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anon® LBP-EX(LJ4)
emanufacturing Instructions

About the Cartridge

The EX cartridge supports machines of three speeds: 8 and 12 ppm for the HP LaserJet 4® series and 16 ppm for the Apple® 16/600 or ZX machine.

The **OPC drum** is about 8 times more sensitive to laser energy than a typical SX or NX OPC, making a dedicated replacement drum essential for proper imaging.

The EX represented the first of a generation of machines that printed thinner characters than those of the SX or NX generation of machines. Consequently, less toner is used per page. For example, a test target that prints as 5% coverage on an SX machine will print at about 3.7% on an EX machine when OEM cartridges are used in each case. Depending on the combination of components you use in your system, the difference can be even more extreme.

While an OEM EX cartridge may be rated at 6,800 pages at 5% coverage, an EX customer base can represent a wide range of printing needs, from short form letters to graphic-intense newsletters. In terms of average page coverage per cycle, that can range from 2% to 12%, or 15,000 and 3,000 pages per cycle, respectively. (As page coverage increases, page yield decreases and vice versa.) Since drum wear is directly related to page yield, the drum may be worn out after one cycle or may last five cycles depending on customer usage. In remanufacturing this cartridge, is it reasonable to expect a percentage of one-cycle drums as well as a percentage of four- or five-cycle drums.

There are two types of **Primary Charge Rollers (PCR)** for the EX, OEM gray and black. Both rollers are similar in durability and both exhibit print problems in low humidity conditions.

Our testing has shown that the PCR is highly susceptible to wear and is essentially worn out after the OEM cycle. Further usage of the PCR results in an extremely high risk of mid-cycle failure and further damage to the PCR. To maximize performance and longevity, we recommend recoating the PCR after the OEM cycle. Both black and gray rollers are recoatable after the OEM cycle and are guaranteed for five cartridge cycles when used with prescribed imaging system and remanufacturing techniques. Additionally, the NX gray PCR can be modified in length to fit the EX cartridge, and it features the identical guarantee. An OEM PCR accepted into Static Control's recoating program can be recoated up to three times, yielding a total usage life of 15 cartridge cycles.

continued on page 2

Remanufacturing Information

Estimated Time to Remanufacture	15-30 mins.
Sug. Remanufactured Cartridge Price	$75-89
Standard "98A" Toner Weight	340/380 grams
Toner Class	Microfine
Recommended Test Printer	LaserJet 4+/LaserJet 5

Table of Contents

Need help?
Call Technical Support.

1.800.948.1072 (USA)
+44 (0) 118 935 1888 (UK)

About the Cartridge continued

The EX uses a black coated **magnetic developer roller**. The wear factor of the black coating is one of the biggest issues with this component. As the coating wears and smooths, it loses its ability to uniformly charge toner and properly deliver toner to the OPC. The result is lighter and lighter print over the life of the mag roller.

Once the coating is worn, neither stripping nor liquid treatments can restore the vital imaging properties of the mag roller. Our research has found that the only reliable method for attaining consistent mag roller performance is to completely resurface and recoat the sleeves. Static Control's EnduraMag™ recoated mag roller is available for the EX application.

Sealing the EX hopper has always been a challenge. While there are several methods available, the most reliable and effective method of obtaining a secure seal is splitting the hopper and installing a gasket-type seal. Ongoing research since the introduction of the cartridge has shown that any type of insertable seal will damage the sealing foam located in the seal channel and will cause leakage from the hopper. Insertion tools and rigid seals can also fatigue the welds along the hopper flanges and, in extreme cases, cause the toner reservoir to separate from the mag roller section.

A recent change in the OEM seal material and the addition of a post in the seal channel virtually dictates splitting the hopper to remove the seal filament and install a gasket seal. The new seal is narrower than the previous seal and requires a new style OEM pull tab.

Effectively sealing the hopper is not just dependent on a leakproof seal. Missing or damaged sealing components can cause a variety of print defects. A combination of foam and felt materials in the hopper section helps prevent the hopper from leaking after the seal is pulled. Small, half-moon-shaped **doctor blade end foam** seals the ends of the doctor blade. A long strip of **sealing foam** installed under the doctor blade stamping prevents leakage during handling. **Mag roller felts** guard against leakage from the ends of the mag roller. A **mag roller sealing blade**, similar to the recovery blade in appearance, prevents toner from falling from the development station. All of these items are available from Static Control along with installation tools. (*Refer to SSS#42-E, Problem Solving, for details.*)

A print defect unique to the EX cartridge is **right- or left-side light print**. This is usually associated with stripped screw bosses that secure the cartridge clips to the top of the cartridge. When a cartridge clip becomes loose, it causes the hopper and waste bin sections to separate. The increased air gap between the mag roller and drum cause a light print defect in the corresponding area on the paper. To prevent this type of defect, we recommend permanently reinforcing the screw bosses with our specially designed brass inserts. *(Refer to SSS#42-E, Problem Solving, for details.)*

Minimum Tools and Supplies Needed

- Phillips head screwdriver with magnetic tip
- Dry, filtered compressed air or toner vacuum
- Soft, lint-free cleaning cloth (Item# LFCCLOTH)
- Kynar® drum power (Item# KPOW)
- Conductive Cartridge Lubricant™ (Item# CONCLUBE)
- Cleaning Swabs (Item# QTIP)
- 91% - 99% isopropyl alcohol
- Adhesive tape

IMPORTANT Read important information concerning the use of compressed air and isopropyl alcohol before beginning the instructions. (Refer to SSS#100, Cleaning Tools or to the information on the next page.)

Another problem associated with the EX is a **false or premature toner low warning**. This can be caused by problems with cartridge, toner, machine, or a combination of all three. To help prevent false warnings, we first recommend re-evaluating the toner you are currently using. Many aftermarket toners we have tested exhibit a high incidence of false toner low warnings. Customers who use Static Control's EX toner formulations experience almost no false toner low warnings attributable to the toner. As a preventative measure, also clean all electrical contacts thoroughly and clean the hopper section exclusively with compressed air. *(For details, refer to SSS#42-E, Problem Solving).*

Cleaning can play an important part in the success of your cartridges. Because of the fragility of many EX cartridge components, we recommend compressed air for cleaning. This is the only method available that does not cause structural or chemical damage to the components. Harsh cleaners or liquid treatments can adversely affect individual components as well as the entire imaging system. The less you affect component properties the better.

Hewlett-Packard™ recently added to their EX cartridge line with the introduction of a high-capacity 98X cartridge featuring 8,800 page yield, 2,000 page more than the standard 98A. In the latter part of 1995, HP introduced a low-capacity 98E cartridge for home office use and a MultiPak (98S: contains 5 standard 98A cartridges) for high volume users. For more information, refer to SSS#42-F, *Changes to the Cartridge.*

Special Considerations

EX PCRs

Static Control accepts three types of OEM PCRs for recoating as EX Remanufactured PCRs:
1) EX OEM Gray 2) EX OEM Black 3) NX OEM Gray

The NX OEM Gray PCR is modified in length to function in the EX cartridge. The ability to use the NX gray roller helps create additional EX roller inventories to simplify your cartridge remanufacturing process. This modified-length PCR has been fully qualified in our Cartridge Systems Laboratory, and features that identical 5/15-cycle warranty as native EX remanufactured rollers. We now have two programs available for our remanufactured PCRs. With our 15-Cycle Program, PCRs can be recoated three times. Each recoating is good for up to five cartridge cycles, for a total of 15 cartridge cycles.We also have a 1-Cycle multi-recoating program which involves recoating the PCR for one cartridge cycle, then recoating it again for another single cartridge cycle. As long as the PCR remains undamaged, this process can be repeated indefinitely. *Contact your Static Control Sales Representative for program details.*

EnduraMag™ Mag Roller Recoating Program

The EnduraMag recoated mag roller uses a revolutionary thin film metal coating that restores graphic print quality to mag rollers that have degraded from normal wear. The EnduraMag features full-page solid blacks cycle after cycle and cartridge to cartridge consistency. Mag rollers recoated through the program are rated for **40,000 pages when used in combination with Static Control's EX drums and EX MicroGraphics™ 1 toner**. Each time the mag roller is reprocessed it is again rated for 40,000 pages. Cleanup between cycles requires only dry, filtered compressed air. *Contact your Static Control Sales Representative for program details and important packaging information.*

Use of Compressed Air

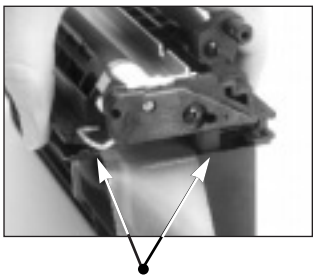
The Occupational Safety & Health Administration (OSHA) Standard, 29 CFR 1910.242 paragraphs a & b for general industry requires effective chip guarding and personal protective equipment (PPE) when using compressed air. When cleaning residual toner particles from cartridges using a compressed air system, you must use air nozzles meeting OSHA requirements. Air nozzles that **regulate air pressure to a maximum of 30 psi** comply with this standard. *(Refer to System Support Series #7, Compressed Air Cleaning Systems or System Support Series #100, Cleaning Tools, for more information.)*

Use of Isopropyl Alcohol

For best results, we recommend using ONLY 91-99% for cleaning as directed in these instructions. 91% isopropyl alcohol is available at most major drug stores; 99% isopropyl alcohol is available through distributors of chemical products. Follow the alcohol manufacturer's safety instructions.

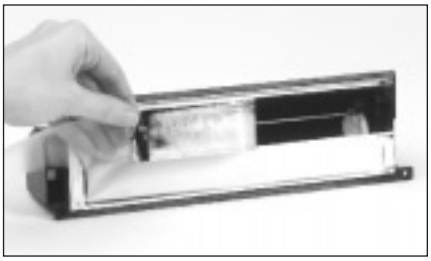
New-style EX Hopper Section

The new-style hopper incorporates a wide post molded into the mag roller section of the hopper that extends into the hollow at the end of the toner reservoir, as shown below. A second, smaller post is molded into the toner reservoir section of the hopper that butts against the outside edge of the mag roller section. Together, the posts guide the pull strip straight out of the seal channel when the strip is pulled by the end user. The position of the large post near the center of the sealing channel narrows the opening to 1.375" and prevents the insertion of existing EX insertable seals or seals that feature pull strips wider than the 1.375" opening.



Two posts guide the seal out of the seal channel. Posts also prevent use of current insertable seals.

The new seal material is a ribbon-type seal that is commonly found in other Canon cartridges such as the LX, BX, and NX. Like the original style seal material, this new material is sealed to the perimeter of the hopper. Whereas the old seal material was pulled out completely by the end user, approximately half of the new seal material is left in the hopper once the pull strip is removed. (See photo) Using insertion seals can dislodge the seal material so that it blocks the toner port, bunches together under the new seal, wraps around the toner agitator bar, or interferes with the operation of the mag roller. The pull tab also changed at the time the new seal material was introduced.



Once the pull strip is removed, about half of the new filament seal material remains in the seal channel.

The most effective method of sealing requires splitting the hopper, removing the filament material and installing a new

Separating the Cartridge

1. **Remove the Phillips screws from the two cartridge clips on the top of the cartridge (FIG 1).**

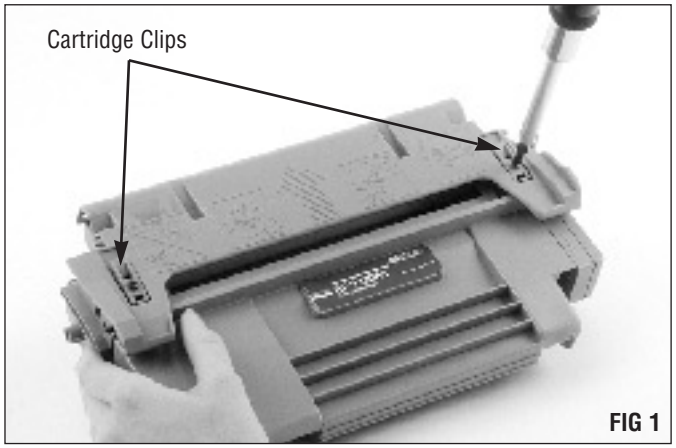


FIG 1

Use a small flat-blade screwdriver to pry out each clip (FIG 2).

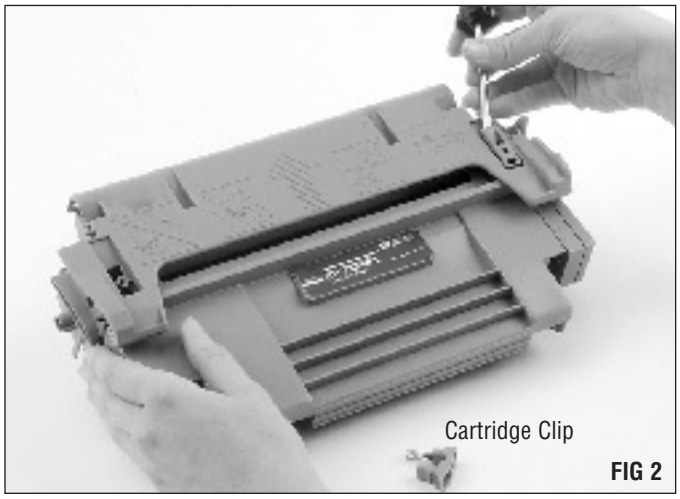


FIG 2

2. **Separate the waste bin and toner hopper sections (FIG 3).**

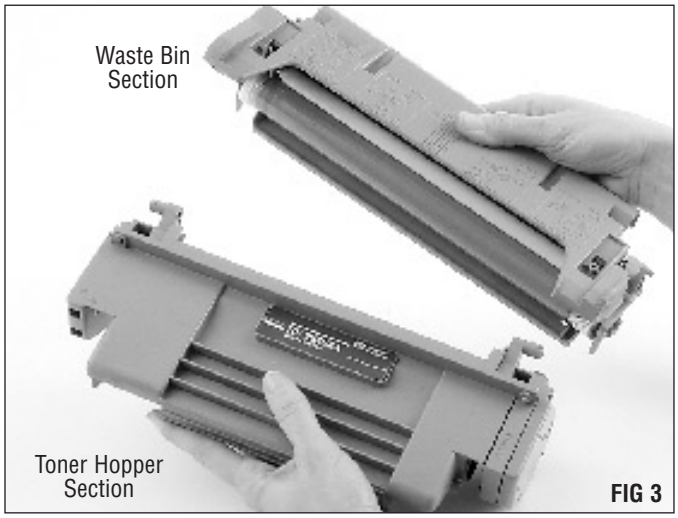


FIG 3

Disassembling the Waste Bin Section

1. **Remove the drum contact axle.**
   Remove the two Phillips screws, then remove the axle (FIG 4 & 5). Note that these screws are shorter than the other assembly screws used with this cartridge and should not be interchanged. A longer screw could puncture the base of the screw boss.

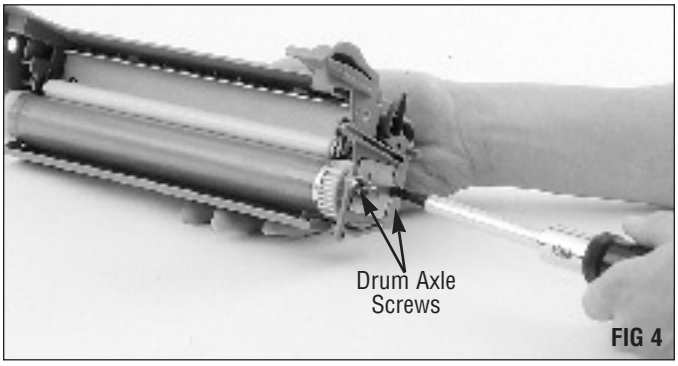


FIG 4

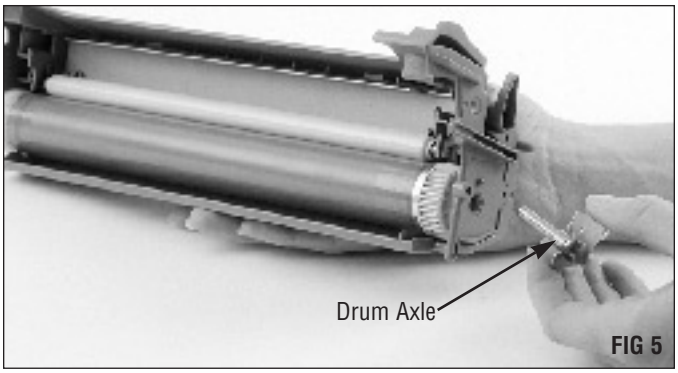


FIG 5

2. **Remove the drum.**
   Grasp the helical gear and lift the drum from the waste bin section (FIG 6). Holding the drum shutter in an "open" position will allow you more room to maneuver the drum. Avoid scratching or touching the coated area of the drum. Place the drum in a light-protected area until you are ready to reassemble the waste bin section.

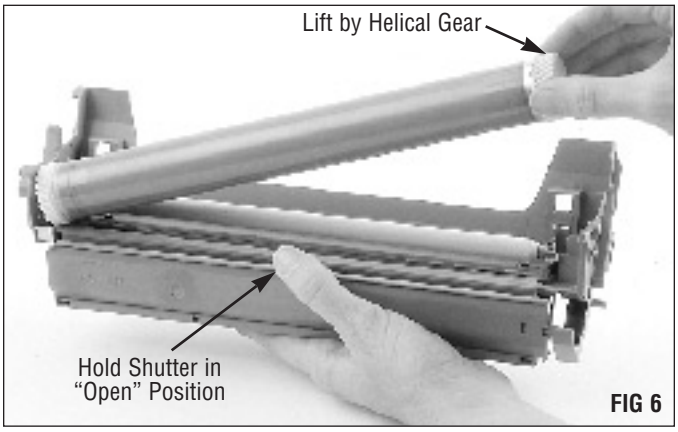


FIG 6

3. **Remove the PCR.**
   Handle the PCR by the axle or use clean latex gloves. Store the PCR on a flat, uniform surface. The PCR shown in **(FIG 7)** is an OEM gray PCR.

   We recommend replacing the OEM PCR after the first cycle with Static Control's remanufactured EX PCR. Turn to page 3 of this manual for more details regarding the types of PCRs that can be recoated for the EX application. (SCC Item# LJ4RMPCR or LJ4RMPCR-ML: 5/15 cycle program; 1CLJ4RMPCR: One-cycle program)

CAUTION DO NOT stack PCRs, lay anything on top of them, or wrap them with rubber bands.

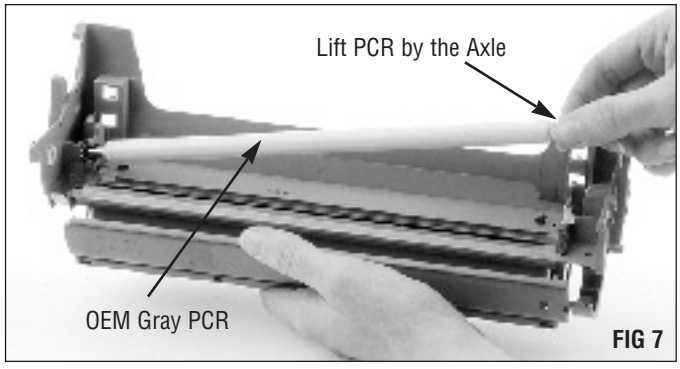


FIG 7

Disassembling the Waste Bin Section

4. **Remove the wiper blade.**
Remove the two screws that secure the blade (FIG 8).

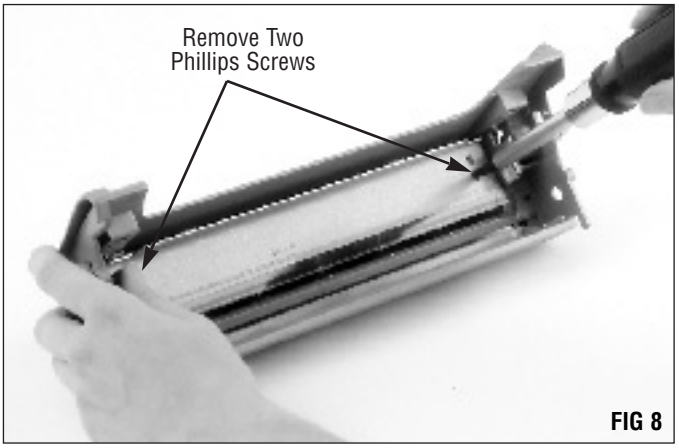


FIG 8

Then lift the blade from the waste bin (FIG 9).

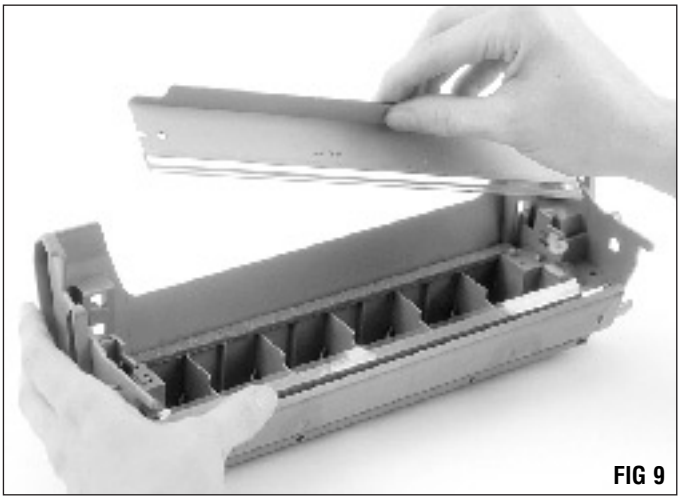


FIG 9

5. **Clean the waste bin section.**
First, dump the bulk of the toner from the waste bin. Then clean the waste bin using dry, filtered compressed air or a toner vacuum with the proper cleaning attachments. Be sure to clean the area around the recovery blade; be careful not to bend or kink the blade (FIG 10).

Direct compressed air on the surface of foam sealing components to remove as much toner and debris as possible.

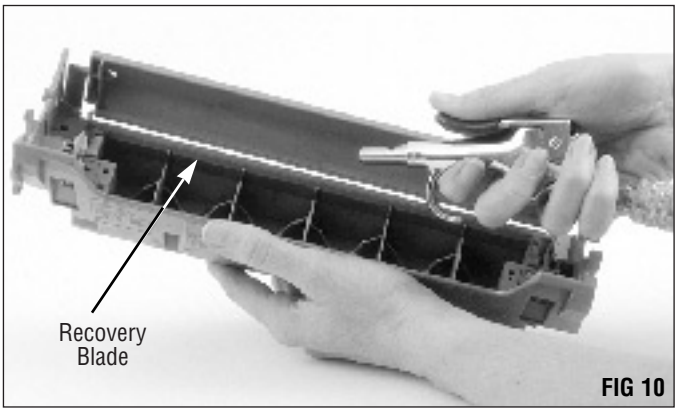


FIG 10

Reinforcing Waste Bin Screw Holes - OVERVIEW

About the Kit:

The screw bosses that seat the cartridge clips are easily stripped with repeated remanufacturing of the cartridge. If the screws and clips are not seated stably in the screw bosses, the hopper sections can become separated during operation and cause light print defects. *Refer to SSS#42-E, Problem Solving for details regarding related print defects.*

FIG 12 through FIG 14 on the next page provide an overview of the repair process.

LJ4 Screw Hole Repair Kit

Includes: Brass Inserts, Replacement Screws, Screw Hole Adhesive, Insertion Tool, No. 20 Drill Bit, Screw Boss Support Tool.

Instruction Manual

System Support Series #31
Read instruction manual thoroughly before using the kit.

Additional Items Needed

- Dry, Filtered, Compressed Air (or a Toner Vacuum)
- Paper Clip
- Power Drill

Contact your Static Control Sales Representative for ordering information.

IMPORTANT This section is an **OVERVIEW** of the LJ4 Screw Hole Repair Kit provided to illustrate the features of the kit. **Do not attempt to install the brass inserts or use any part of the kit without thoroughly reading the instructions provided with the kit.**

FIG 11

Reinforcing Waste Bin Screw Holes - OVERVIEW

1. **Drill the screw boss.**
   Position screw boss support tool as shown in (FIG 12). Starting at the top side of the waste bin, drill at low RPM completely through the screw boss. The drill bit is included in the kit (FIG 12).

   The support tool prevents breakout of the screw bosses during the drilling operation.

   Always use ANSI-approved eye protection when operating the drill. Follow the drill manufacturer's instructions and safety precautions.

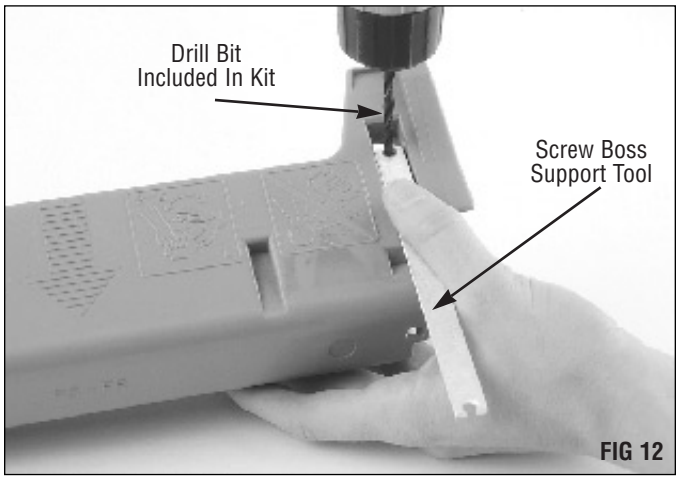


FIG 12

2. **Install the brass insert.**
   Apply one small drop of adhesive on the inside surface of the drilled screw boss. Follow the instructions and safety precautions on the tube of adhesive.

   Place the insert on the insertion tool and screw the insert into the screw boss (FIG 13).

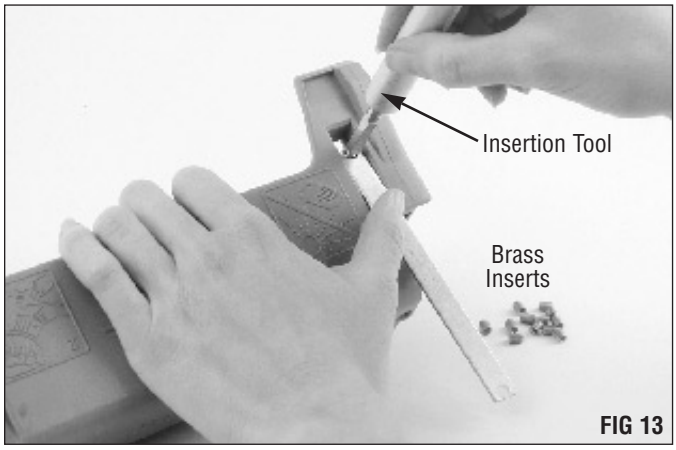


FIG 13

3. **(FIG 14) shows a fully installed brass insert.**
   Use the replacement screws for reassembly.

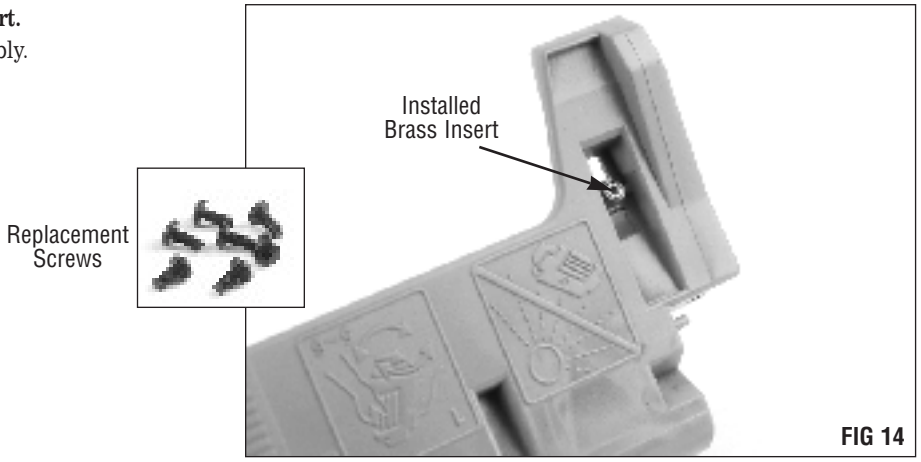


FIG 14

Assembling the Waste Bin Section

2. **Install drum shutter felt if one is not already present. Or, replace a worn shutter felt.**
   The felt helps prevent damage to the drum from the opening and closing of the shutter (FIG 15).

   For complete details regarding installation, refer to the instructions included with the drum shutter felts. (SCC Item# SXUNVDSFELT)

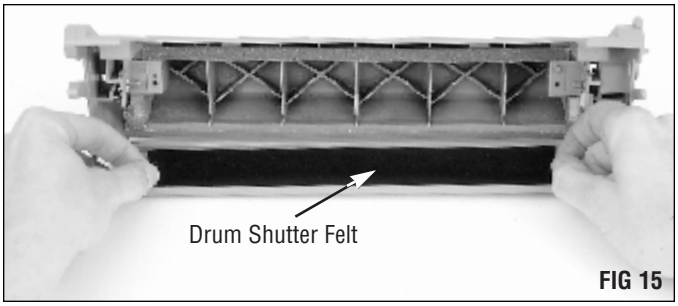


FIG 15

3. **Clean the PCR saddles.**
   Using a cotton swab dampened with 91-99% isopropyl alcohol, clean the PCR saddles and the metal contacts in the waste bin section (FIG 16).

CAUTION DO NOT apply conductive grease to the PCR saddles or the metal contact.

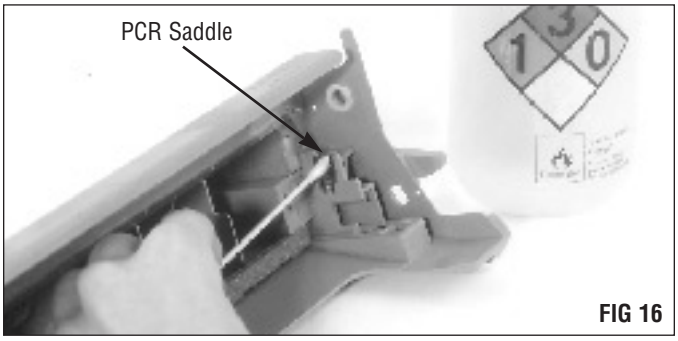


FIG 16

4. **Inspect the recovery blade.**
   The blade should display a smooth, even surface as shown in (FIG 17). Replace the blade if waves or creases are visible. (SCC Item# LJ4RECBLADE)

   A Recovery Blade Installation Kit is available to ease installation. The kit comes with a slotted installation tool and detailed installation instructions. (SCC Item# RBIKIT)

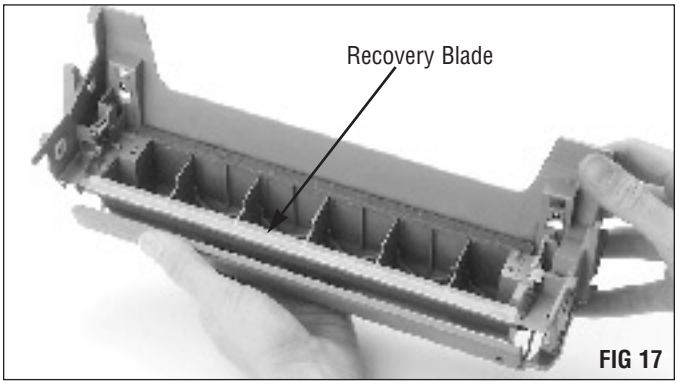


FIG 17

5. **Clean and inspect the wiper blade.**
   To avoid damaging the blade, we recommend cleaning the wiper blade only with compressed air (FIG 18). For best results, replace the blade each time you replace the drum. (SCC Item# LJ4BLADE)

CAUTION DO NOT use alcohol or any alcohol-based cleaning agent to clean the polyurethane blade.

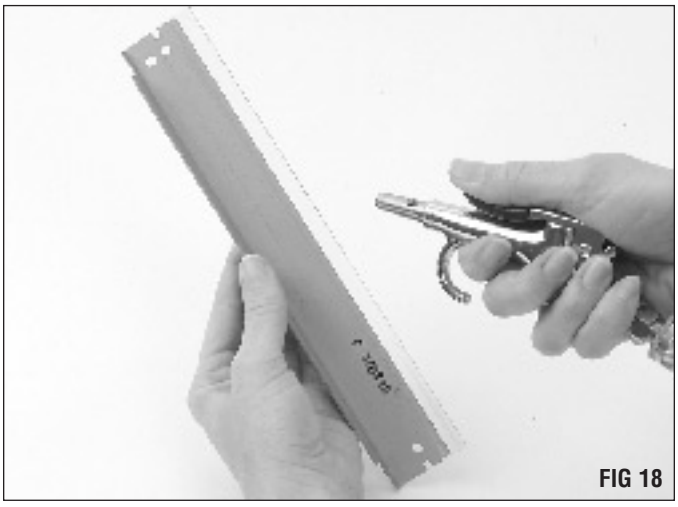


FIG 18

Assembling the Waste Bin Section

6. **Dip the leading edge of the wiper blade in Kynar® powder (FIG 19).**
   Examine the length of the blade to ensure even coverage. Repeat the dipping process once more.

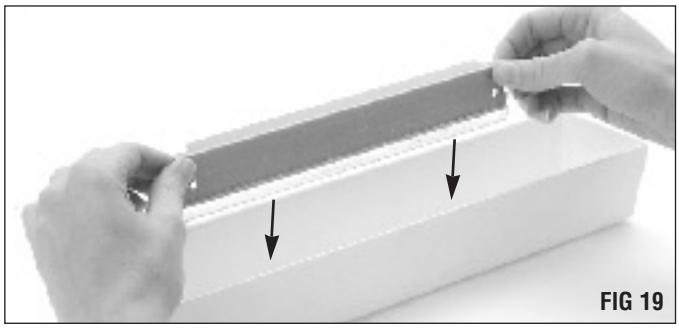


FIG 19

7. **Install the wiper blade.**
   Position the stamping over the locating posts; and secure the blade with two Phillips screws (FIG 20).

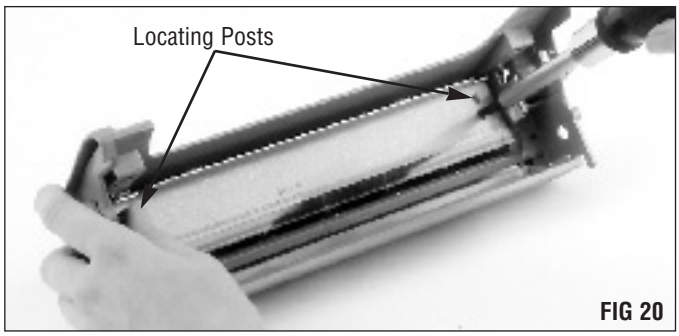


FIG 20

8. **Clean the PCR and install.**
   If you are reusing an OEM PCR or Static Control's 15-cycle Remanufactured PCR, clean the rollers as directed:

   SCC 15-cycle PCR: Use a soft, lint-free cloth dampened with 91-99% isopropyl alcohol.

   OEM PCR: Use a soft, lint-free cloth dampened with water.

   SCC 1-cycle PCR: Does not require cleaning.

   Gently wipe the PCR in one direction. Be careful not to pinch or dent the surface of the PCR, as the material has poor memory. **(FIG 21-22)**


FIG 21


FIG 22

CAUTION DO NOT lubricate the PCR shaft or conductive saddle.

9. **Install the SCC remanufactured PCR (FIG 23).**

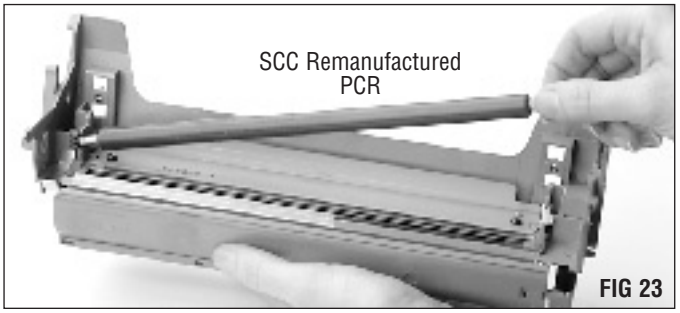


FIG 23

Assembling the Waste Bin Section

10. **Clean and inspect the drum.**
Clean the drum with compressed air. Inspect the drum for deep concentric wear lines or cracks in the coating (FIG 24). Replace the OEM drum with a SCC EX drum. (SCC Item# NGTLJ4DRGR - NGT™; UP4LJ4DRGR - UltraPrint™, or OSLJ4DRGR - Odyssey™)

CAUTION DO NOT use cleaning agents or coatings on the drum. Be careful not to nick the surface of the drum with the air nozzle.


FIG 24

11. **Pad the coated area of the drum with Kynar®.**
Be careful to avoid Kynar on the gears (FIG 25).

FIG 25

12. **Install the drum and axles.**
Install the drum and drum axle and secure the axle with two Phillips screws (FIG 26). Remember that these screws are shorter than the other assembly screws. Using one of the longer screws could puncture the base of the screw boss. Rotate the drum in its normal rotational direction (into the wiper blade) until virtually all of the powder is deposited in the waste bin (FIG 27).

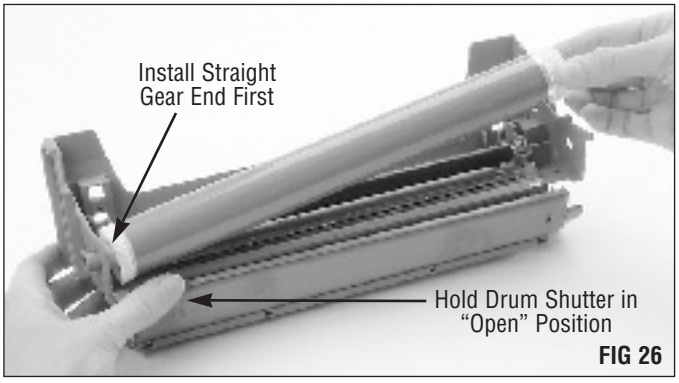


FIG 26

13. **Gently wipe any Kynar powder off the PCR with a soft, dry, lint-free cloth.**
Turn the drum in small increments in its normal rotational direction in order to clean the entire PCR surface.

CAUTION Make sure ALL Kynar has been removed from the PCR.

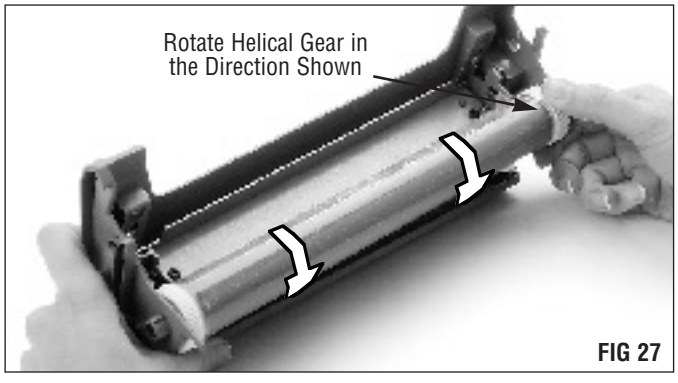


FIG 27

14. **Place the assembled waste bin section in a light-protected area until final reassembly.**

Disassembling the Toner Hopper Section

Before you begin this section, turn to page 3 to familiarize yourself with the new-style hopper section used in current production EX cartridges. The new style hopper uses a ribbon-type seal and features the addition of two posts in the seal channel opening. These modifications virtually dictate that the hopper be split in order to obtain an effective seal.

Whether you are sealing new or old style hoppers, splitting the hopper and using the RapidSeal™ sealing system ensures the most reliable and effective seal. **Both the cartridge splitting and RapidSeal sealing systems are compatible with old- and new-style hopper sections.** An overview of Static Control's manual splitter and RapidSeal sealing system will follow this section.

The split hopper system can be used with the hopper assembled or disassembled. This section shows how to fully disassemble the hopper section. However, if you want to save time in your remanufacturing processes by keeping the hopper assembled, proceed to page 13, *Splitting the Hopper.*

1. **Remove the gear housing end cap and gears.**
   The housing is secured to the hopper by two Phillips Screws. Also remove the four gears inside the housing (FIG 28 & 29).

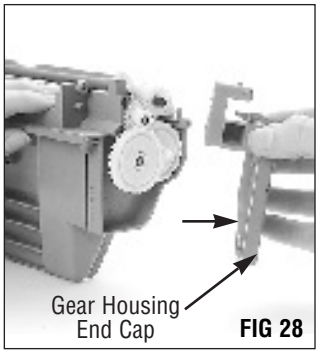


FIG 28

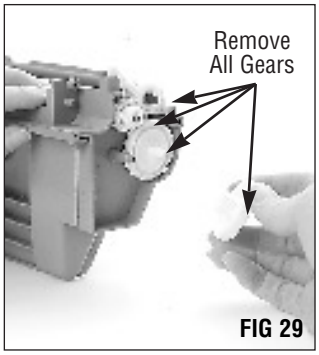


FIG 29

2. **At the other end of the hopper, remove the mag roller end cap.**
   Remove the two Phillips screws that secure the end cap (FIG 30).

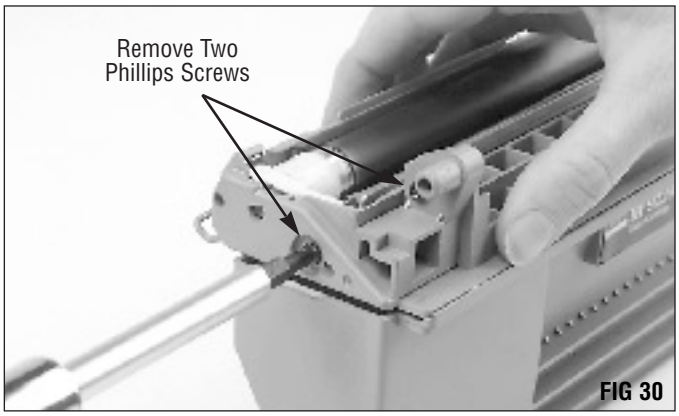


FIG 30

Before you remove the end cap, note that the white mag roller stabilizer is seated between two posts and is slightly difficult to remove. Carefully pull the end cap straight off the end of the hopper; be careful not to break the stabilizer or the posts (FIG 31). The bearing will remain on the end cap.

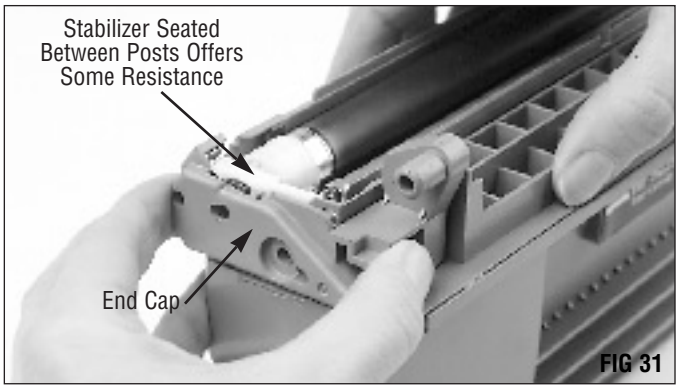


FIG 31

Disassembling the Toner Hopper Section

3. **Remove the mag roller, bushings, and stabilizer.**
Note the stabilizer on the non-contact end of the mag roller. Be careful not to scratch the surface of the roller (FIG 32).

Before storing the mag roller, clean any excess toner from the roller with dry, filtered compressed air.

If light print problems are the result of a degraded mag roller, recoat the roller through Static Control's EnduraMag™ mag roller recoating program. Contact your Sales Representative for program details and important packaging information.

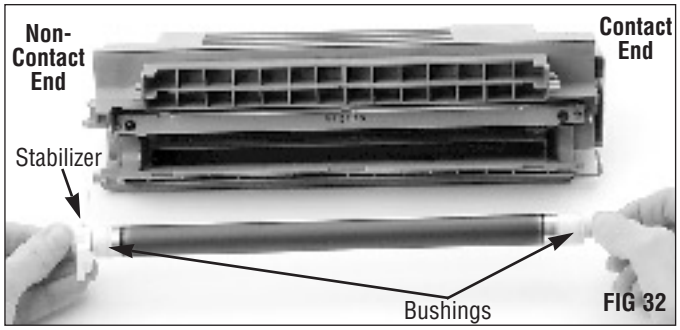


FIG 32

4. **Remove the doctor blade.**
Remove the two Phillips screws that hold the doctor blade (FIG 33).

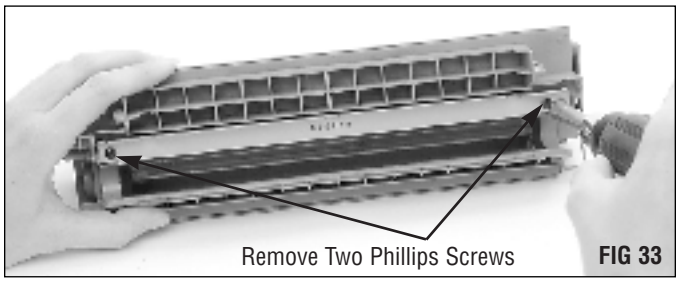


FIG 33

Use a flat-blade screwdriver to first lift up the slotted end of the stamping. Be careful not to break the locating post at the other end of the stamping (FIG 34).

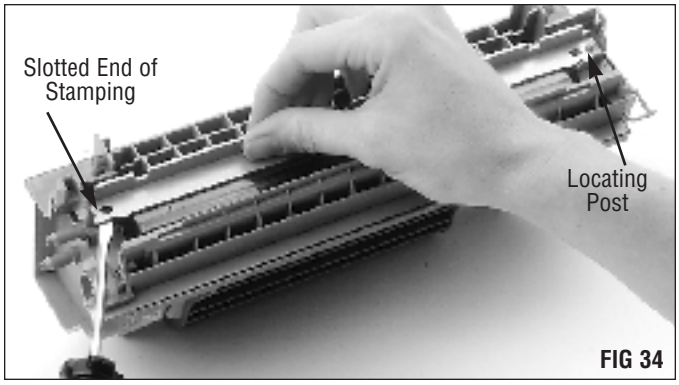


FIG 34

5. **Clean the hopper.**
First, dump the bulk of the toner from the hopper. Then clean the hopper using dry, filtered compressed air (FIG 35). We do not recommend cleaning the hopper with a toner vacuum because there is a risk of bending the toner low bar with the attachments. *(For details, refer to SSS#42-E, Problem Solving.)*

If you plan to split the hopper and install a RapidSeal™ sealing system, continue to the next section.

If you plan to fill the toner reservoir without splitting or sealing the hopper, proceed to page 24 to assemble the hopper.

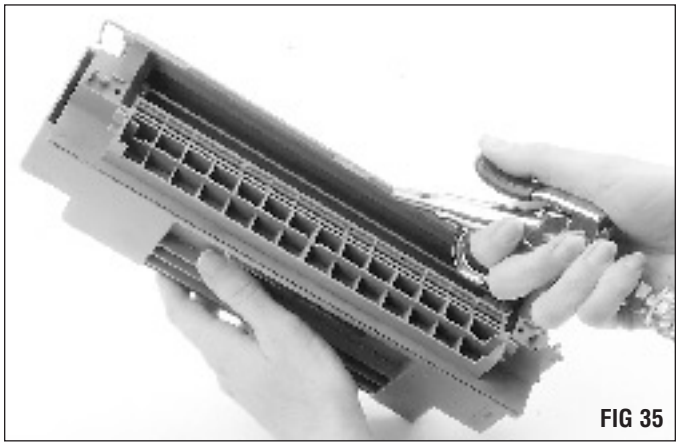


FIG 35

Splitting the Hopper - OVERVIEW

IMPORTANT This section is an **OVERVIEW** of the EX Manual Cartridge Splitting System provided to illustrate the features of the machine. **Do not attempt to use the Cartridge Splitting System without thoroughly reading the instruction manual.** For complete instructions, refer to the LJ4 Cartridge Splitting System User's Manual. (SCC Item# EXMCSS or refer to SSS#97 for complete installation instructions.) Contact your Static Control Sales Representative for ordering information.

Features:

• Precision one-step splitting process
• Preserves alignment pins, facilitating alignment of hopper sections during reassembly
• Used with the RapidSeal™ sealing system, the entire split hopper system provides 100% leak-free performance
• Compatible with both old- and new-style hoppers

EX Manual Splitter*

Item Code EXMCSS
Includes the following items:
• EX Manual Splitter
• Alignment Pin Tool #1 (CS4-37)
• Alignment Pin Tool #2 (CS4-38)
• Instruction Manual
*U.S. Patent applied for.

Instruction Manual

System Support Series #97
Read instruction manual thoroughly before using the cartridge splitter.

Recommended Starter Kit

• LJ4 Manual Cartridge Splitting System Starter Kit (EXMSSKIT)
Contents:
• Mag Roller Section Jig
• Foam Removal Tool Assembly
• Rail Assemble Hopper Jig
• T-Handle Rail Removal Tool
• Mag Roller Spacer Tool #2
• LJ4/EX RapidSeal Split Hopper Seal/Tab Narrow (50)
• LJ4/EX Reusable Black Stainless Locking Rail (100)
• LJ4/EX Sealing Channel Rail Foam (100)
• SSS#82 Instructions

Recommended Item

• LJ4/EX Felt O-Ring Washer Installation Kit (LJ4FWASHERKIT)

Additional Items Needed

• Dry, Filtered, Compressed Air (or a Toner Vacuum)
• Soft, Lint-Free Cloth (LFCCLOTH)

1. **Prepare the hopper for splitting.**
   The manual splitter separates the hopper sections by breaking the ultrasonic welds along the length of the hopper. The splitting operation is facilitated by initially breaking the welds around the corner alignment pins, as shown in (FIG 36). Alignment pin tools are provided with the manual splitter.

   In (FIG 36), the operator is using Alignment Pin Tool #1 to break the weld around an alignment pin.

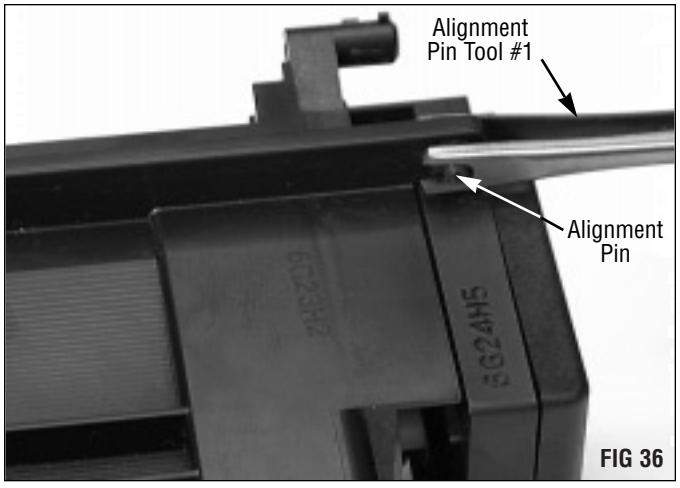


FIG 36

Splitting the Hopper - OVERVIEW

2. **Load the hopper in the splitter (FIG 37).**
The hopper assembly can be loaded in the splitter with or without the mag roller installed. A rigid aluminum alloy framework holds the hopper in a fixed position during the splitting operation.

FIG 37

3. **Split the hopper**
Once the hopper is secured in the splitter, a lever handle drives and retracts a splitting wedge along two shafts mounted to the frame in an easy one-handed operation (FIGs 38 and 39). High-precision, matched ball bearings mounted in the traverse blocks allow smooth travel through the splitting process and maintain tight tolerance of the splitting wedge through thousands of splitting operations.

The splitting wedge, which enters the contact end of the hopper, is designed to avoid the alignment pins, as well as the guide post found in new style EX hoppers. With the alignment pins preserved, hopper sections can be precisely aligned during reassembly. Rejoin the split hopper sections with the EX RapidSeal System.

FIG 38

IMPORTANT The mag roller and toner hopper sections split using the EX Manual Splitting System must be rejoined with their original counterparts. (MAG ROLLER SECTIONS AND TONER HOPPER SECTIONS ARE NOT INTERCHANGEABLE.)

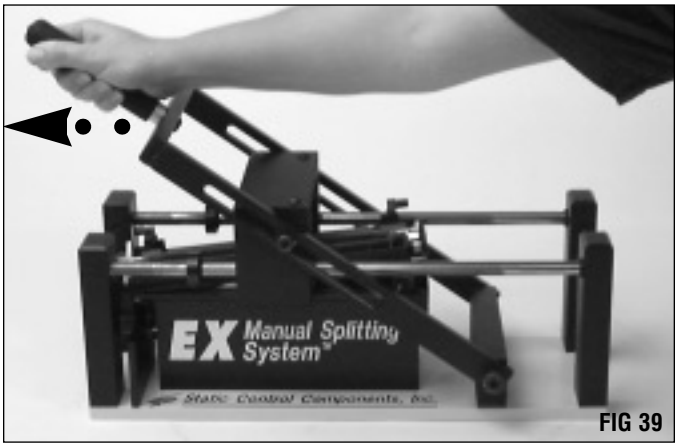


FIG 39

Splitting the Hopper - OVERVIEW

4. **Release the round alignment pin.**
   Again, an alignment pin tool is used to release the round alignment pin and facilitate separating the cartridge (FIG 40).

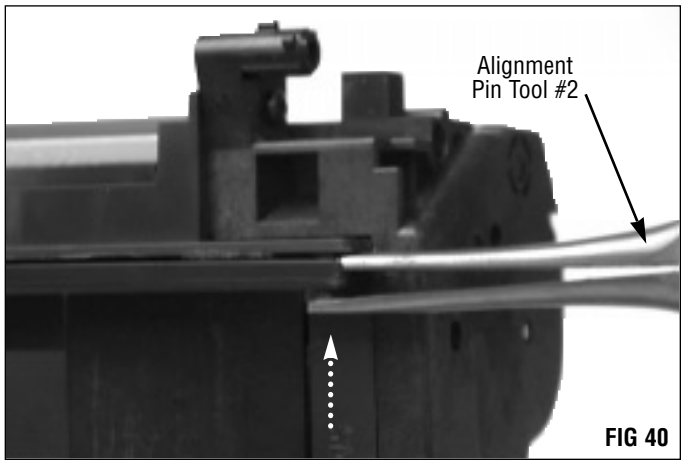


FIG 40

5. **Disengage the agitator drive gear.**
   The cartridge splitter can be used with the hopper fully assembled or fully disassembled. If you split an assembled hopper section, pay close attention to disengaging the agitator drive (FIGs 41, 42, and 43).

FIG 41

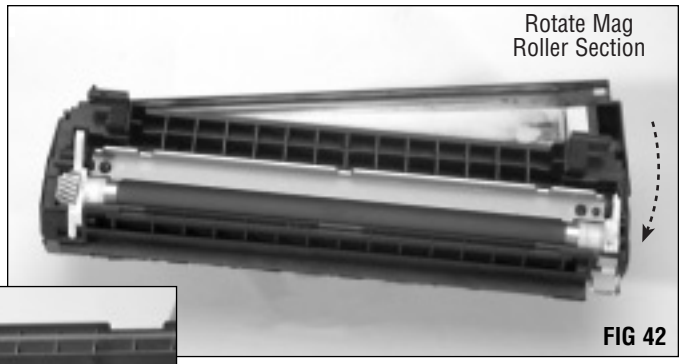


FIG 42

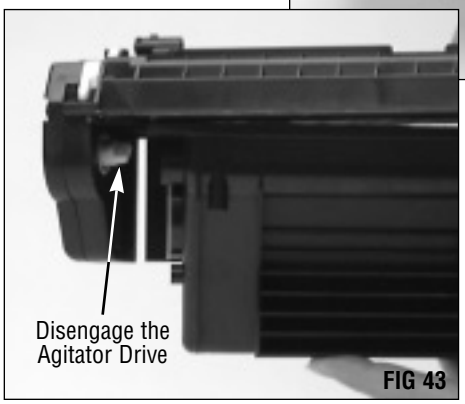


FIG 43

Splitting the Hopper - OVERVIEW

6. **Disengage the Square Alignment Pin.**
   Turn the hopper around and disengage the alignment pin.

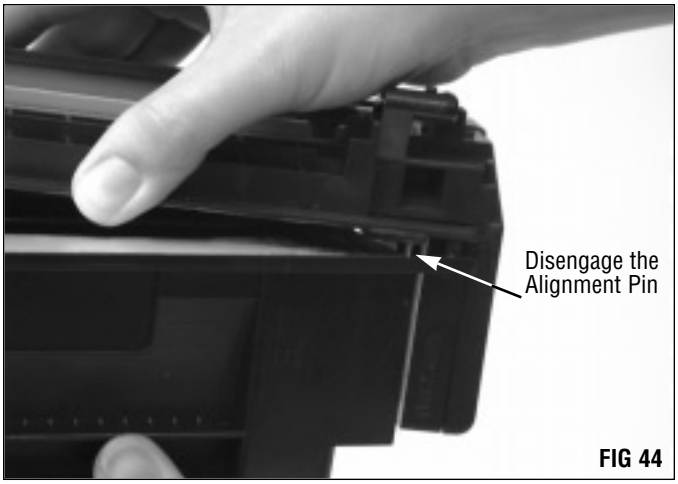


FIG 44

Installing a RapidSeal™ Sealing System-OVERVIEW

IMPORTANT This section is an **OVERVIEW** of the EX RapidSeal sealing system and is provided to illustrate the features of the sealing and locking rail systems. **Do not attempt to use the RapidSeal sealing system without thoroughly reading the instruction manual.** For complete instructions, refer to the LJ4 Cartridge Splitting System User's Manual. (SCC Item# CS4-700 or refer to SSS#82 for complete installation instructions.)

Features

- **SPEED** - Reseals an EX hopper in less than 60 seconds with stainless or plastic locking rails.
- **APPEARANCE** - Black, full-length rails completely covering the hopper flanges giving the appearance of an OEM cartridge.
- **PERFORMANCE** - Correct alignment of the agitator drive assembly is maintained, preventing the agitator noise defect.
- **FLEXIBILITY** - A single split hopper system that supports every type of EX hopper with a choice in locking rail systems: reusable stainless or single-use plastic.

RapidSeal Installation Kit (CS4-700)

The kit includes the following items:

- LJ4/EX Mag Roller Section Jig (CS4-741)
- Foam Removal Tool Assembly (CSS-40)
- LJ4/EX Hopper Rail Assembly Jig (CS4-744)
- T-Handle Rail Removal Tool (CSS-39)
- LJ4/EX Mag Roller Spacer Tool #2 (CS4-150)

Instruction Manual

System Support Series #82

Read instructions thoroughly before installing the RapidSeal™ or locking rails.

Other Items You Need (sold separately)

- LJ4/EX Plastic Locking Rails (CS4-575)
- LJ4/EX Blackened Stainless Steel Locking Rails (CS4-550)
- LJ4/EX Sealing Channel End Foams (LJ4SHFOAM-1)
- LJ4/EX Sealing Channel Rail Foams (LJ4SCRFOAM)
- LJ4/EX Felt O-Ring Washer (LJ4FWASHER)
- LJ4/EX New Style OEM-Type Seal Pull Tab (LJ4OEMTABNS)
- LJ4/EX Split Hopper PSA RapidSeal - Wide (LJ4SHPSARS-W)
- LJ4/EX Split Hopper PSA RapidSeal - Wide with Pull Tab (LJ4SHPSARSWPK)
- LJ4/EX Foam Type Split Hopper RapidSeal - Wide (EXFTRS-W)
- LJ4/EX Split Hopper PSA RapidSeal - Narrow (LJ4SHPSARS-N)
- LJ4/EX Split Hopper PSA RapidSeal - Narrow with Pull Tab (LJ4SHPSARSNPK)
- LJ4/EX Foam Type Split Hopper RapidSeal - Narrow (EXFTRS-N)
- Lint-Free Cleaning Cloth (LFCCLOTH)

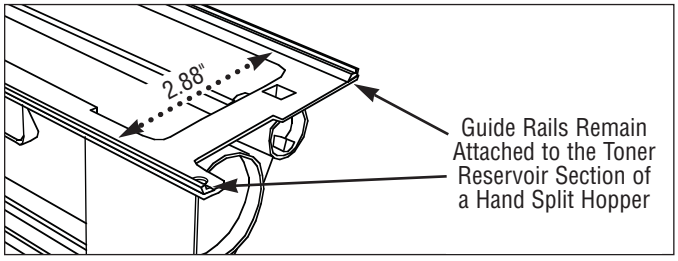
(IMPORTANT For best results we recommend using ONLY 91% - 99% isopropyl alcohol for cleaning as directed in these instructions. See page 3 for more details.)

RapidSeal Options

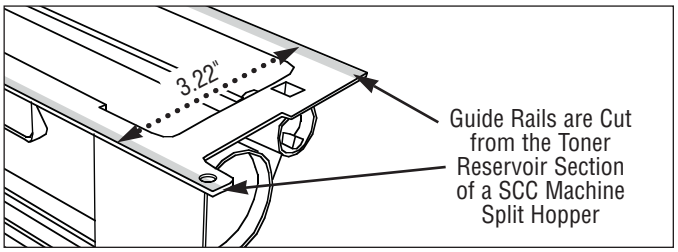
Two types of locking rails are designed for use with the RapidSeal system: Plastic Locking Rails and Blackened, Stainless Steel Locking Rails. Plastic locking rails are single-use rails, designed primarily for one-way cartridge remanufacturing. Blackened, stainless steel locking rails are designed for multiple-cycle use. Steel locking rails are easily removed and reinstalled and even if you recover only a small percentage of cartridges with steel locking rails, the fact that the rails can be reused makes steel rails more economical over time.

LJ4/EX splitting techniques vary from manually breaking the ultrasonic welds with a screwdriver, to hand-held cutting devices which fracture the hopper sections apart, to Static Control's rotary blade splitting machine which removes a small section of plastic from the hopper body. The different splitting techniques necessitate different gasket seal widths. The RapidSeal system offers two seal gasket widths: (1) a narrower seal gasket, 2.88" (Item Code:LJ4SHPSARS-N) for cartridges split with a screw driver or fracture device, (2) a wider seal gasket, 3.22" (Item Code: LJ4SHPSARS-W) for cartridges cut with rotary blades as on the SCC Cartridge Splitting Machine. **Before using the RapidSeal Split Hopper Sealing System, it is important to classify your cartridges into either the hand split or SCC machine split category to determine which seal gasket width you need.**

Hand Split Hopper Uses NARROW Gasket



Machine Split Hopper Uses WIDE Gasket



Installing a RapidSeal Sealing System - OVERVIEW

1. **Clean and inspect the mag roller section.**
   An advantage of splitting the hopper is gaining access to the seal channel foam for cleaning and replacement. The foams are used to seal the ends of the hopper and prevent leakage from the hopper after the seal is pulled (FIG 45). Ripped foam or foam compacted with toner can allow toner to leak from the hopper.

   If the hopper has been previously sealed with insertable adhesive or heat seals, the seal channel foams may be ripped or torn and require replacement.

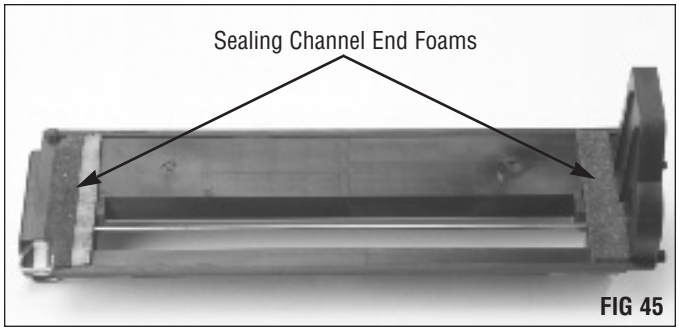


FIG 45

2. **Install rail foams.**
   The RapidSeal system uses a combination of locking rails and rail foam to rejoin and reseal the two hopper sections.

   The rail foam is installed along the length of the mag roller section as shown in FIGs 46 and 47. This foam component is a one-time installation, requiring replacement only if the foam is ripped, detached, or missing.

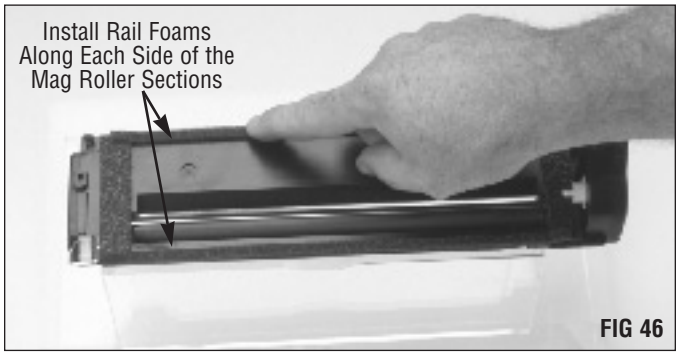


FIG 46

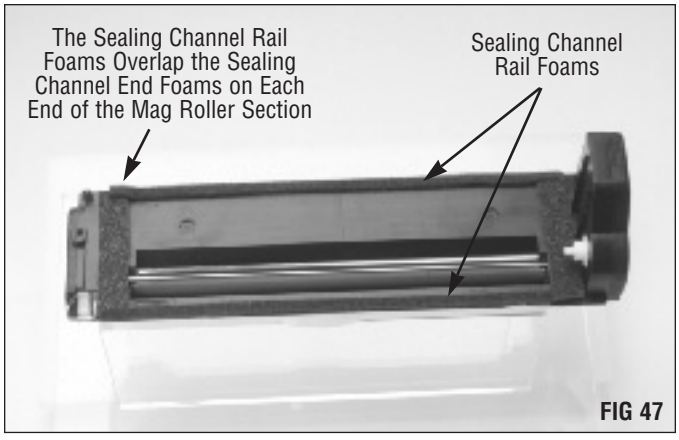


FIG 47

Installing a RapidSeal Sealing System - OVERVIEW

3. **Prepare the toner hopper section.**
New-style EX cartridges feature a filament type seal that leaves seal material adhered to the hopper once the seal is pulled. In order to provide a proper sealing surface in this style of hopper, all of the remaining filament must be removed and the sealing surface cleaned (FIGs 48, 49 and 50).

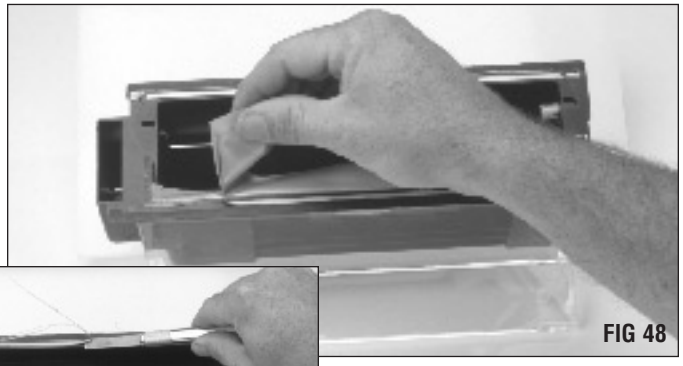


FIG 48

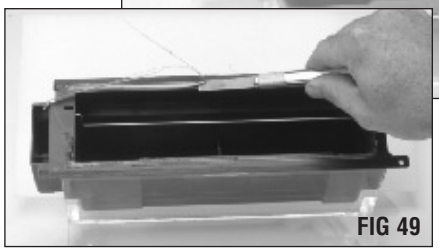


FIG 49

FIG 50

4. **Replace the Agitator Felt O-ring Washer.**
When the washer becomes compacted with toner it can allow toner to migrate out of the hopper through the agitator gear opening.

We recommend replacing the felt o-ring washer each cycle to help prevent leakage.

For complete installation instructions, refer to the LJ4 Felt O-ring Washer Installation Kit (LJ4FWASHER) or (SSS#28, written and illustrated instructions)

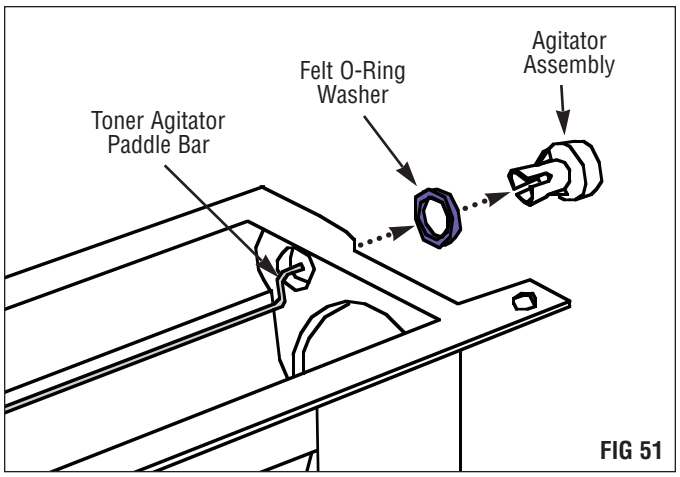


FIG 51

Installing a RapidSeal Sealing System - OVERVIEW

5. **Install an EX RapidSeal.**
The RapidSeal system offers two seal gasket widths (FIG 52) in addition to a choice of foam type or rigid seals, both offering PSA adhesive backing.

(1) **a narrower seal gasket**, 2.88" for cartridges split with a screw driver or the SCC Manual Cartridge Splitter.
Split Hopper PSA RapidSeal - Narrow: LJ4SHPSARS-N
Foam-type Split Hopper PSA RapidSeal - Narrow: EXFTRS-N

(2) **a wider seal gasket**, 3.22" for cartridges cut with rotary blades as on the SCC Cartridge Splitting Machine.
Split Hopper PSA RapidSeal - Wide: LJ4SHPSARS-W
Foam-type Split Hopper PSA RapidSeal - Narrow: EXFTRS-W

Please refer to SSS #82 for complete RapidSeal installation instructions.

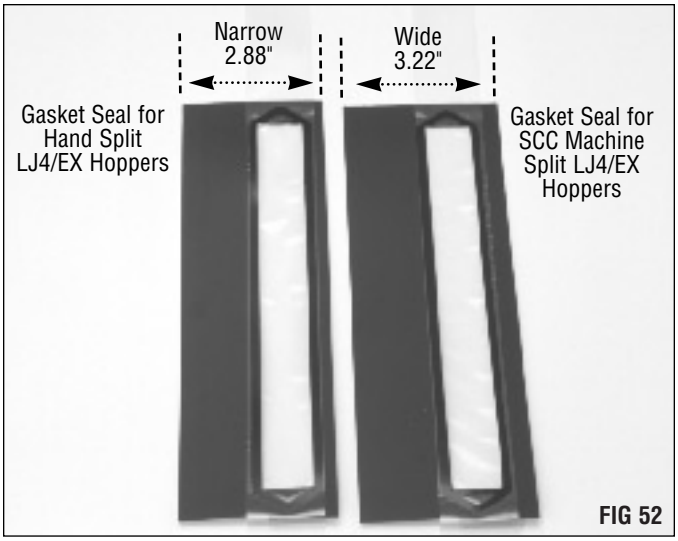


FIG 52

The gasket seals use a pressure-sensitive adhesive to secure it to the hopper.

Peel off the backing (FIG 53).

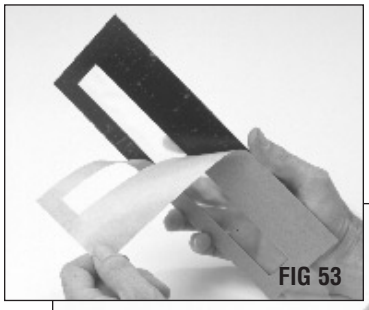


FIG 53

Place the gasket on toner reservoir section (FIG 54).

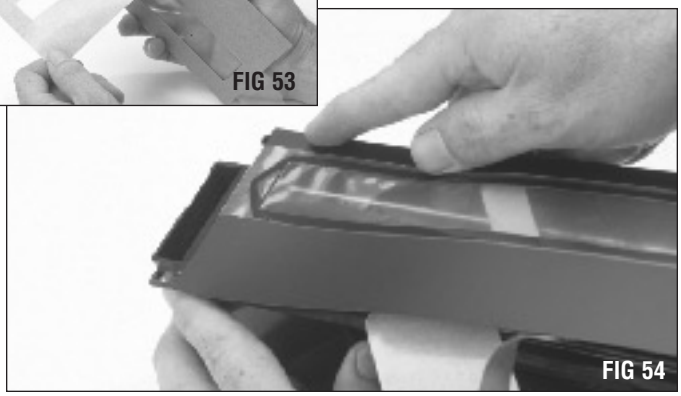


FIG 54

Secure the perimeter of the seal (FIG 55).

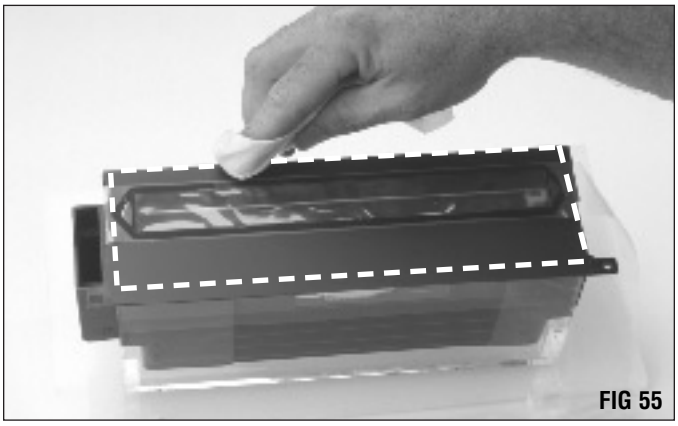


FIG 55

Installing a RapidSeal Sealing System - OVERVIEW

6. **Fill the Toner Reservoir**
   Fill the toner hopper with 340 grams or 380 grams of LJ4/EX MicroGraphics™ 1 Toner (Item Code: EX340B or EX380B).

   The optional Toner Filling Jig (Item Code: CS4-45) shown in FIG 56 makes refilling the cartridge easier

IMPORTANT Shake the toner bottle vigorously before pouring the toner into the hopper.

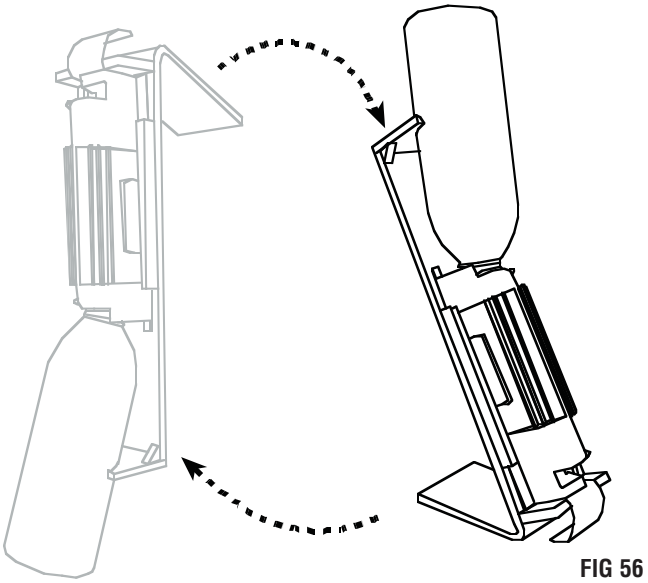
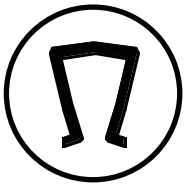


FIG 56

7. **Rejoin the hopper sections.**
   The RapidSeal system features one-piece external locking rails that rejoin the mag roller and hopper sections. Two kinds of locking rails are available to suit your production needs.

   Plastic Locking Rails (Item Code: CS4-575) are designed for single use only and offer a less expensive rejoining method for one way cartridge remanufacturing.

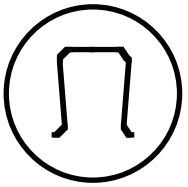


Cross Section of Plastic Locking Rail

IMPORTANT The plastic locking rail is a single-use rail. Once removed from the cartridge you should not reuse plastic locking rails.

   Blackened Stainless Steel Locking Rails (Item Code: CS4-550) are designed for multiple use cycles.

   FIGs 57 and 58 show how the rails are installed.



Cross Section of Blackened Stainless Steel Locking Rail

IMPORTANT The rails require a specific installation technique. Refer to the installation instructions included with the RapidSeal system.

FIG 57

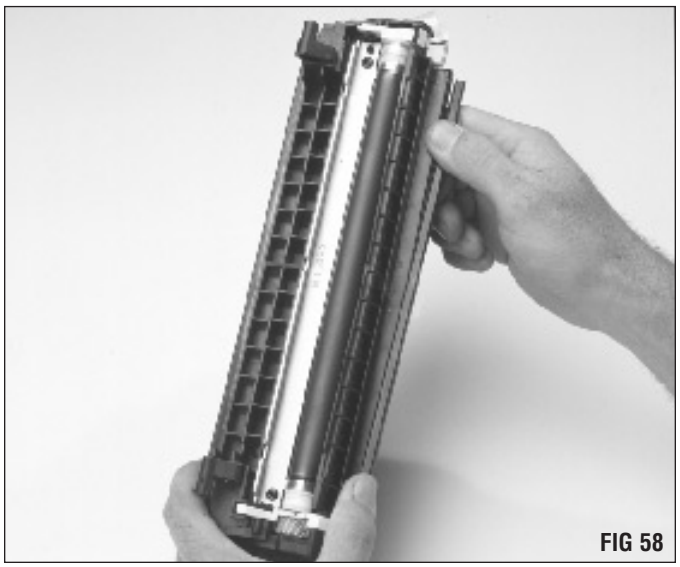


FIG 58

Installing a RapidSeal Sealing System - OVERVIEW

8. **Correct bowing in the mag roller section.**
When the hopper is split, it is not unusual to see the hopper flange bowing inward when the sections are rejoined. If the bowing is not corrected, various print defects can result.

An important step in installing the rails is checking for and correcting any bowing on the mag roller housing (FIG 59).

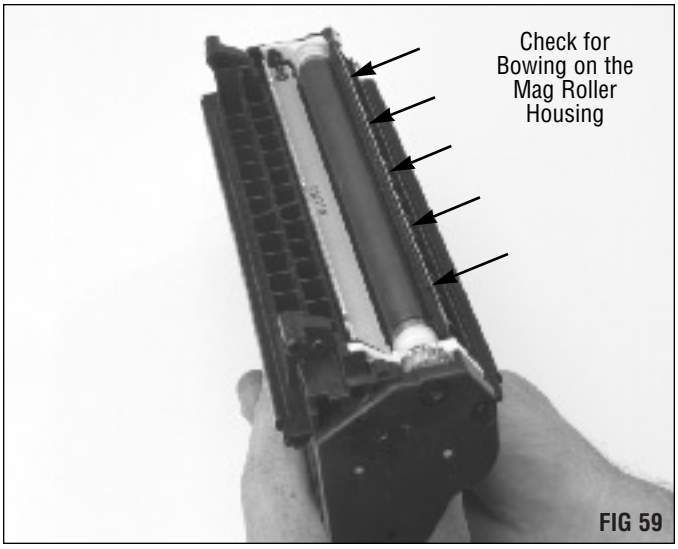


FIG 59

A Mag Roller Spacer Tool (Item Code: CS4-150) is used to correct the bow and allow the locking rail to be properly positioned on the hopper flange (FIGs 60 and 61).

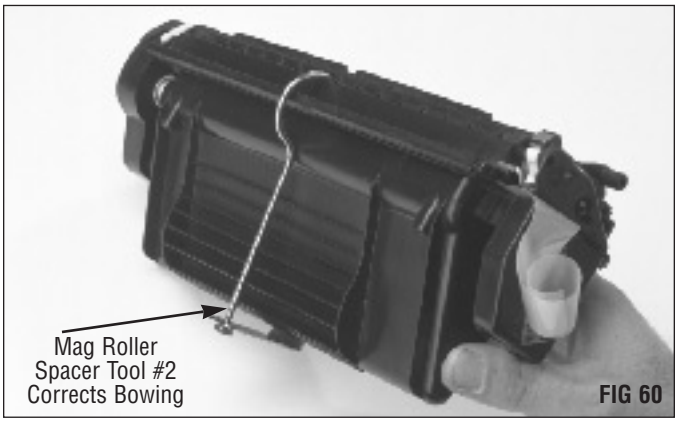


FIG 60

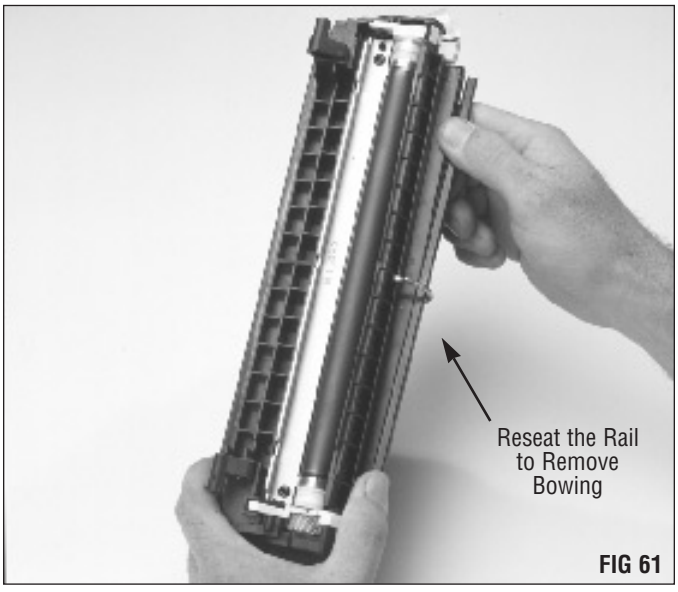


FIG 61

Installing a RapidSeal Sealing System - OVERVIEW

9. Removing the locking rails.
Once a hopper has been rejoined with the RapidSeal sealing system, you need only remove the locking rails to remanufacture the cartridge.

Remove locking rails by inserting the tip of the T-Handle Rail Removal Tool (Item Code: CSS-39) between the rail and the hopper flange on one end of the rail, as shown. Use the tool as a lever and gently pry the locking rail off the hopper flange.

With the rails removed the hopper will easily pull apart allowing you to inspect and replace the foams, install a seal, and rejoin the hopper as described in the previous steps.

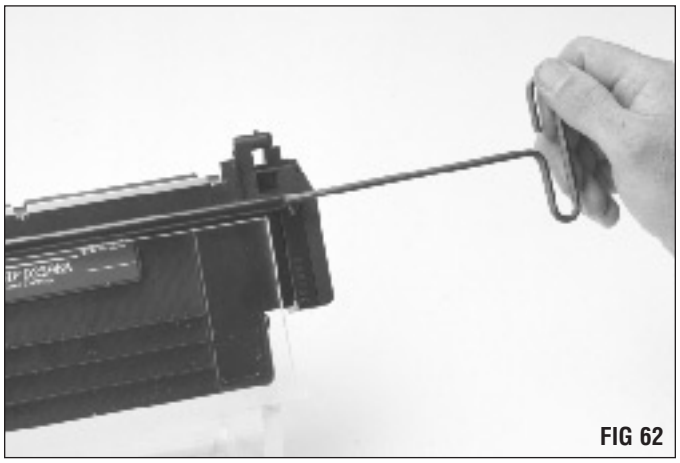


FIG 62

Assembling the Hopper Section

1. **Install doctor blade sealing foam if it is not present or damaged.**
   The sealing foam reduces the occurrence of toner leakage from under the doctor blade stamping. OEM cartridges do not have this foam installed.

   Place the foam on the mounting surface as shown in (FIG 63). For more details regarding installation, refer to the instructions included with the product. (SCC Item# LJ4DBSFOAM)

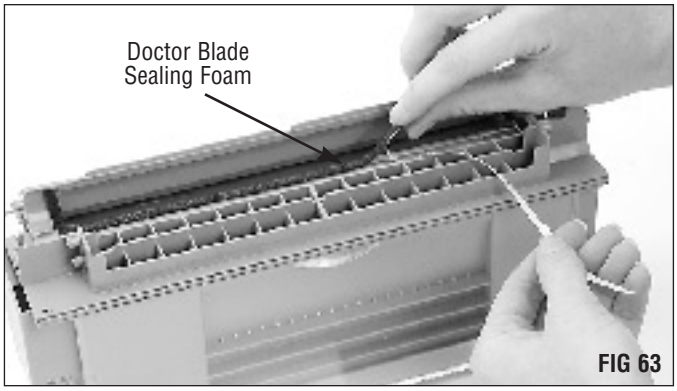


FIG 63

2. **If you are not using a seal, fill the hopper through the toner port. Shake the toner bottle vigorously to aerate the toner.**

3. **Clean and inspect the doctor blade; then install the blade.**
   Clean the doctor blade with dry, filtered compressed air or a lint-free cloth (FIG 64). Do not use alcohol to clean the blade. Replace the doctor blade as required. (SCC Item# LJ4DBLADE)


FIG 64

   Install the doctor blade, noting the locating posts at each end of the stamping (FIG 65).

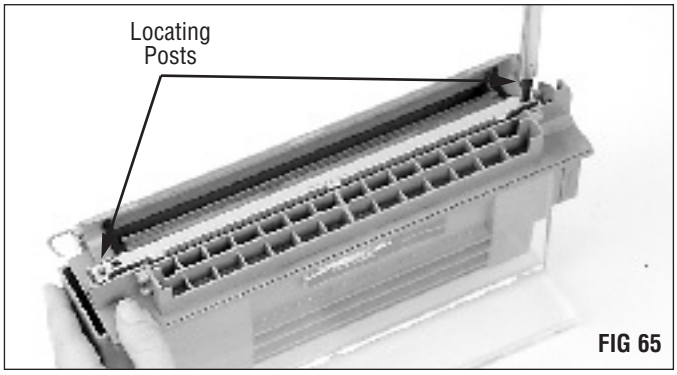


FIG 65

4. **Remove the mag roller stabilizer and clean the mag roller contact plate.**
   Remove the white stabilizer from the mag roller end cap (FIG 66). Use a cotton swab dampened with isopropyl alcohol to clean the contact plate in the end cap (FIG 67).

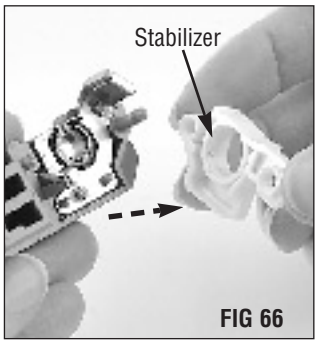


FIG 66

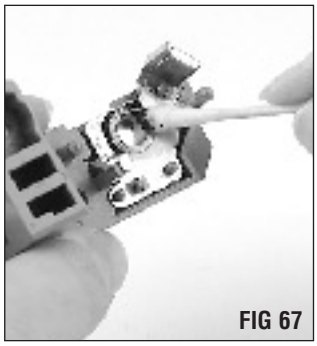


FIG 67

Assembling the Hopper Section

5. **Clean the mag roller, wire contact, and bushings.**
Clean the mag roller with dry, filtered compressed air or a lint-free cloth (FIG 68). Be careful not to scratch the coated surface of the mag roller.


FIG 68

Clean the wire contact on the mag roller with a cotton swab dampened with isopropyl alcohol (FIG 69).

Clean the mag roller bushings with a lint-free cloth and install on each end of the mag roller (FIG 70). If you are reusing the OEM bushings, note that the longer bushing is installed on the contact end of the roller.

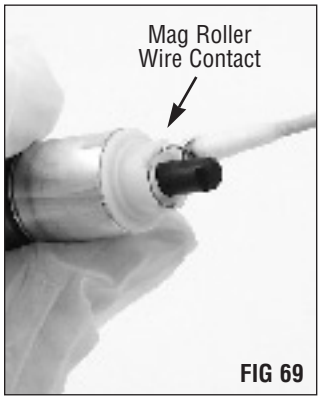


FIG 69

FIG 70

6. **Install the mag roller (FIG 71).**

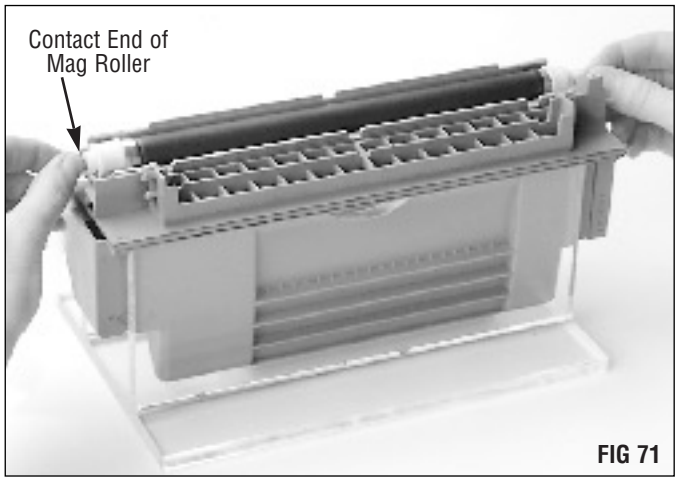


FIG 71

7. **Install the mag roller stabilizers on each end of the mag roller.**
Make sure the stabilizers fit securely between the locating posts as shown in (FIG 72 & 73).

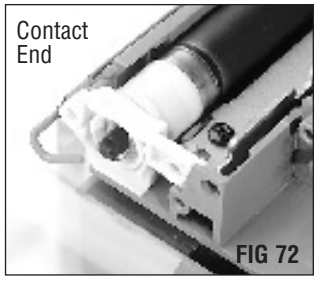


FIG 72

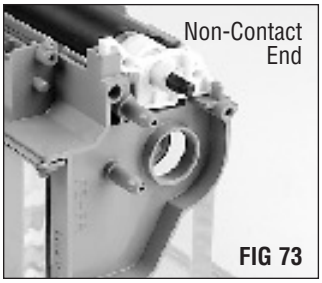


FIG 73

Assembling the Hopper Section

8. **Apply a thin layer of conductive lubricant on the contact plate in the mag roller end cap (FIG 74).**

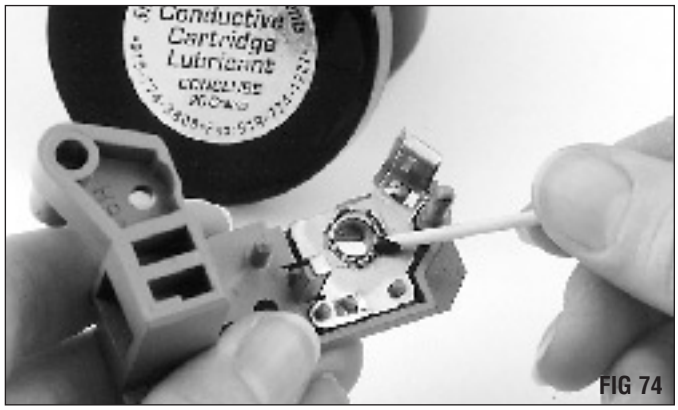


FIG 74

9. **Install the mag roller end cap.**
Install the end cap, noting that the mag roller axle is keyed. Make sure the axle is securely seated in the locating boss (FIG 75).

Secure the end cap with two Phillips screws (FIG 76).

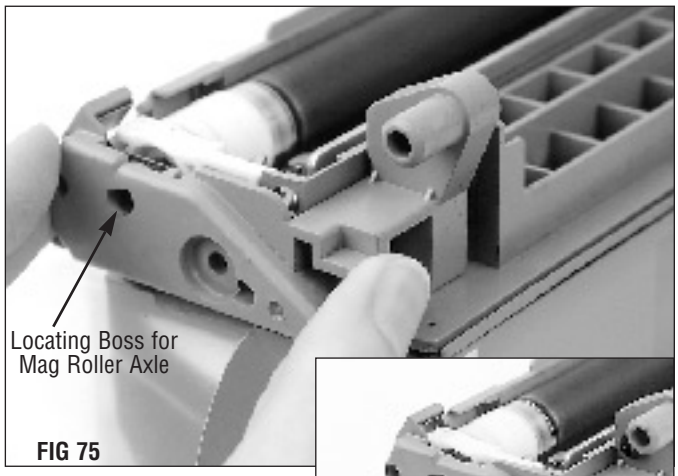


FIG 75

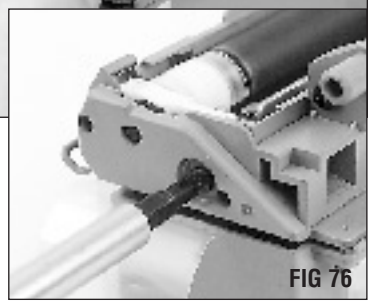


FIG 76

10. **Install the gears on the non-contact end of the hopper.**
The following illustrations (FIGs 77-80) show the order and orientation of gear installation.

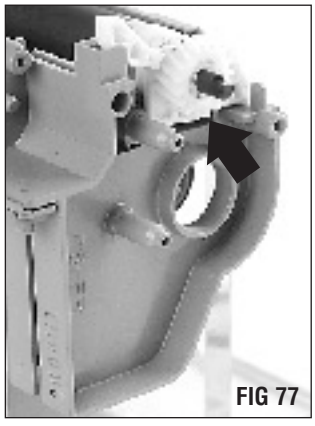


FIG 77

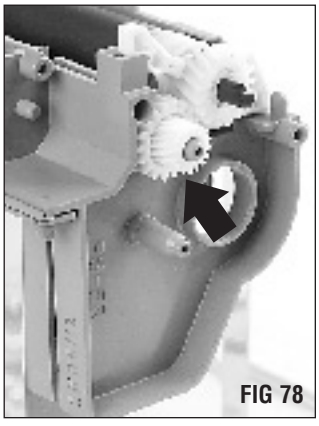


FIG 78

Assembling the Hopper Section

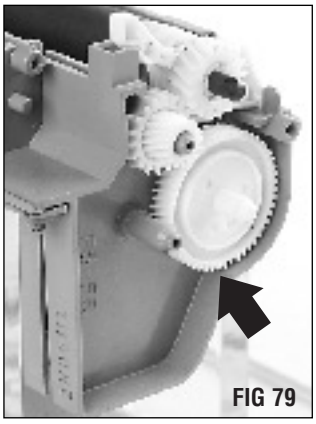


FIG 79

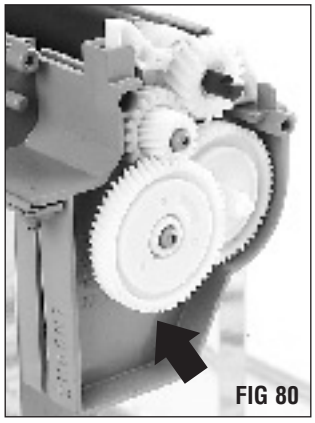


FIG 80

11. **Clean and install the gear housing.**
Clean the the gear housing with dry, filtered compressed air or a toner vacuum. Install the gear housing, noting that the mag roller axle is keyed. Secure the gear housing with two Phillips screws (FIG 81).

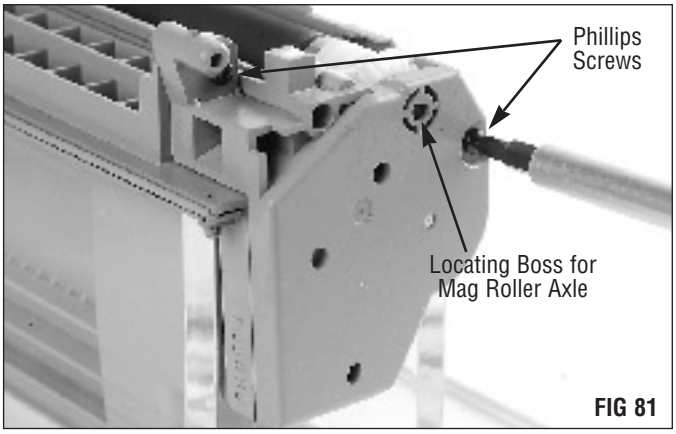


FIG 81

12. **Assemble the waste bin and toner hopper sections.**
Install the cartridge clips on the top of the cartridge (FIG 82). Secure each clip with a custom machine screw that mates with the brass insert (FIG 83).

Note that the original OEM screws will not work with the brass inserts installed in the screw bosses.

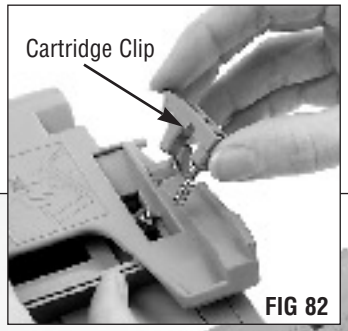


FIG 82

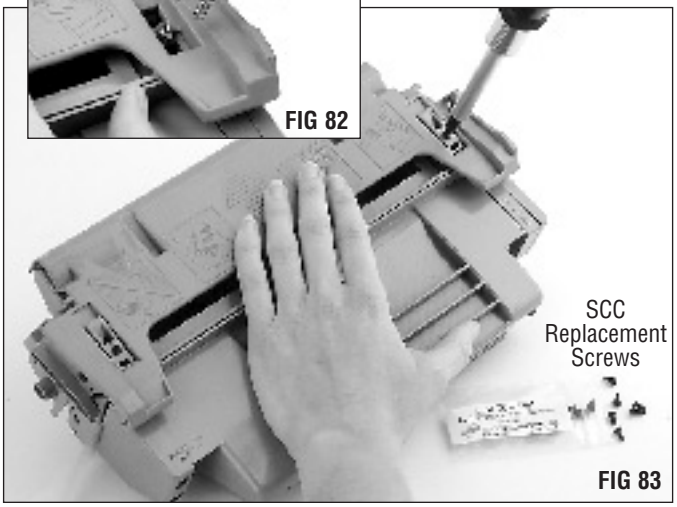


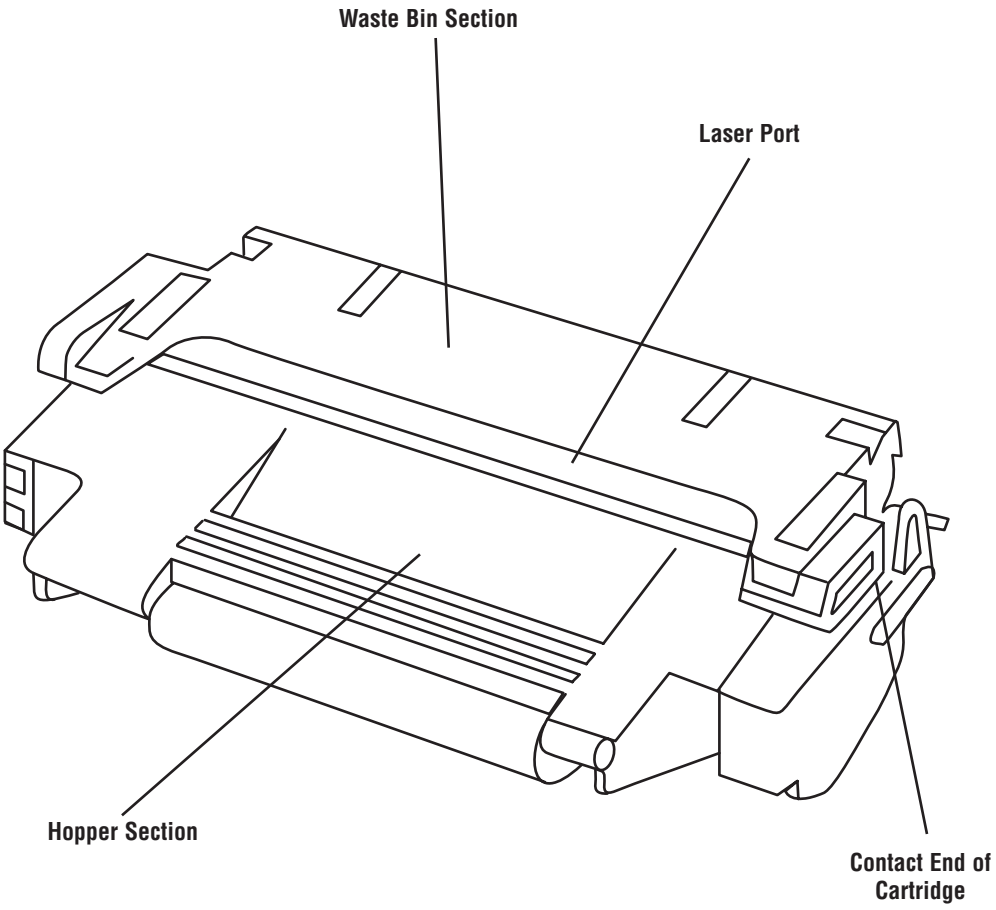
FIG 83

Notes

Notes

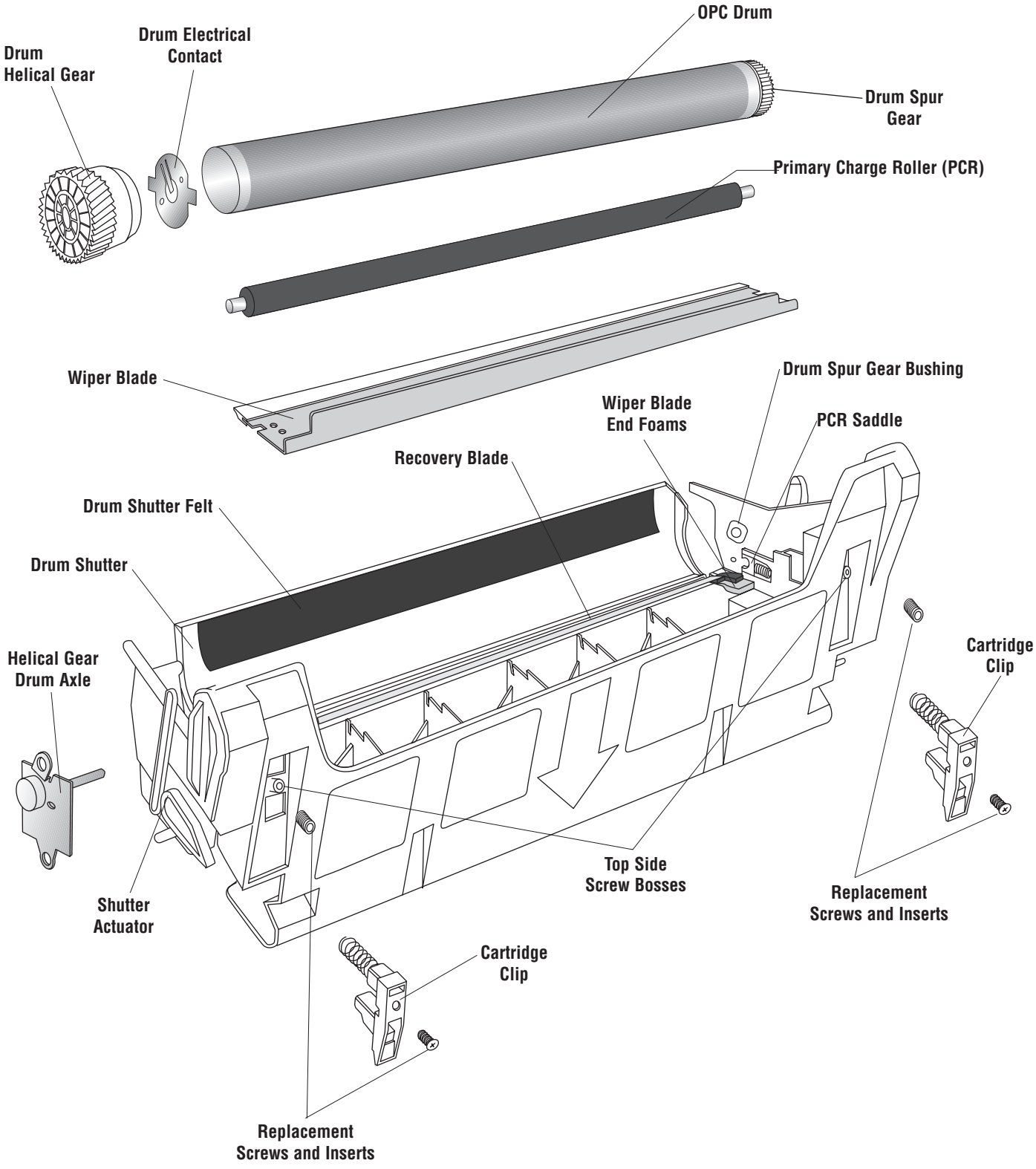
Notes

Canon® LBP-EX(LJ4)
Cartridge Components



This fully illustrated Cartridge Components guide gives you a complete breakdown of all cartridge components, along with component terms and definitions. Use the illustrations for training or referencing replacement components.

Waste Bin Assembly - Terms and Definitions



Cartridge Clip
Two cartridge clips located on the top side of the waste bin secure the waste bin and hopper sections together. Springs on the clips apply pressure to the hopper section so that the mag roller bushings are properly seated on the drum, maintaining the correct air gap between the drum and mag roller.

Drum Electrical Contact
Installed in the helical gear of the drum; makes contact with the helical gear drum axle and provides contact between the drum and printer.

Drum Shutter
Protects the drum from light damage when the cartridge is out of the printer. When the cartridge is installed in the printer, the shutter opens so that the drum is exposed to the paper.

Drum Shutter Felt
Shutter felt is an aftermarket component installed on the interior surface of the drum shutter. The felt protects the drum from potential damage caused by the opening and closing of the shutter.

Drum Spur Gear Bushing
Incorporated into the right (non-contact) end of the waste bin section to hold the spur gear end of the drum in position.

Helical Gear Drum Axle
Installed at the left end of the waste bin section to hold the drum in place; this contact also provides electrical contact between the electrical contact in drum and the printer.

Organic Photo Conductor (OPC) Drum
The OPC drum is an aluminum cylinder coated with light-sensitive organic photoconductive material used to retain an image written to it by a laser beam. (Also called OPC, drum, or photoreceptor)

Drum Gears (Helical and Spur)
The helical gear, or the big gear, houses the drum contact. The other gear is often called the spur or straight gear. An axle is molded in the EX spur gear.

Primary Charge Roller (PCR)
The Primary Charge Roller uniformly charges the OPC drum. (Also called PCR, charge roller, or roller)

PCR Saddles
Support the PCR at each end of the shaft. One saddle, located at the contact end of the cartridge, is made of conductive material. Located adjacent to this saddle is a metal electrical contact which rides on the PCR shaft end. The opposite saddle is non-conductive. The springs at the base of the saddles maintain tension on the PCR so that it will make constant and uniform contact with the drum.

Recovery Blade
Acts as a dam at the base of the waste bin and keeps the toner from falling out of the waste bin onto the paper. (Also called catcher blade or scavenger blade.)

Replacement Screws and Inserts
Aftermarket components used to reinforce stripped top side screw bosses; the inserts are installed in the screw bosses and the replacement screws are provided to secure the cartridge clips.

Shutter Actuator
Opens the drum shutter when the cartridge is installed in the printer.

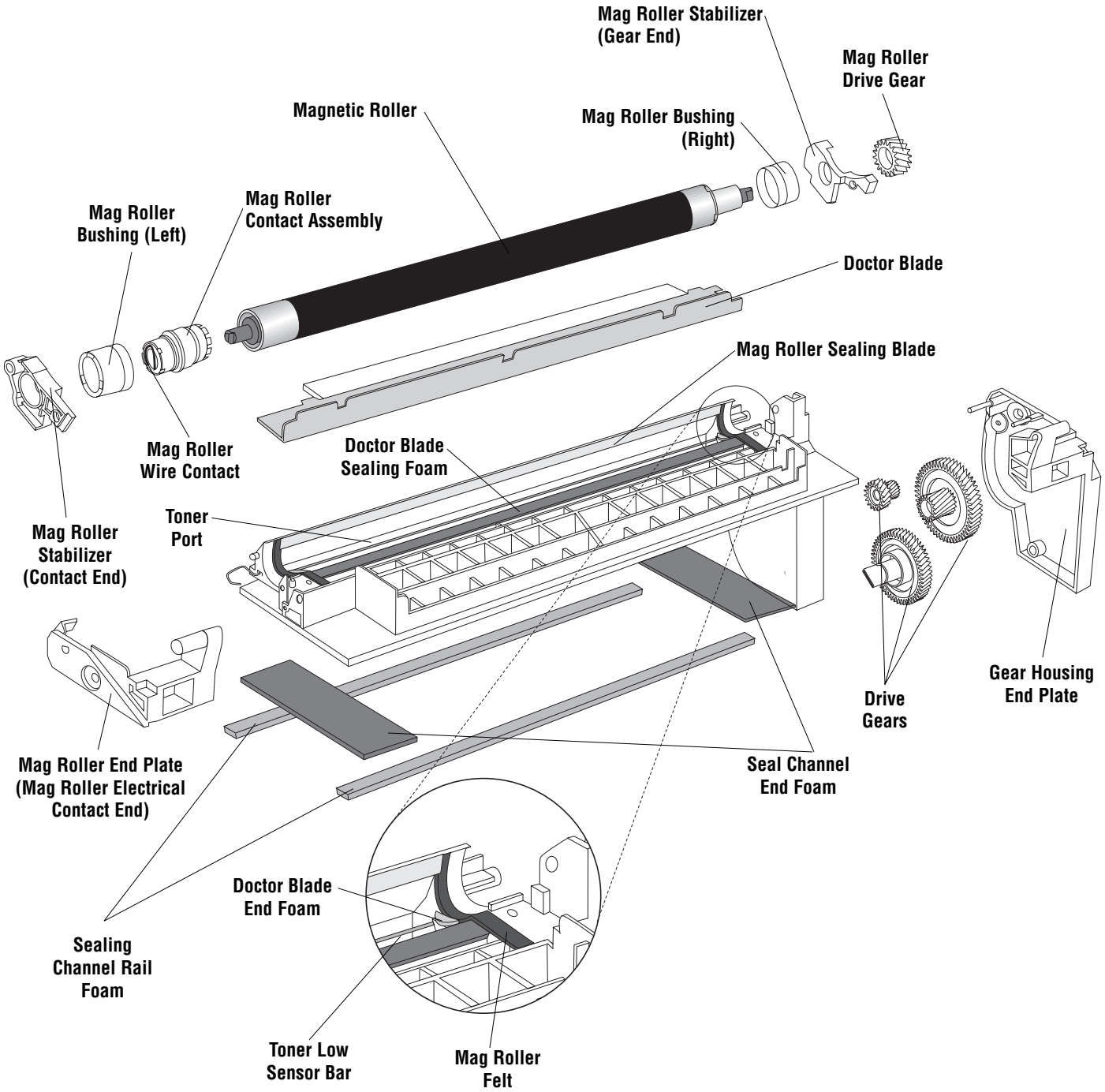
Top Side Screw Boss
The screw boss serves as an anchor for the cartridge clip screw. The screws must be secure in the screw bosses to keep the cartridge sections together.

Waste Bin
A receptacle that catches toner wiped from the drum. (Also called waste hopper or dust bin)

Wiper Blade
Cleans the drum by wiping away toner that was not transferred to the paper. The blade is constructed of a metal stamping (base) and polyurethane blade. (Also called cleaning blade)

Wiper Blade End Foams
Layers of foam that seal the area at each end of the wiper blade to prevent leakage from the waste bin.

Mag Roller Assembly - Terms and Definitions



Development Station
Area of the cartridge where toner is transferred from the toner hopper to the latent image on the OPC drum using the mag roller and doctor blade.

Doctor Blade
Uniformly meters the amount of toner on the mag roller. The doctor blade is constructed of a metal stamping (base) and a flexible blade. (Also called metering blade)

Doctor Blade End Foam
Small half-moon-shaped pieces of foam that seal the ends of the doctor blade and prevent leakage from the toner hopper.

Doctor Blade Sealing Foam
A strip of foam that seals the area between doctor blade stamping and cartridge shell and prevents leakage from the toner hopper.

Gear Housing End Plate
A removable housing that covers the drive train on the hopper section of the cartridge. This housing also provides a locating boss that supports the magnet inside the mag roller sleeve and keeps the magnet stationary.

Magnetic (Developer) Roller
A rotating coated aluminum sleeve around a stationary magnet. The developer roller attracts toner magnetically. The developer roller and the doctor blade charge the toner. The doctor blade also meters the amount of toner present on the developer roller. An AC/DC voltage transfers the toner to the OPC. (Also called mag roller, developer roller.)

Mag Roller Bushings (Right and Left)
Placed on each end of the mag roller sleeve to establish consistent air gap between the mag roller and drum when the cartridge sections are assembled. The EX cartridge has both right and left mag roller bushings, which should not be interchanged.

Mag Roller Drive Gear
Rotates the mag roller sleeve around the permanent magnet.

Mag Roller End Plate
Houses the mag roller metal contact plate and locating boss that supports the magnet inside the sleeve and keeps the magnet stationary.

Mag Roller Felt
Material that lines the saddles where the mag roller rests in the hopper; also provides a seal at the ends of the mag roller.

Mag Roller Sealing Blade
A thin blade similar in appearance to the recovery blade, that seals the area between the mag roller and mag roller section and prevents leakage from the development station.

Mag Roller Stabilizers (Gear End and Contact End)
Prevents lateral movement of the mag roller. A stabilizer is placed on each end of the mag roller axle and secured in place by screws and locating posts in the hopper section.

Mag Roller Wire Contact
A springed wire that contacts the metal contact plate in the mag roller end plate and provides electrical contact between the mag roller and printer.

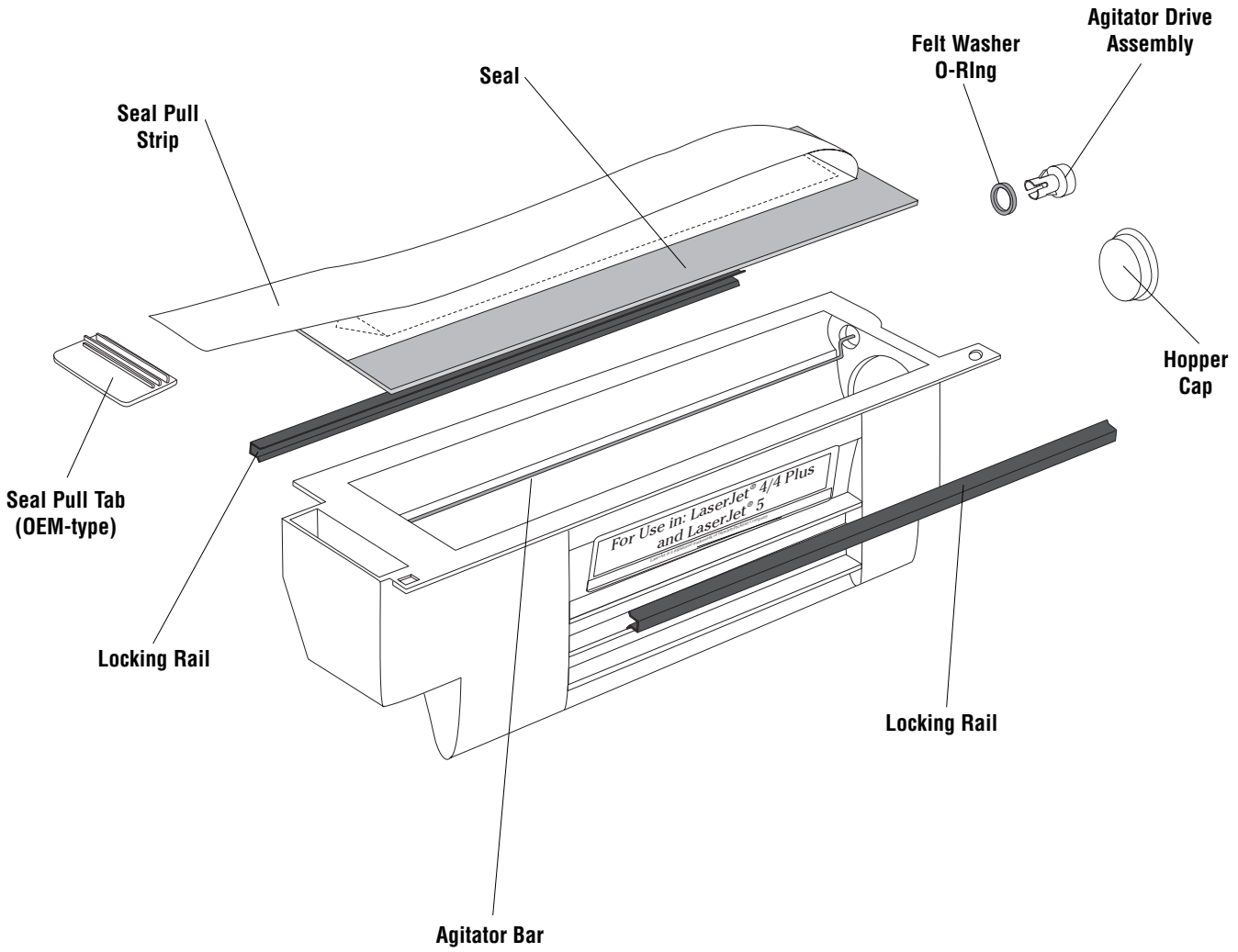
Sealing Channel End Foam
These rectangular pieces of foam adhere to the mag roller section of the hopper. Entry foam and end foam seal the ends of the hopper where the toner reservoir and mag roller sections are not ultrasonically welded together.

Sealing Channel Rail Foam
Narrow strips of foam installed on the underside of the mag roller section. The foam is used with the RapidSeal™ seal system to seal the long sides of an assembled hopper section.

Toner Low Sensor Bar
Acts as an antenna to detect low toner volume in the hopper. Once a signal from the antenna reaches a specified value, the printer displays a toner low warning for the printer operator.

Toner Port
An opening occupied by the seal, the toner port runs along the length of the hopper. Once the seal is removed, toner travels through this opening to the development station.

Toner Hopper Assembly - Terms and Definitions



Agitator Bar

A thin metal bar that rotates inside the toner hopper to move the toner toward the development station.

Agitator Drive Assembly

Rotates the agitator bar in the hopper. The assembly is located at the drive train end of the hopper section.

Felt O-Ring Washer

Installed on the agitator drive assembly to seal the assembly and prevent leakage from the hopper.

Hopper Cap

Plugs the fill opening of the hopper. The hopper can only be filled through the fill opening if the hopper is split. Otherwise the hopper is filled through the toner port.

Locking Rail

Used to reassemble and secure the mag roller and toner sections after splitting. Available in plastic or metal.

Pull Tab

Attached to the seal pull strip to enable the end user to remove the seal pull strip and release toner into the development station.

Seal

A rigid gasket base with a seal attached. The gasket base is attached to the toner hopper sealing surface.

Seal Channel

The area between the mag roller and hopper sections in which a seal is installed. (not illustrated)

Seal Pull Strip

Strip of seal material pulled by the end user to release the toner into the development station.

Component Management Reference Chart

COMPONENT	ITEM CODE	CLEAN	LUBRICATE
OPC Drum	NGTLJ4DRGR - NGT™ UP4LJ4DRGR - UltraPrint™ OSLJ4DRGR - Odyssey™	Dry, filtered compressed air	Pad coated area of drum with Kynar®; Rotate drum against wiper blade - 6 rotations
OEM PCR	NA	Soft, lint-free cloth dampened with water DO NOT clean OEM PCR with alcohol	NA
SCC Reman. PCR 15-cycle	LJ4RMPCR or MLSC (Modified Length Service. for NX OEM gray PCR)	Lint-free cloth dampened with isopropyl alcohol	NA
SCC Reman. PCR 1-cycle	ICLJ4RMPCR or MLSC (Modified Length Serv, for NX OEM gray PCR)	No cleaning required; Recoat after each reman cycle Do not use alcohol to clean 1-cycle PCR	NA
PCR Contact Saddle	NA	Cotton swab dampened with isopropyl alcohol	DO NOT lubricate - lubricant not present on OEM
Magnetic Developer Roller - OEM	NA	Dry, filtered compressed air DO NOT clean with alcohol or touch surface	NA
EnduraMag™ Remanufactured Mag Roller	EXRMSMDR-1 EXRMSMDR-2	Dry, filtered compressed air DO NOT clean with alcohol or touch surface	NA
Mag Roller Bushings	Under development	Dry, filtered compressed air, dry cotton swab or lint-free cloth	NA
Mag Roller Contacts	NA	Dry, cotton swab dampened with isopropyl alcohol	Thin layer of Conductive Cartridge Lubricant™ on contact in MR end plate
Mag Roller Felt	LJ4MRFELT	Dry, filtered compressed air	NA
Toner	EX340B, EX380B, EX340B-SG, EX380B-SG	Clean toner hopper with dry, filtered compressed air or toner vacuum	NA
Seal	LJ4SHPSARS-N (RapidSeal™) LJ4SHPSARS-W (RapidSeal) LJ4SEAL (Rigid Seal) EXFTRS-N (Foam-type RapidSeal) EXFTRS-W (Foam-type RapidSeal)	Remove OEM seal filament or SCC RapidSeal; Clean sealing surface with soft lint-free cloth dampened with isopropyl alcohol	NA
Recovery Blade	LJ4RECBLADE (mylar) PRECB-LJ4 (polyurethane)	Dry, filtered compressed air	NA
Doctor Blade	LJ4DBLADE	Dry, filtered compressed air DO NOT clean with alcohol	NA
Doctor Blade End Foam	LJ4DBEFOAM	Dry, filtered compressed air	NA

EVALUATE	REPLACE
Test print to check print density; check for deep concentric wear lines, particularly on helical gear end	Replace OEM drum after OEM cycle with SCC system-qualified drum; inspect drum each cycle and replace as required
OEM PCR typically wears out after OEM cycle	Use SCC's remanufactured EX PCR (LJ4RMPCR) or an NX OEM gray PCR modified in length to function in the EX cartridge
SCC15-cycle Remanufactured PCR guaranteed 5 remanufacturing cycles before it requires recoating	Recoat 15-cycle PCR after the 5th and 10th remanufacturing cycles; After the initial recoating, the PCR can be recoating two additional times for a total of 15 remanufacturing cycles; NX OEM gray PCR (remanufactured) can be modified in length to function in the EX cartridge (MLSC)
SCC One-cycle Remanufactured PCR guaranteed 1 remanufacturing cycle	Recoat dedicated SCC One-cycle remanufactured PCR after each remanufacturing cycle; NX OEM gray PCR (remanufactured) can be modified in length to function in the EX cartridge as a one-cycle PCR
NA	NA
Print test against baseline to check for light print; visually inspect for scratches, & previously treated or sanded mag rollers	Recoat OEM mag roller through EnduraMag program; Note that the EX uses two types of mag roller sleeves; Refer to SSS#110 for details; Contact your SCC Sales Representative for program details
EnduraMag™ is rated at 40,000 pages when used in combination with SCC EX drums and MicroGraphics™ 1 toner.	Recoat EX EnduraMag after approximately 40,000 pages; Refer to SSS#110 for mag roller assembly and disassembly instructions
Make sure bushings are clean and free of cracks or excessive wear	Replace cracked or excessively worn bushings
For optimum continuity, make sure wire contact is free of toner and debris	NA
Felts should appear clean, intact, and secured to mag roller saddle	Replace if felt becomes excessively frayed, compacted with toner, or dislodged
NA	NA
Completely remove old seal each usage cycle and install new gasket seal (requires splitting of hopper)	Replace the seal each time you remanufacture the cartridge; Use the wide seal (LJ4SHPSARS-W) if the hopper has been machine manually split; Use the narrow seal (LJ4SHPSARS-N if the hopper has been split and has guide rails in tact; Read installation instructions carefully; Foam- and rigid-type seals are available
Blade should display a smooth surface and be completely secured to mounting surface	Replace blade if bent, kinked, or damaged; use Recovery Blade Installation Kit for ease of installation (mylar blade); Polyurethane blade does not require an installation tool
Test print to check print quality, background, or side-to-side variations in print quality	Replace OEM doctor blade with SCC replacement blade after the OEM cycle; test print and inspect each cycle; replace blade as required
Foam should display a smooth clean surface. Missing or dislodged foam can cause page edge print defects.	Replace if foam becomes pitted, dislodged, or is missing

chart continued on the next page

** The SCC remanufactured PCR is guaranteed for five usage cycles when used with the SCC imaging system and remanufacturing and maintenance procedures.*

Component Management Chart, continued

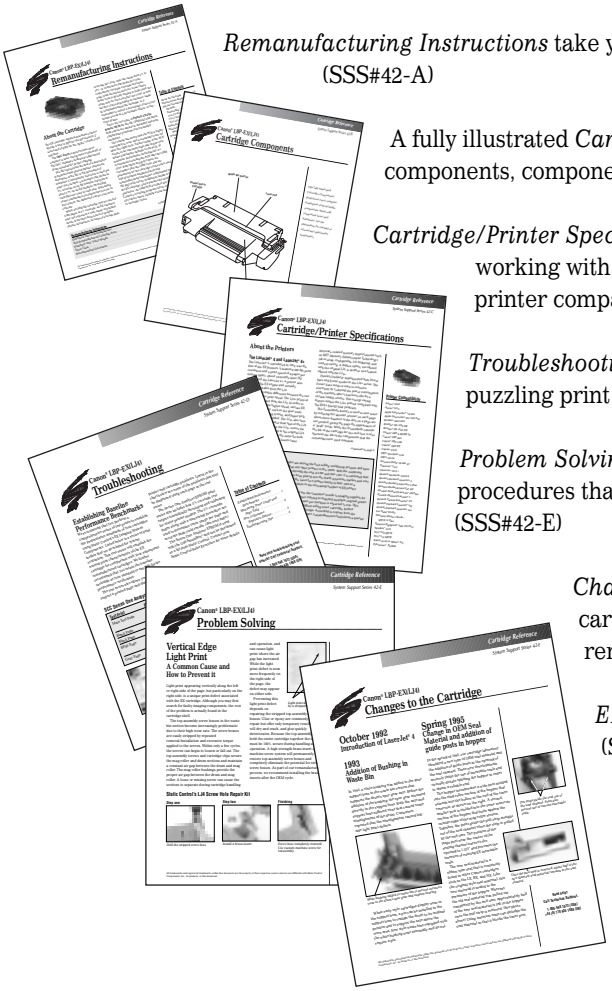
COMPONENT	ITEM CODE	CLEAN	LUBRICATE
Wiper Blade	LJ4BLADE	Dry, filtered compressed air DO NOT clean with alcohol (see page 51)	Dip edge of wiper blade in Kynar® Make sure blade edge is evenly covered
Mag Roller Sealing Blade	LJ4MRSBLADE	Dry, filtered compressed air	NA
LJ4 O-Ring Felt Washer	LJ4FWASHER	Dry, filtered compressed air	NA
Sealing Channel End Foam	LJ4SHFOAM-1	Dry, filtered compressed air Hold nozzle directly over foam	NA
Sealing Channel Rail Foam	LJ4SHFOAM-1	Dry, filtered compressed air Hold nozzle directly over foam	NA
Doctor Blade Sealing Foam (Aftermarket Part)	LJ4DBSFOAM	Dry, filtered compressed air	NA
Drum Shutter Felt (Aftermarket Part)	SXUNVDSFELT	Dry, filtered compressed air	NA

EVALUATE	REPLACE
Test print and check for vertical streaks	Install a new wiper blade each time you replace the drum; test print and inspect each cycle; replace as required
Blade should display a smooth surface and be fully attached to housing. Kinks in blade will cause toner leakage or print defects	Replace if blade is bent, cracked, or dislodged; blade must be removed and replaced each time mag roller felts are installed
Agitator drive assembly is prone to leakage; check for pile of toner inside printer just under the right end of the cartridge	Replace OEM felt washer w/SCC replacement; then replace each cycle
Installed in split hoppers; Surface should display smooth surface and be free of toner; Damaged foam is a source of leakage.	Replace foam if surface is badly pitted and torn enough to allow toner to migrate through foam and out of hopper or if foam has melted due to heatsealing
Installed in split hoppers using rigid-type seals; Surface should display smooth surface and be free of toner; Damaged foam is a source of leakage.	Replace foam if surface is badly pitted and torn enough to allow toner to migrate through foam and out of hopper or if foam has melted due to heatsealing
Foam should display smooth surface and be secured to cartridge surface	Replace if foam is pitted or dislodged; install foam if not present
Install to help protect drum from damage caused by opening and closing of shutter	Replace if felt starts to peel or becomes dislodged

Need More Information?

The EX Cartridge Reference Series Tells You Everything You Need to Know

Remanufacturing Instructions is just one of the documents in a 6-part reference series on the EX cartridge. This series provides you with everything you need to know to successfully remanufacture the EX cartridge: from step-by-step instructions to troubleshooting and problem solving. For more information *Contact your Static Control Sales Representative at the numbers below.*



Remanufacturing Instructions take you step-by-step through the entire cartridge remanufacturing process. (SSS#42-A)

A fully illustrated *Cartridge Components* guide shows a complete breakdown of all cartridge components, component terms and definitions and a cartridge management chart. (SSS#42-B)

Cartridge/Printer Specifications provides important reference information you may need when working with your customers: OEM part numbers, cartridge and printer specifications, printer compatibility, and descriptions of popular printer models. (SSS#42-C)

Troubleshooting Tips gives you both general and engine-specific tips on troubleshooting puzzling print defects, plus a repetitive defect guide. (*Currently being revised.)* (SSS#42-D)

Problem Solving provides solutions to unique problems with a guide of products and procedures that will make remanufacturing easier, as well as prevent imaging problems. (SSS#42-E)

Changes to the Cartridge documents any changes that have occurred in the cartridge since its introduction and how those changes may affect your remanufacturing procedures. (SSS#42-F)

EX Cartridge Reference Pack includes all the documents described above. (SSS#42)

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Canon® LBP-EX(LJ4)
Cartridge/Printer Specifications

About the Printers

The LaserJet® 4 and LaserJet® 4+

The LaserJet® 4, introduced in 1992, was the first of the EX printers. It featured 600 dpi print resolution and a print speed of 8 pages per minute (ppm). About 18 months later, HP introduced the LaserJet 4+, a printer also based on the EX engine and virtually indistinguishable from the LJ4.

The most notable difference between the two machines is the print speed. The LJ4+ prints at 12 ppm, 50% faster than the LJ4. In order to compensate for the higher speed, various EX engine components, such as the gear train, laser scanner, cooling system, and paper pick mechanism were modified. The LJ4+ also uses a more powerful processor than that of the LJ4, a 25 MHz Intel 80960KB in the LJ4+ versus the 20 MHz Intel 80960KA used in the original LJ4. Memory configurations are the same for both machines; however, the LJ4+ boasts some firmware-related memory improvements such as MET (Memory Enhancement Technology), job overlap, configurable I/O buffering, and context saving. A duplex option, not offered with the original LJ4, is another new feature offered with the LJ4+.

Hewlett Packard® implemented both Power Save and Econo modes in the LJ4+ series. The Power Save mode is used to conserve electricity by reducing the power consumption of the machine after it has been idle for a certain length of time. This energy-saving feature makes the LJ4+ printer compliant with the EPA's Energy Star program.

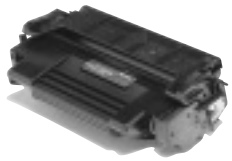
The EconoMode feature is used to save toner by reducing the amount of toner on each page. About three-quarters of the dots on a page are not printed, giving the page the appearance of a "draft" mode. While the EconoMode extends the life of the cartridge for the end user, it also shortens the life of the components that the remanufacturer must maintain.

continued on page 2

Market Outlook

Laser printers featuring the EX engine are among the best selling workgroup printers and have been produced in higher numbers than any other printer in the 1990's. With the continued shipping of LaserJet® 4+/4M+ printers through the end of 1996 and into 1997, it is estimated that nearly 5 million EX engine printers have been placed into the North American market and over 7 million worldwide. The introduction of the LaserJet 5 printer family in May 1996 as a replacement to the LJ4+ promises to contribute to the increasing number of EX printer placements.

Equally important to the printer placement are the consumer trends in imaging supplies for the EX-based printers. With a shift from consumer copying to mopying (multiple original prints) and an increase in network printing, the page count per machine is expected to rise. HP's introduction of a "family" of EX cartridges, HP's biggest-selling toner cartridge, further emphasizes the popularity and longevity of the cartridge. According to reports from the *Recharger Magazine* and *Hard Copy Journal (May 1997)*, remanufacturers hold about a quarter of the EX cartridge market.



Printer Compatibility

Anzac® 3008
Anzac® 3010
Apple Laserwriter® 16/600
Apple Laserwriter Pro® 600/630
Brother® 960/1260
Brother® HL-1260 NE
Brother® HL-1260 DX
Canon® LBP-8 MARK IV
Canon® LBP-860
Canon® LBP-1260
Canon® LBP-EX
Canon® P-270
DEC® Declaser 5100
DEC® LN-09
Decision Data® IS-682-4C
Genicom® 7612
Genicom® 7612 i
Hewlett-Packard® C2001A
Hewlett-Packard LaserJet® 4
Hewlett-Packard LaserJet® 4 Plus
Hewlett-Packard LaserJet® 4M
Hewlett-Packard LaserJet® 4M Plus
Hewlett-Packard LaserJet® 5
Hewlett-Packard LaserJet® 5N
Hewlett-Packard LaserJet® 5M
Hewlett-Packard LaserJet® 5se
Lee Data® IS-682
Printerm Master Check® MICR 12 Plus
Siemens Highprint® 4821-P10/P15
Tandem® 5575
Troy® 508 MICR
Troy® 512 MICR
Xante Accel-a-Writer® 812
Xylostome® XLP820

About the Printers, continued

LaserJet 5

The LaserJet 5, introduced in May 1996, replaced the LaserJet 4 and 4 Plus printers, the world's best selling work group laser printers. Based on the same EX engine used in the LJ4/4+, the LJ5 features improved usability and performance at a price lower than that of a LaserJet 4+. The LJ5 retained the resolution and print speed of it's LJ4+ predecessor and uses the same 92298A cartridge. *(For more information about the EX cartridge line, see page 3.)* With an increased duty cycle of 35,000 pages/month (up 15,000 pages/month from the LJ4+'s 20,000 page/month), the LJ5 will most likely to see more use than did the LJ4 family of printers.

The LJ5 is the first printer to use PCL 6, HP's next-generation printer language. PCL 6 offers endusers better graphics performance, improved grayscaling and new font-synthesis technology. Improved software and a new control panel design also make the LJ5 easier to use than it's predecessor.

In addition to offering the PC- and Mac-compatible printers, LJ5 and LJ5M respectively, HP also offers an LJ5N, an ethernet-ready printer. All three models are designed for small work group printing.

In HP's campaign to make laser printer "ownership a better value", they lowered the list price of all three models. 20% on the LJ5, 13% on the LJ5N and 13% on the LJ5M.

Apple® 16/600

The Apple LaserWriter® 16/600, a 600 dpi, 16 ppm printer is based on the ZX engine. Although the engine is different from the EX, the LaserWriter 16/600 uses an EX toner cartridge. Our compatibility tests have shown that the Apple and HP EX cartridges are completely interchangible.

The engine specifications are the same as those of the 8 ppm and 12 ppm EX engines used in previous Apple printer models. The LaserWriter 16/600 features a Power Save mode.

An important difference between the ZX and EX machines is found in the fuser assembly. The upper fuser roller in the LJ4+/ZX machine is slightly larger than that of the LJ4 in order to accommodate the increased speed. When troubleshooting fuser offsetting print defects, make sure you are using the correct repetitive defect measurement. *For more details, see page SSS#42-D, Troubleshooting.*

Cartridge Information

	HP LaserJet® 4/4+	HP LaserJet® 5	Apple Laserwriter Pro® 600/630	Apple LaserWriter® 16/600
OEM Part Number	92298A[1]	92298A[1]	M2473G/A	M2473G/A
OEM Published Yield[2]	6,800 pages[3]	6,800 pages[3]	6,000 pages	6,000 pages
Price (Retail List/Ave.Whole.)	$130.50/$79	$130.50/$79	$149/$76	$149/$76

[1]Three types of HP cartridges are available for the LJ4/4+/5. See page 3 for details. [2]Yield is based on 5% page coverage unless noted otherwise. [3] HP has recently (as of early 1996) changed their page rating to 6,800 pages; the previous rating was 6,000 pages.

Printer Information

	HP LaserJet® 4/4+	HP LaserJet® 5	Apple LaserWriter Pro® 630	Apple LaserWriter® 16/600
Introduction List Price	$2,199/$1,759	$1,629.00	$ 2,139	$2,429
First Ship Date	October 1992/May 1994	May 1996	January 1993	September 1994
Pages Per Minute (ppm)	8 ppm/12 ppm	12 ppm	8 ppm	16 ppm
Engine Duty Cycle	20,000 pages/month	up to 35,000 pages/month	450,000 pages/life	450,000 pages/life
Resolution (dpi)	600 x 600 dpi	600 x 600 dpi	600 x 600 dpi	600 x 600 dpi
Page Size	Let/Legal/Exec/A4	Let/Legal/Exec/A4/A5	Let/Legal/A4	Let/Legal/A4
Energy Star Compliant	no/yes	yes	no	no
Energy saving mode	no/yes	yes	no	yes
EconoMode	no/yes		no	no

About the Cartridge

HP's EX Cartridge "Family"

In May 1997, Hewlett Packard (HP) added a fourth cartridge to its EX line of laser printer cartridges. HP's EX line offers endusers a choice of cartridges for low-capacity, standard, high-capacity, and high volume usage.

• The **standard "98A"** (92298A) is the original cartridge offered with the first EX printer. Although the 98A was first introduced with a published yield of 6,000 pages, HP upgraded the yield to 6,800 pages in early 1996.

• The **low-capacity "98E"** (C3973A) cartridge was introduced in Winter 1995 to accommodate low-capacity end users. The toner load, along with the price, was lowered to be more appealing to small office/home office consumers who may use only a couple of cartridges a year.

• At the same time the 98E was introduced, HP also offered a MultiPak of five standard cartridges (the **MultiPak "98S"** (92298S)) for high-volume users. Consumers could save $5-10 per cartridge by purchasing the pack instead of five individual cartridges.

• Finally, the **high-capacity "98X"** (92298X) cartridge was introduced in March 1997 to complete the EX cartridge family line. The 98X cartridge is compatible with all EX engine-based printers, including HP's newest addition, the LaserJet 5. HP increased cartridge yield from 6,800 pages to 8,800 pages, and with the new pricing structure, priced the new cartridge for less than the old price of a standard 98A.

For information regarding changes incorporated into the 98X cartridge, please refer to 42-F, Changes to the Cartridge.

HP's EX Cartridge Lineup

	Low-capacity 98E	Standard 98A	High-capacity 98X	MultiPak 98S
OEM Part Number	C3973A	92298A	92298X	92298S (5-92298A)
OEM Published Yield[1]	4,000 pages	6,800 pages	8,800 pages	6,800 pages/cart
OEM Toner Weight[2]	235 grams	335 grams	435 grams	335 grams ea. cartridge
Previous List Price (US)	$107	$144	NA	NA
Current List Price (US)-May	$95.50	$130.50[5]	$144[5]	$592.50
Ave. Wholesale Price (US)	$61.00	$80.00	$89.00	$361.00

[1]Based on 5% toner coverage

[2]Average weight

[3]Previous Prices reflect retail prices from the previous printig of this manual.

[4]Current Prices reflect retail prices as of June 1997

[5]Prices obtained from a March 3,1997 press release from Hewlett-Packard.

Canon® LBP-EX(LJ4)
Troubleshooting

Establishing Baseline Performance Benchmarks

We recommend that you perform a comprehensive series of test prints to establish the performance standards of your cartridges using Static Control's EX Imaging System Components. Listed below is a series of print targets that we developed for system evaluation. This test series will establish the normal print characteristics of the EX cartridge for comparison with your subsequent remanufactured cartridges. We further recommend that you retain the baseline cartridge as your standard to simplify future performance verification.

The test series also allows you to visually inspect a printed page and diagnose many printer and cartridge problems. Listed in the chart below are some of the problems that may be diagnosed using each page in the test series.

The Series One Analyzer EPROM print series also includes four 5% coverage test targets scientifically developed and calibrated for major printer models. The 5% coverage pages along with a measuring procedure are used to determine toner usage per page and accurate page yield results. *(See next page.)*

The Series One Analyzer EPROM is used with the G80 SmartBox® and can be purchased as a kit from Static Control. Contact your Static Control Sales Executive for more details.

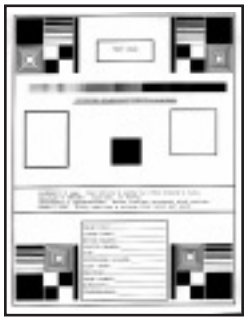
Table of Contents

SCC Series One Analyzer EPROM Print Targets

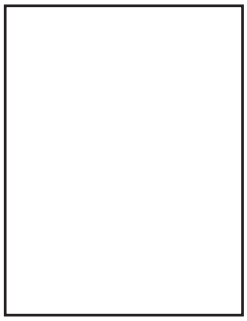
Test Print	Problems That May be Diagnosed Using the Test Print
Main Test Page	Drum Ghosting, Developer Roller Ghosting, Vertical Black Lines, Horizontal Black Lines, Toner Smear
Blank Page	Pin Hole Defects, Blasting
Black Page	Pin Hole Defects, Developer Roller Defect
BP80 Page	Improperly Formed Characters, Gear Defects, Fuser Offset, Bubble Print (or grapes)
Gray Page	Substrate Defects, Dropouts (faded areas)

Need help troubleshooting print defects? Call Technical Support.

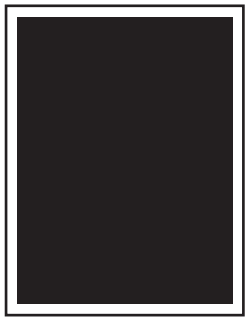
1.800.948.1072 (USA)
+44 (0) 118 935 1888 (UK)



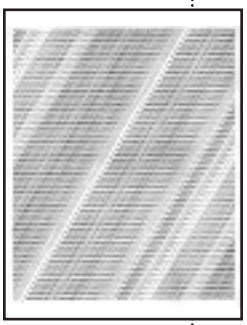
Main Test Page



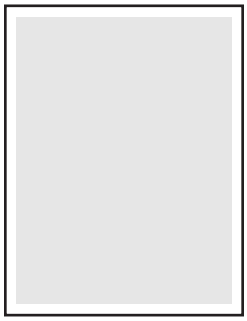
Blank Page



Black Page



BP80 Page



Gray Page

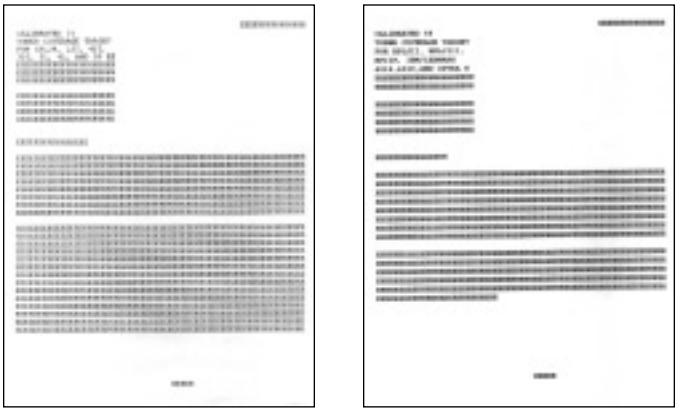
Measuring Toner Usage (Page Yield)

Toner usage (or page yield) information is often needed by a cartridge remanufacturer to determine cost per page in their remanufactured cartridges or to run their own page yield tests. An important aspect of determining toner usage is using the proper test target.

Our system development lab developed a set of standardized test prints using the letter E to determine toner usage for 12 of the most popular printer models. Different printers have different dot sizes determined by the manufacturer. You may have noticed that some printers appear to have darker text than others. For this reason, each printer system can require different number of E's to produce a 5% coverage page.

The necessity for engine-specific E-pages is best illustrated by comparing the difference between EX and SX 5% coverage pages arranged in business letter format as shown below. The EX machine requires a certain number of E's to reach 5% coverage. In comparison, the SX machine requires a different number of E's to reach 5% coverage. The business letter format is used for comparison only and should not be used for testing purposes. The 5% coverage page designed for yield testing features the letter E spread out over the normal printed area of 8" x 10" in order to avoid continuous printing in any one area.

Static Control's Series One Analyzer EPROM, used with the G80 Anacom SmartBox®, includes four E-pages and five print performance evaluation targets. *For more information, contact your Static Control Sales Executive.*



An example of how 5% coverage might look in a business letter format. The left page was printed on an EX printer and the right page printed on an SX printer

5% Coverage Test Targets available for:

- HP LaserJet® II, III, IIP, IIIP, IBM/Lexmark® 4019, 4029, 4039, Optra R, Optra L (Target #1)
- HP LaserJet 4/5, IIISi/4Si, 4L/4P, 5L, 5P/5MP (Target #2)
- HP LaserJet 5Si, 4V, IBM Network Printer 24 (Target #3)
- Lexmark Optra N (Target #4)

Product Information

G80 Smart Box with Analyzer™ . . . . . .(ANACOMG80-1US)
Includes: G80 Smart Box with Analyzer, Top Switch Pad, Anacom G80 Power Supply, Anacom G80 RS-232C/Cable, Anacom G80 Manual, Analyzer™ Users Guide, Test Pattern Reader 5% Reader Cards

Analyzer Chip Series 1 . . . . . .(ANLZS1)
Includes: Analyzer Yield Test-Standard, Laminate 5% Coverage Samples, Insertion Instructions, SCC Users Guide, Disposable Grounding Wrist Strap

For additional product and ordering information, call your Static Control Sales Executive.

To learn more about about page yield and toner usage, refer to Technical Bulletin SSS#112, Page Yield for Printer Cartridges.

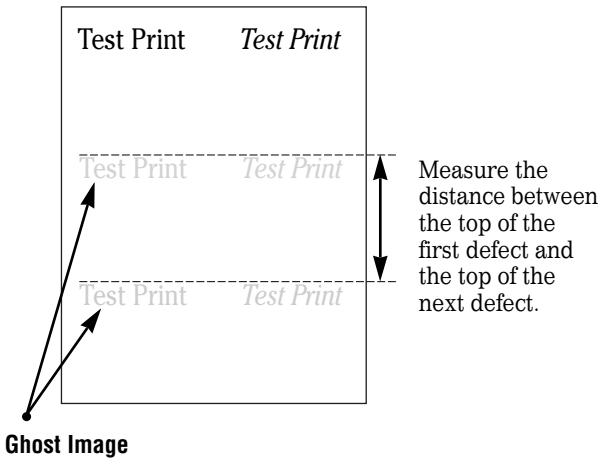
How to Measure Repetitive Defects

1. **Find the repeating defect.** Defects may appear as horizontal banding, dots, lines, or hazing. In EX cartridges, the repetitive defect will appear vertically on a page in the portrait orientation.

2. **Measure the distance between the defects.** Interval measurements are provided in both inches and millimeters. To get an accurate measurement, measure from the top or bottom of the first defect to the top or bottom of the next defect. Make sure you are measuring like defects. It is possible to have two sets of repetitive defects overlapping each other on the page.

3. **Find the interval number in the table below and the corresponding component.** Some probable causes of the defect are listed to help you with troubleshooting. This is not an exclusive list. Some repetitive defects may be the result of a combination of factors. If you have trouble locating a defect, call Technical Support at the telephone numbers listed on the back of this manual.

Example of Repetitive Ghosting Defect



Repetitive Defect Troubleshooting Guide

Interval	Component	Probable Cause of Defect
HP LaserJet® 4 , @ 2.5" (63 mm) Intervals **HP LaserJet® 4+(EX) HP LaserJet 5 (EX) Apple® 16/600 (ZX)** @ 3.09" (78.5 mm) Intervals	Upper Fuser Roller	Toner offsetting, fuser roller/pressure roller incompatibility, upper fuser roller/lower pressure roller wear/contamination
@ 2.5" (63 mm) Intervals	Lower Pressure Roller	Toner/pressure roller incompatibility, pressure roller wear/contamination (defect will appear on backside of page)
@ 1.97" (50.1 mm) Intervals	Mag Roller	Mag roller wear, mag roller electrical contact, mag roller cleaning damage, mag roller bushing wear, doctor blade failure, toner properties, mag roller contamination
@ 3.7" (94.2 mm) Intervals	OPC Drum	OPC wear, OPC damage, OPC contact, elliptical drum rotation, OPC light exposure degradation, PCR defect
@ 1.48" (37.7 mm) Intervals	Primary Charge Roller	PCR wear, PCR Contamination, toner properties, poor electrical contact, low RH% conditions, dry paper
@ 2.125" (54 mm) Intervals	Transfer Roller	Transfer Roller wear, Transfer Roller Contamination

Print Defect Troubleshooting Tips

The following table is a list of common print defects you may encounter during print testing. Included in the table is a general listing of probable causes for each type of defect; this listing will help direct you to the source of the defect.

If you have questions or require further assistance, call our Technical Support Staff at the telephone numbers listed below.

Print Defect	Probable Cause of Defect
Background	Inadequate drum charging/erasing, OPC wear, PCR wear, toner properties, low RH% conditions, dry paper
Ghosting	Inadequate drum charging/erasing, OPC wear, PCR wear, PCR contamination, low RH% conditions, toner properties, dry paper, upper fuser roller (toner offsetting)
Light Print	Mag roller, electrical contacts, OPC wear, PCR wear, toner properties, high RH% conditions, damp paper, doctor blade, transfer roller wear, stripped screw bosses under cartridge clips (right/left side light print)
Streaking/Lines	Wiper blade (sharp-edged lines), upper fuser roller, PCR contamination (vertical line), missing/damaged doctor blade end foam or mag roller felts (page edge line), OPC concentric ring wear (from PCR damage)
Random Sprinkles	Recovery blade, mag roller felts, mag roller sealing blade
Smudges	OPC contamination, upper fuser roller, mag roller contamination
Toner Offsetting	Upper fuser roller, lower pressure roller, toner properties

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Canon® LBP-EX(LJ4)
Troubleshooting

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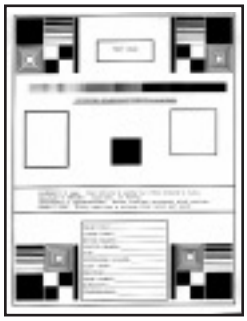
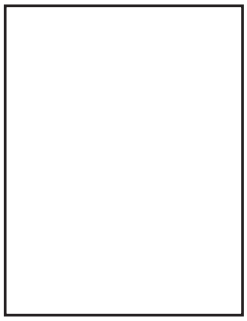


Main Test Page



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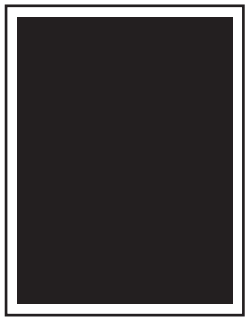

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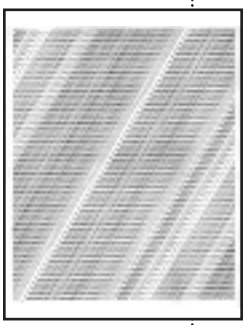
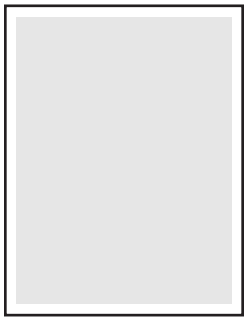


BP80 Page



Gray Page

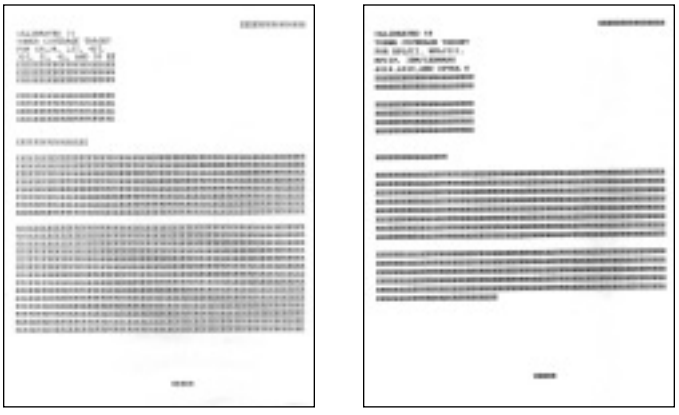
Measuring Toner Usage (Page Yield)

Toner usage (or page yield) information is often needed by a cartridge remanufacturer to determine cost per page in their remanufactured cartridges or to run their own page yield tests. An important aspect of determining toner usage is using the proper test target.

Our system development lab developed a set of standardized test prints using the letter E to determine toner usage for 12 of the most popular printer models. Different printers have different dot sizes determined by the manufacturer. You may have noticed that some printers appear to have darker text than others. For this reason, each printer system can require different number of E's to produce a 5% coverage page.

The necessity for engine-specific E-pages is best illustrated by comparing the difference between EX and SX 5% coverage pages arranged in business letter format as shown below. The EX machine requires a certain number of E's to reach 5% coverage. In comparison, the SX machine requires a different number of E's to reach 5% coverage. The business letter format is used for comparison only and should not be used for testing purposes. The 5% coverage page designed for yield testing features the letter E spread out over the normal printed area of 8" x 10" in order to avoid continuous printing in any one area.

Static Control's Series One Analyzer EPROM, used with the G80 Anacom SmartBox®, includes four E-pages and five print performance evaluation targets. *For more information, contact your Static Control Sales Executive.*



An example of how 5% coverage might look in a business letter format. The left page was printed on an EX printer and the right page printed on an SX printer

5% Coverage Test Targets available for:

- HP LaserJet® II, III, IIP, IIIP, IBM/Lexmark® 4019, 4029, 4039, Optra R, Optra L (Target #1)
- HP LaserJet 4/5, IIISi/4Si, 4L/4P, 5L, 5P/5MP (Target #2)
- HP LaserJet 5Si, 4V, IBM Network Printer 24 (Target #3)
- Lexmark Optra N (Target #4)

Product Information

G80 Smart Box with Analyzer™ . . . . . .(ANACOMG80-1US)
Includes: G80 Smart Box with Analyzer, Top Switch Pad, Anacom G80 Power Supply, Anacom G80 RS-232C/Cable, Anacom G80 Manual, Analyzer™ Users Guide, Test Pattern Reader 5% Reader Cards

Analyzer Chip Series 1 . . . . . .(ANLZS1)
Includes: Analyzer Yield Test-Standard, Laminate 5% Coverage Samples, Insertion Instructions, SCC Users Guide, Disposable Grounding Wrist Strap

For additional product and ordering information, call your Static Control Sales Executive.

To learn more about about page yield and toner usage, refer to Technical Bulletin SSS#112, Page Yield for Printer Cartridges.

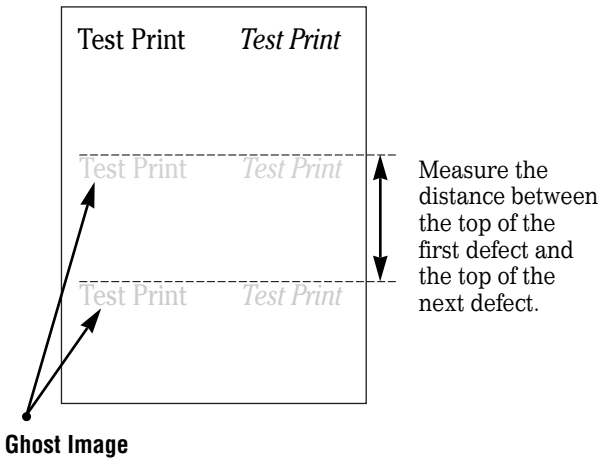
How to Measure Repetitive Defects

1. **Find the repeating defect.** Defects may appear as horizontal banding, dots, lines, or hazing. In EX cartridges, the repetitive defect will appear vertically on a page in the portrait orientation.

2. **Measure the distance between the defects.** Interval measurements are provided in both inches and millimeters. To get an accurate measurement, measure from the top or bottom of the first defect to the top or bottom of the next defect. Make sure you are measuring like defects. It is possible to have two sets of repetitive defects overlapping each other on the page.

3. **Find the interval number in the table below and the corresponding component.** Some probable causes of the defect are listed to help you with troubleshooting. This is not an exclusive list. Some repetitive defects may be the result of a combination of factors. If you have trouble locating a defect, call Technical Support at the telephone numbers listed on the back of this manual.

Example of Repetitive Ghosting Defect



Repetitive Defect Troubleshooting Guide

Interval	Component	Probable Cause of Defect
HP LaserJet® 4 , @ 2.5" (63 mm) Intervals **HP LaserJet® 4+(EX) HP LaserJet 5 (EX) Apple® 16/600 (ZX)** @ 3.09" (78.5 mm) Intervals	Upper Fuser Roller	Toner offsetting, fuser roller/pressure roller incompatibility, upper fuser roller/lower pressure roller wear/contamination
@ 2.5" (63 mm) Intervals	Lower Pressure Roller	Toner/pressure roller incompatibility, pressure roller wear/contamination (defect will appear on backside of page)
@ 1.97" (50.1 mm) Intervals	Mag Roller	Mag roller wear, mag roller electrical contact, mag roller cleaning damage, mag roller bushing wear, doctor blade failure, toner properties, mag roller contamination
@ 3.7" (94.2 mm) Intervals	OPC Drum	OPC wear, OPC damage, OPC contact, elliptical drum rotation, OPC light exposure degradation, PCR defect
@ 1.48" (37.7 mm) Intervals	Primary Charge Roller	PCR wear, PCR Contamination, toner properties, poor electrical contact, low RH% conditions, dry paper
@ 2.125" (54 mm) Intervals	Transfer Roller	Transfer Roller wear, Transfer Roller Contamination

Print Defect Troubleshooting Tips

The following table is a list of common print defects you may encounter during print testing. Included in the table is a general listing of probable causes for each type of defect; this listing will help direct you to the source of the defect.

If you have questions or require further assistance, call our Technical Support Staff at the telephone numbers listed below.

Print Defect	Probable Cause of Defect
Background	Inadequate drum charging/erasing, OPC wear, PCR wear, toner properties, low RH% conditions, dry paper
Ghosting	Inadequate drum charging/erasing, OPC wear, PCR wear, PCR contamination, low RH% conditions, toner properties, dry paper, upper fuser roller (toner offsetting)
Light Print	Mag roller, electrical contacts, OPC wear, PCR wear, toner properties, high RH% conditions, damp paper, doctor blade, transfer roller wear, stripped screw bosses under cartridge clips (right/left side light print)
Streaking/Lines	Wiper blade (sharp-edged lines), upper fuser roller, PCR contamination (vertical line), missing/damaged doctor blade end foam or mag roller felts (page edge line), OPC concentric ring wear (from PCR damage)
Random Sprinkles	Recovery blade, mag roller felts, mag roller sealing blade
Smudges	OPC contamination, upper fuser roller, mag roller contamination
Toner Offsetting	Upper fuser roller, lower pressure roller, toner properties

STATIC CONTROL COMPONENTS, INC.

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Int'l 919·774·3808 • Int'l Fax 919·774·1287
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anon® LBP-EX(LJ4)

roblem Solving

Vertical Edge Light Print

A Common Cause and How to Prevent it

Light print appearing vertically along the left or right side of the page, but particularly on the right side, is a unique print defect associated with the EX cartridge. Although you may first search for faulty imaging components, the root of the problem is actually found in the cartridge shell.

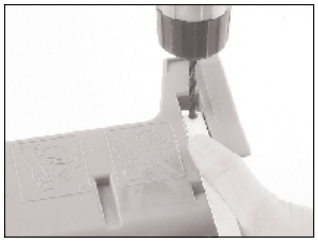
The top assembly screw bosses in the waste bin section become increasingly problematic due to their high wear rate. The screw bosses are easily stripped by repeated removal/installation and excessive torque applied to the screws. Within only a few cycles, the screws can begin to loosen or fall out. The top assembly screws and cartridge clips secure the mag roller and drum sections and maintain a constant air gap between the drum and mag roller. The mag roller bushings provide the proper air gap between the drum and mag roller. A loose or missing screw can cause the sections to separate during cartridge handling and operation, and can cause light print where the air gap has increased. While the light print defect is seen more frequently on the right side of the page, the defect may appear on either side.

Light print defect caused by a stripped screw boss.

Preventing this light print defect depends on repairing the stripped top assembly screw bosses. Glue or epoxy are commonly used for repair but offer only temporary results. Epoxy will dry and crack, and glue quickly deteriorates. Because the top assembly screws hold the entire cartridge together the screws must be 100% secure during handling and operation. A high-strength brass insert and machine screw system will permanently restore top assembly screw bosses and completely eliminate the potential for stripped screw bosses. As part of our remanufacturing process, we recommend installing the brass inserts after the OEM cycle.

Static Control's LJ4 Screw Hole Repair Kit

Step one

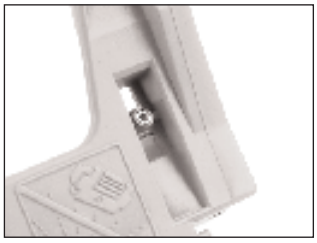


Drill the stripped screw boss.

Step two

Install a brass insert.

Finishing



Screw boss completely restored. Use custom machine screw for reassembly.

Table of Contents

Need help?
Call Technical Support.

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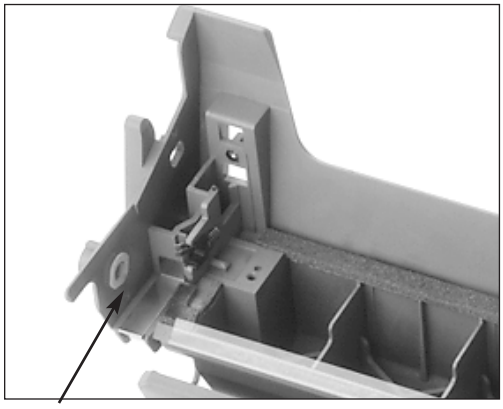
Canon® LBP-EX(LJ4)
Changes to the Cartridge

October 1992
Introduction of LaserJet® 4

1993
Addition of Bushing in Waste Bin

In 1993, a white bushing was added to the gear support boss in the waste bin section that supports the drum's spur gear axle. Before the addition of the bushing, the spur gear mounted directly in the support boss. Both the axle and support boss suffered wear that caused some misalignment of the drum. Customers reported that the misalignment caused left-side light print defects.



White bushing added to waste bin to prevent excessive wear to the drum's spur gear and support bearing.

When early style cartridges display wear in the support boss, a pin can be installed in the support boss to realign the drum to its original position and to support the axle above the worn area. New style waste bins equipped with the white bushing wear minimally and do not require a pin.

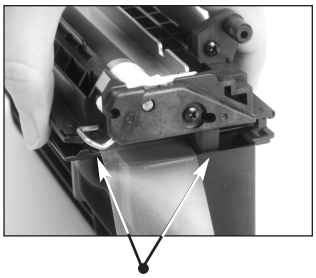
Spring 1995
Change in OEM Seal Material and addition of guide posts in hopper

In the spring of 1995, our cartridge laboratory identified a new type of OEM seal material and the addition of guide posts at the opening of the seal channel. These new developments severely limits the use of insertable seals and virtually dictate splitting the hopper in order to obtain a reliable seal.

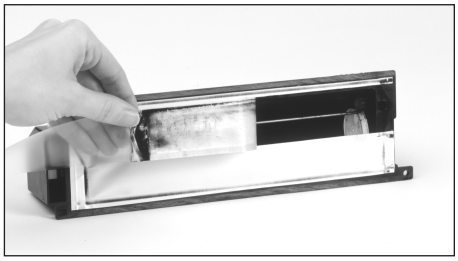
The hopper incorporates a wide post molded into the mag roller section of the hopper that extends into the hollow at the end of the toner reservoir, as shown on the right. A second, smaller post is molded into the toner reservoir section of the hopper that butts against the outside edge of the mag roller section. Together, the posts guide the pull strip straight out of the seal channel when the strip is pulled by the end user. The position of the large post near the center of the sealing channel narrows the opening to 1.375" and prevents the insertion of existing EX insertable seals.

The new seal material is a ribbon-type seal that is commonly found in other Canon cartridges such as the LX, BX, and NX. Like the original style seal material, this new material is sealed to the perimeter of the hopper. Whereas the old seal material was pulled out completely by the end user, approximately half of the new seal material is left in the hopper once the pull strip is removed. (See photo above) Using insertion seals can dislodge the seal material so that it blocks the toner port,

continued on back



Two posts guide the seal out of the seal channel. Posts also prevent use of current insertable seals.



Once the pull strip is removed, about half of the new filament seal material remains in the seal channel.

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