17M3	XYY Stepper motors	3	1006251-1, 1006251-2, 1006251-3	Standard	X4-Align	
19M1, 19M2	Squeegee Stepper motors	2	7569M-1, 7569M-2, 7569M-3	Standard	X2-Print	
29M1	Squeegee Carriage motor	1	1006957	Standard	X2-Print	
24M1	Camera X motor	1	1008423	Standard	X4-Align	
24M2	Camera Y motor	1	1008424	Standard	X4-Align	
35M1	Paste Dispenser drive motor	1	1009267	Paste Dispense option	X2-Print	
22M1	USC Vacuum motor	1	P6870	Vacuum motor option	X2-Print	See Document 1006587 for install instructions
21M1	USC Paper index motor	1	CA-975	wiper option	X2-Print	
21M2	USC Pump motor	1	1006830	wiper option	X2-Print	
23M1	Toling Index motor	1	1006281	AutoTooling option	X2-Print	
31M1	Heatsink cooling fan	1	10024861	Standard	N/A	XT75 Rail powers fan/ fan part of 7545M assy

Z Amplifier Troubleshooting Chart

Error Displayed	Error Meaning	What to Check
At	Amplifier over-temp fault	Check amplifier
bF	Output is disabled due to under voltage or over voltage condition	Possible issue: Regen Resistor, check X77-FU1/X77-R1
CF	Configuration fault	Programming of Pac Sci unit
d	disabled (normal display - not an error condition)	
E	Enabled (normal display - not an error condition)	
FE	Following error	Excessive load on table?
FL	Feedback loss	Check Resolver cable from X77-J3 to motor
Ot	Over temp motor fault	Check motor
P	Pause input is active	Check wiring to X77-J1
Os	Over speed fault	Check resolver wiring
SC	Short circuit fault	Check wiring to amplifier - all connections!
	Blank display means no power - Pac Sci should be off with system power is off	Check X77 Contacter for 24vDC at A1 and A2

AccuFlex Test Points

Signal	Designation	Location
Ovp	J9	x60
Video	J2	x60
Ovs	J1	x60
Camera Y position CH B	J6	x60
Camera Y position CH A	J5	x60
Camera X position CH B	J4	x60
Camera X position CH A	J3	x60
paste carriage position CH A	J7	x60
paste carriage position CH B	J8	x60

AccuFlex Signal LEDs

LED Description	Signal Type	Color	ID	Location of LED
paste carriage -	Output	green	N/A	x60
paste carriage +	Output	green	N/A	x60
rear squeegee phase 4	Output	green	N/A	x60
rear squeegee phase 3	Output	green	N/A	x60
rear squeegee phase 2	Output	green	N/A	x60
rear squeegee phase 1	Output	green	N/A	x60
front squeegee phase 4	Output	green	N/A	x60
front squeegee phase 3	Output	green	N/A	x60
front squeegee phase 2	Output	green	N/A	x60
front squeegee phase 1	Output	green	N/A	x60
eject home right	Input	green	N/A	x60
eject home left	Input	green	N/A	x60
stencil locate (not used)	Input	green	N/A	x60
squeegee carriage home	Input	green	N/A	x60
rear squeegee nearly home	Input	green	N/A	x60
rear squeegee home (not used)	Input	green	N/A	x60
front squeegee nearly home	Input	green	N/A	x60
front squeegee home (not used)	Input	green	N/A	x60
paste cartridge down	Input	green	N/A	x60
paste cartridge up	Input	green	N/A	x60
paste cartridge empty	Input	green	N/A	x60
paste cartridge home	Input	green	N/A	x60
paste cartridge position CH A	Input	green	N/A	x60
paste cartridge position CH B	Input	green	N/A	x60
5VS present	Power	green	N/A	x60
12V present	Power	green	N/A	x60
tooling magnet 1 +	Output	green	N/A	x60
tooling magnet 2 +	Output	green	N/A	x60
look up +	Output	green	N/A	x60
look down +	Output	green	N/A	x60
camera x+	Output	green	N/A	x60
camera x -	Output	green	N/A	x60
camera y +(bypassed)	Output	green	N/A	x60
camera y - (bypassed)	Output	green	N/A	x60
camera x position CH A	Input	green	N/A	x60
camera x position CH B	Input	green	N/A	x60
camera y position CH A	Input	green	N/A	x60
camera y position CH B	Input	green	N/A	x60

LED Description	Signal Type	Color	ID	Location of LED
tooling sensor 1	Input	green	N/A	x60
tooling sensor 2	Input	green	N/A	x60
board stop	Input	green	N/A	x60
camera x limit left	Input	green	N/A	x60
camera x limit right (not used)	Input	green	N/A	x60
camera x home	Input	green	N/A	x60
42vp	Power	green	D1	x1,x2,x3,x4,x5,x6
24vs	Power	green	D2	x1,x2,x3,x4,x5,x6
24v	Power	green	D3	x1,x2,x3,x4,x5,x6
5vp	Power	green	D4	x1,x2,x3,x4,x5,x6
12v	Power	green	D5	x1,x2,x3,x4,x5,x6
5VS present	Power	green	D6	x1,x2,x3,x4,x5,x6
reset	Check	amber	D7	x1,x2,x3,x4,x5,x6
cpu active (blinks with processor speed)	Check	amber	D8	x1,x2,x3,x4,x5,x6
over current (on signals an error condition)	Check	red	D9	x1,x2,x3,x4,x5,x6
over temperature (on signals an error condition)	Check	red	D10	x1,x2,x3,x4,x5,x6
wiper latch	Output	green	D1	x62
wiper paper index	Output	green	D2	x62
5VS present	Power	green	D1	x68
12vs present	Power	green	D2	x68
12vs present	Power	green	D1	x64
12vp	Power	green	N/A	x14 (not on Hispeed Z)
24vp	Power	green	N/A	x14 (not on Hispeed Z)
42vp	Power	green	N/A	x14 (not on Hispeed Z)
over current (on signals an error condition)	Check	red	N/A	x14 (not on Hispeed Z)
over temperature (on signals an error condition)	Check	red	N/A	x14 (not on Hispeed Z)
x home	Input	green	D3	x67
x limit right (not usd)	Input	green	D2	x67
12V present	Power	amber	D1	x67
5v present	Power	amber	D6	x67
x position channel A	Input	green	D4	x67
x position channel B	Input	green	D5	x67
A/D signal	Input	red	D1	x73
5v present	Power	green	D2	x73
12V present	Power	green	D2	x73