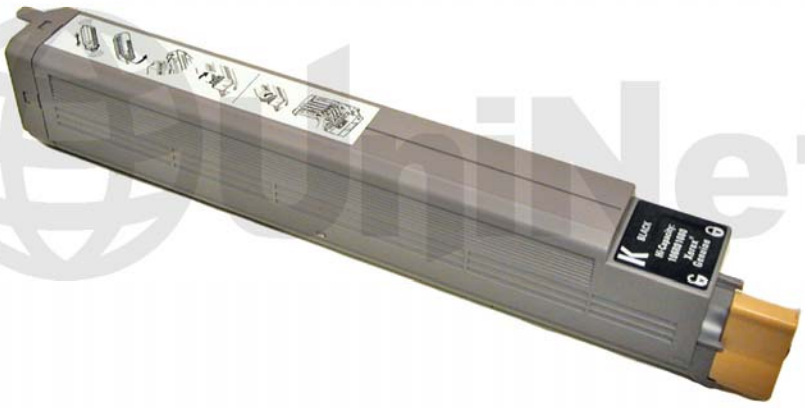
XEROX® PHASER 7400

CARTRIDGE REMANUFACTURING INSTRUCTIONS



TONER CARTRIDGE

DRUM CARTRIDGE

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REMANUFACTURING THE XEROX PHASER 7400 TONER & DRUM CARTRIDGES

By Mike Josiah and the Technical Staff at UniNet

The Xerox Phaser 7400 printers are based on a 36ppm color/40ppm monochrome, 1200 dpi engine. All versions are based on an 800MHz PowerPC chip, and come standard with either 256MB or 512MB memory (depending on the model). In all models the maximum is 1GB of memory. This engine uses a two cartridge system, a toner tube and a drum unit. The toner tube is very easy to remanufacture, the drum unit is a bit more complicated but also fairly easy to do. Both cartridges will be covered in these instructions.

MACHINES BASED ON THE PHASER 7400 ENGINE

Phaser 7400
Phaser 7400DN
Phaser 7400DT
Phaser 7400DX
Phaser 7400DXF

These units have four toner tubes, four drum units, a separate waste toner cartridge and transfer unit. With the exception of the black, the toner tubes come in both standard and high yield (9,000 and 18,000) yields. The black tube comes only in a 15,000 page yield. It is interesting to note that both the toner tube and the drum unit need to be reset. The toner tube uses a chip while the drum unit uses a fuse. Both need to be replaced each cycle. The toner tube chips are hidden under the cartridge identification label, while the drum unit's fuse is in an end cap.

In addition to the drum unit, the fuser assembly and transfer belts both have a fuse installed on them. When a new unit (drum transfer or fuser), is detected, the printer resets that units life counter and then blows the fuse. The counter will not show as reset until two pages have been printed. After the counter has been reset, it will count the pages printed until the maximum life has been reached for that unit.

CARTRIDGES USED IN THE XEROX PHASER 7400

106R01080	**15,000 page yield**	**Black cartridge**	**$181.00 retail***
106R01150	**STD yield (9,000 pages)**	**Cyan cartridge**	**$296.00 retail***
106R01151	**STD yield (9,000 pages)**	**Magenta cartridge**	**$296.00 retail***
106R01152	**STD yield (9,000 pages)**	**Yellow cartridge**	**$296.00 retail***
106R01077	**High yield (18,000 pages)**	**Cyan cartridge**	**$437.00 retail***
106R01078	**High yield (18,000 pages)**	**Magenta cartridge**	**$437.00 retail***
106R01079	**High yield (18,000 pages)**	**Yellow cartridge**	**$437.00 retail***
108R00650	**Black drum unit (30,000 pages)**		**$188.00 retail***
108R00647	**Cyan drum unit (30,000 pages)**		**$188.00 retail***
108R00648	**Magenta drum unit (30,000 pages)**		**$188.00 retail***
108R00649	**Yellow drum unit (30,000 pages)**		**$188.00 retail***
106R01081	**Waste toner cartridge (30,000 pages)**		**$309.00 retail***

***Retail pricing in US dollars, as of July 2007. The fuser assembly is rated for 100,000 pages.**

It is also important to note that new OEM drum cartridges come filled with toner. When you rebuild a drum unit, it is important to include a rebuilt toner tube so that the customer gets the same value. It is possible to fill the drum unit without a tube, but it is extremely difficult, and the possibility of dumping the toner is very high. A filled tube is a much better way to go, plus if you give them a high yield version, you can charge more and still give your customers better value.

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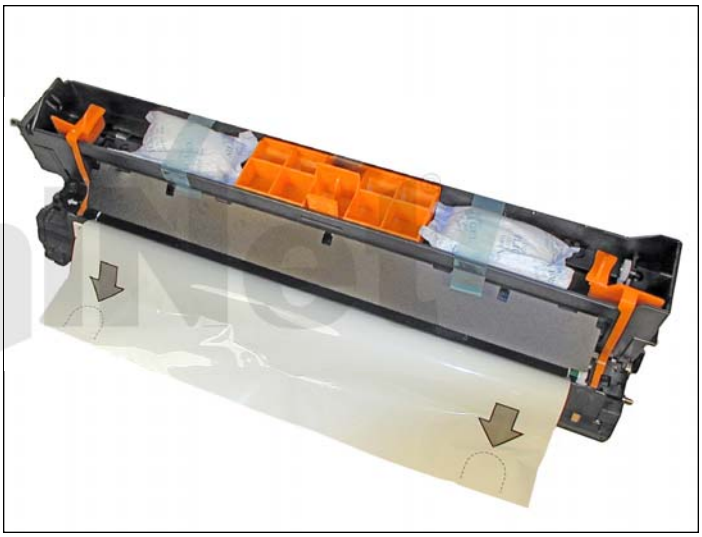
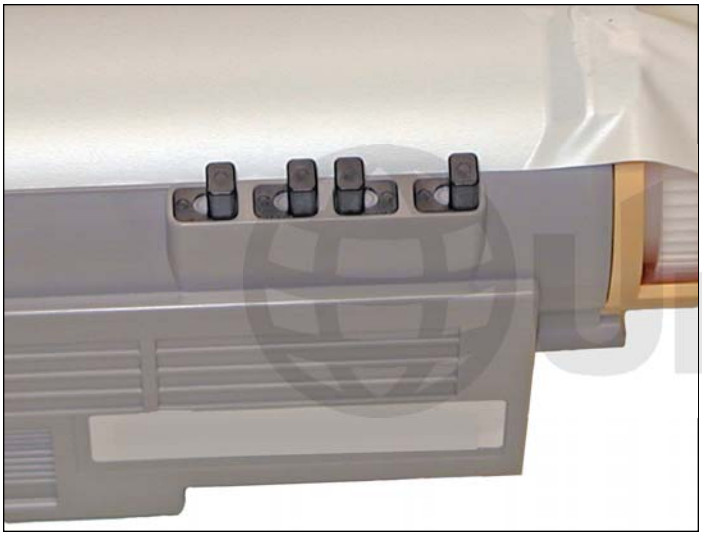
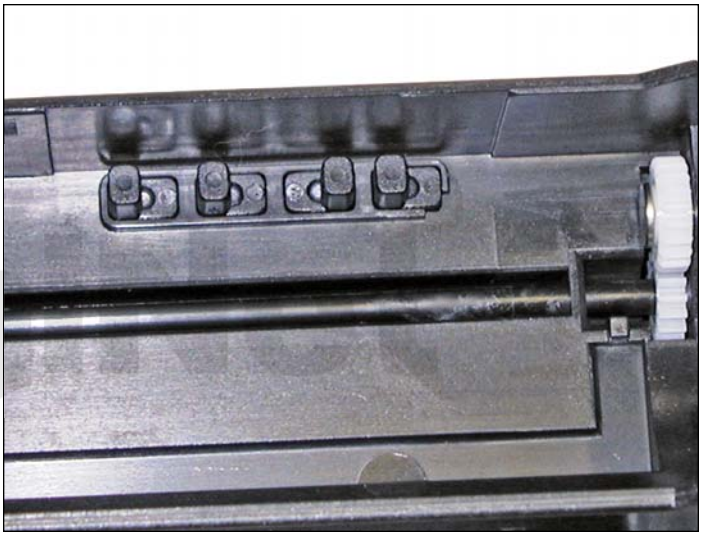
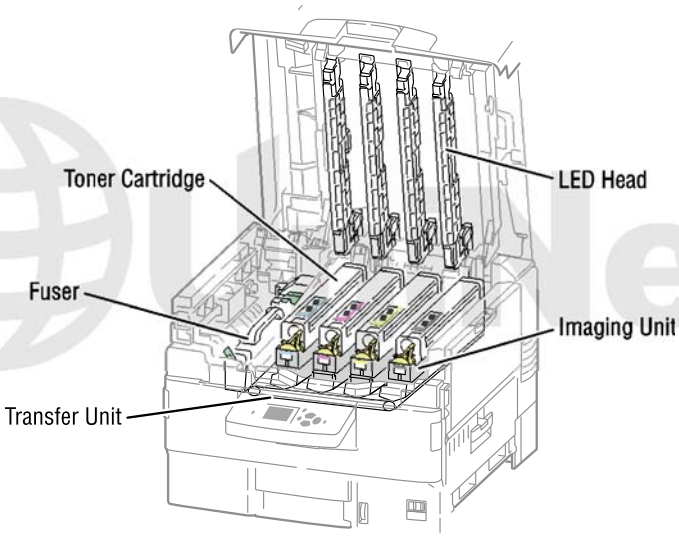


The two upper photos show how the drum unit comes packaged.



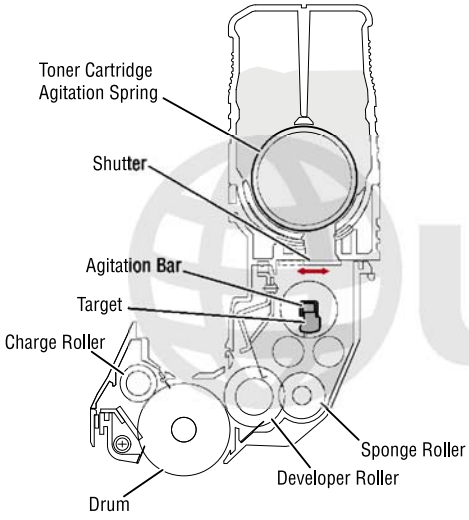


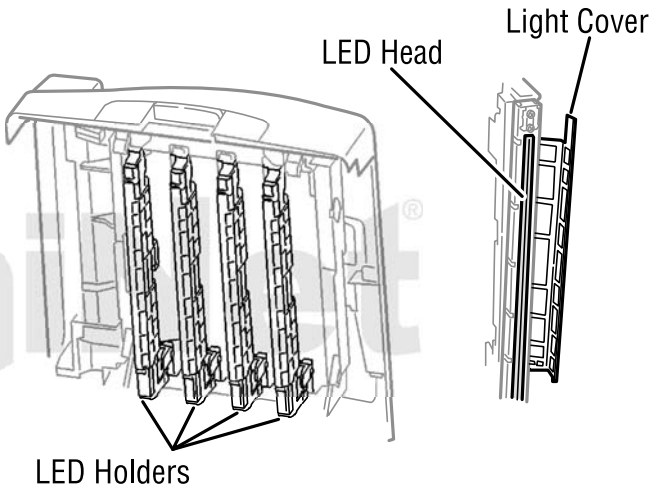
Photos here show the tab system that keeps different color toner cartridges from accidentally being installed in the wrong drum units. The cartridges shown are for the black system. Since this printing system is different from anything covered in the past, we will be covering the printer theory here. Cartridge and printer troubleshooting, as well as how to print test pages, will be covered at the end of this article.



CARTRIDGE THEORY

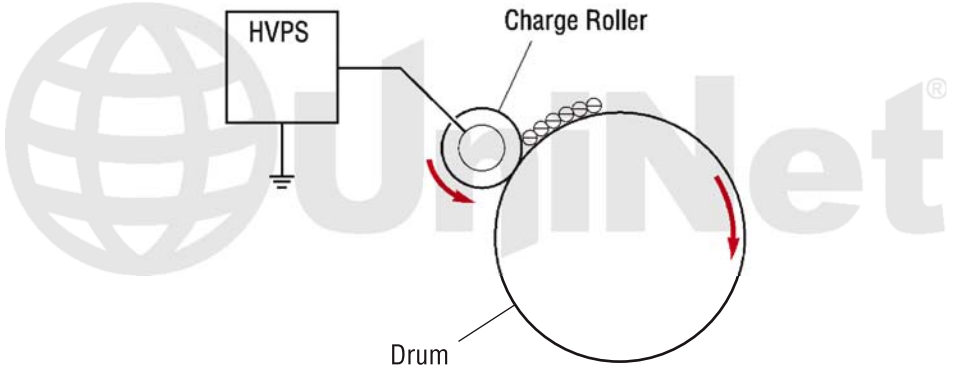
As with most other theory sections we have done, the easiest way to follow the theory is to break it down into a series of steps or stages. But first the first three diagrams show in general the physical layouts of some of the more important parts. The diagram above shows an overview of the printer, toner and drum (imaging) units as they all relate to each other. Note that these machines are not laser printers. They are LED printers. Each color has a bank of LED's that write the image to the drum.





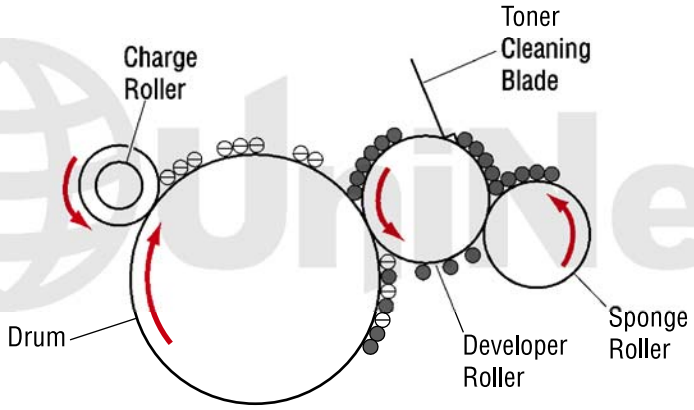
Left: a nice side view breakdown of both the drum unit and the toner tube.

Right: LED heads shown in the top cover of the printer and their covers.

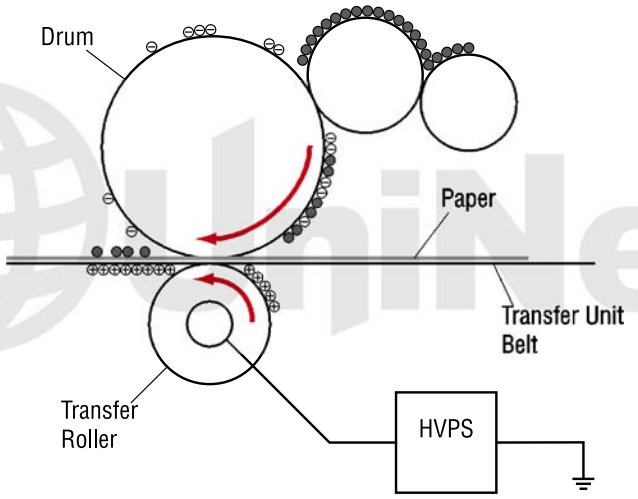


In the **first stage**, the Primary Charge Roller (PCR) places a uniform negative DC voltage on the OPC drum surface. The amount of the negative DC voltage placed on the drum is controlled by the printer's intensity setting. This process occurs simultaneously for all four color cartridges.

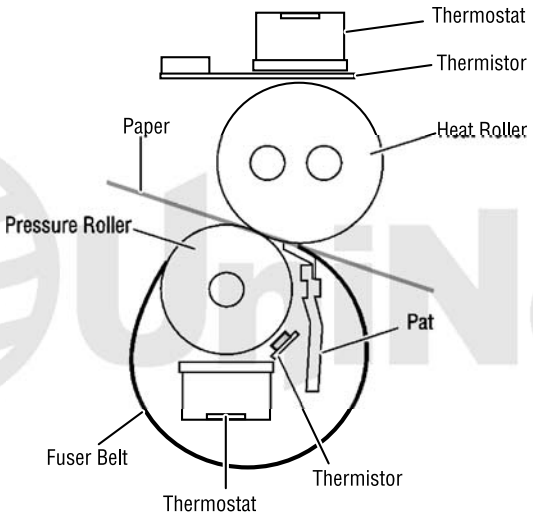
In the **second stage**, the LED head emits light directly to the negatively charged surface of the drum. LED printers do not use scanners or mirrors; the LED head spans the width of the entire page with hundreds of individual LED lamps. This light leaves a latent electrostatic image on the drum. The areas where the light did not strike the drum will retain the higher negative charge. Unlike lasers, LED heads also have the ability to change the power of the light that strikes the OPC drum. This process allows for better control of half tones. Each color cartridge has its own LED head; all four Led heads operate simultaneously.



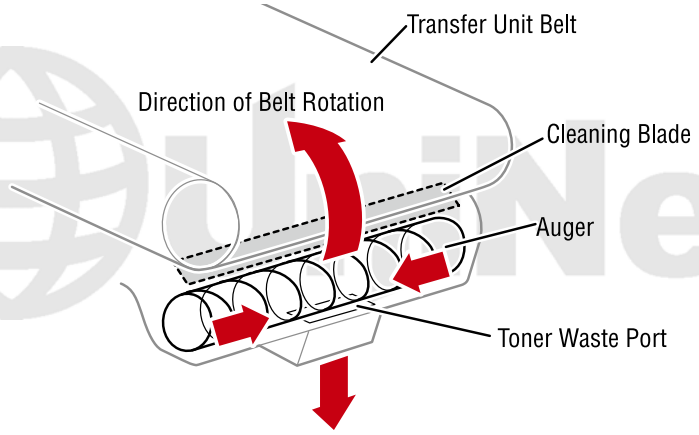
The **third or developing stage** is where the toner is developed on the drum by the developing section (or supply chamber), which contains the toner particles. The development stage is actually made up of two steps: toner charging, and the actual development. In the toner charging stage, the toner feed (sponge) roller turns inside the hopper. As the sponge feed roller brings the toner to the developer roller it also places a negative charge on the toner. This charge ensures a uniform charge on the toner. Once the toner is properly charged, the toner will coat the developer roller. The toner is also held onto the developer roller by another negative DC bias voltage. This voltage is controlled by the printer's intensity setting, and causes either more or less toner to be attracted by the developer roller. This in turn will either increase or decrease the print density. The amount of toner on the developer roller is controlled by the doctor blade, which uses pressure to keep the amount of toner on the roller constant. As the light exposed areas of the OPC Drum approach the developer roller, the toner particles are attracted to the drum's surface due to the opposite voltage potentials of the toner, and LED light exposed areas of the OPC drum.



The **fourth stage** is the transfer stage. In this stage, the transfer roller (which is located directly opposite each OPC drum), places a positive DC bias charge on the back of the transfer belt. Each toner cartridge has a separate transfer roller that is made from a conductive sponge material. At the same time, the paper is moving between the OPC drum and the transfer belt. As the paper/belt passes the transfer roller, the positive charge is picked up, and draws the negatively charged toner off the drum onto the paper. This process is repeated for each color cartridge. As the toner piles onto the paper, the positive charge on the paper weakens as the paper runs through each cartridge. For this reason, the charge is increased slightly from the transfer charging roller for each successive color.

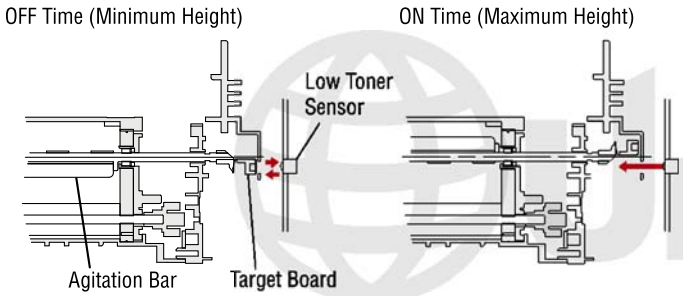


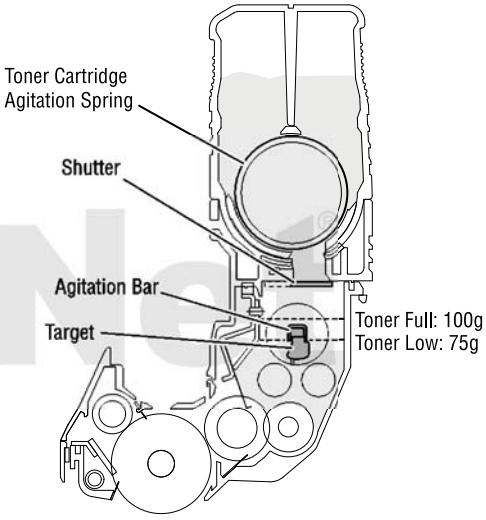
In the **fifth stage**, the image is then fused onto the paper by the fuser assembly. The fuser Assembly is comprised of the heating assembly and pressure roller. The pressure roller presses the page up into the heating assembly which then melts the toner into the paper. The heating assembly consists of a flexible sleeve with the pressure roller inside and a heat roller that sits on top of it. This system is very different from other HP or Lexmark systems.



DRUM & TRANSFER BELT CLEANING

The drum and transfer belt are both cleaned after the image is transferred to the paper. Unlike most of the more complicated HP systems, these machines have just a simple wiper blade/auger system that removes the old toner and places it into the waste cartridge. Both the drum unit and the transfer belt have separate cleaning systems, but all the waste toner from both units goes to the same separate waste unit.





TONER LEVEL DETECTION

Each drum unit contains an Agitation gear and Agitation bar. The Agitation bar moves the toner to the area above the developer roller. Located at the end of the Agitator bar is the toner low sensor target. Located in the printer, the toner low sensor is an optical sensor that monitors the amount of light reflected back from the target. As the toner level drops, the period of time that the agitation bar remains at its highest point is reduced. This time change signals toner level changes. There are three levels of toner status; OK, Low and empty. When the empty state has been reached, the printer terminates the current job (at the end of the current page), and will not accept any new jobs.

After checking the toner level 3 times, and the toner level state remains low, the toner supply agitator rotates and brings more toner into the hopper. Once the toner level returns to high, the agitator stops rotating. After the toner low state is detected 20 times, the printer considers the toner tube empty.

SUPPLIES REQUIRED

1. Phaser 7400 toner (correct color for drum and tube)
2. New wiper blade
3. New OPC drum
4. Sealing strip
5. Shipping locks
6. Replacement chip for toner tube
7. Replacement fuse for drum unit
8. Drum lubricant
9. PCR cleaner
10. Conductive grease

TOOLS REQUIRED

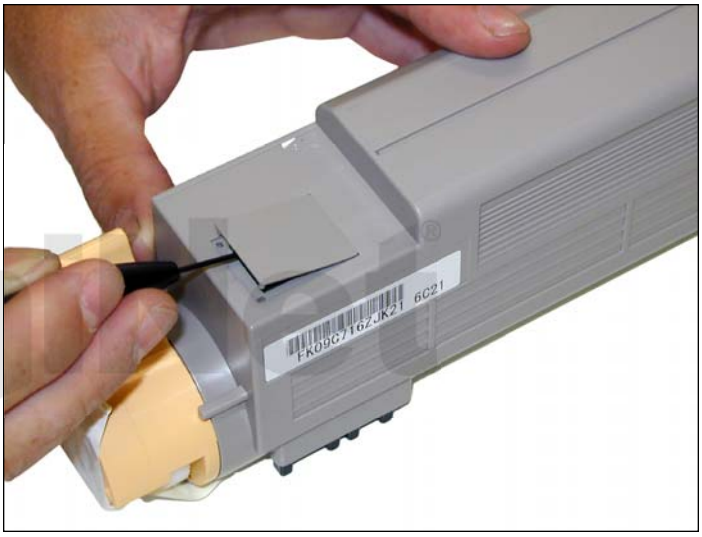
1. Toner approved vacuum
2. A small (jeweler's) common screwdriver
3. Phillips head screwdriver (#1)
4. Needle nose pliers

TONER CARTRIDGE

1. Clean the exterior of the cartridge.

With a small jewelers screwdriver, carefully pry out the fill plug and vacuum the hopper clean.

2. Carefully peel the part number label off the handle side of the tube.

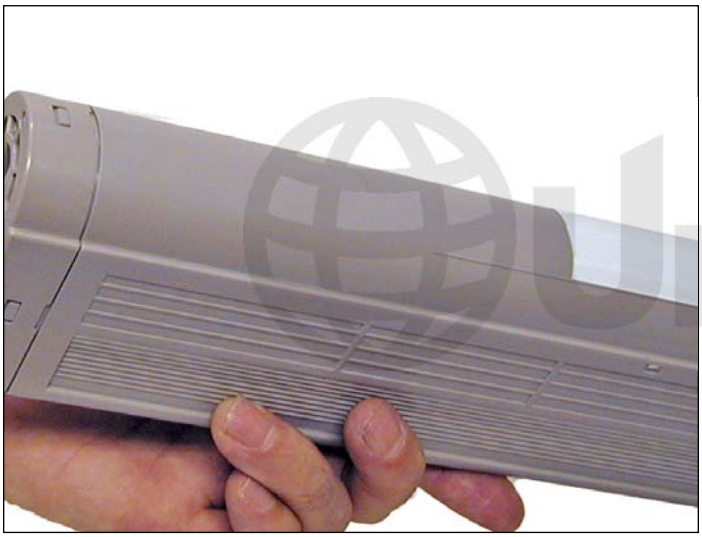


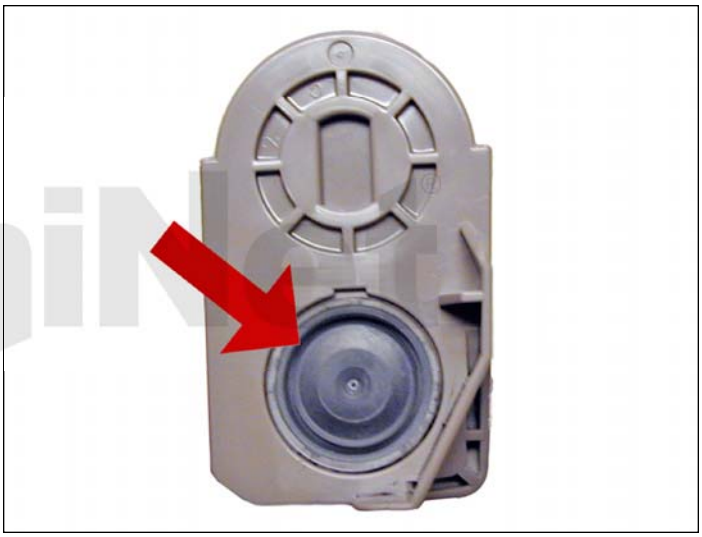
3. Remove the chip cover with a small jeweler's screwdriver.

4. Replace the chip, cover and label.

Be careful to use the correct color chip!

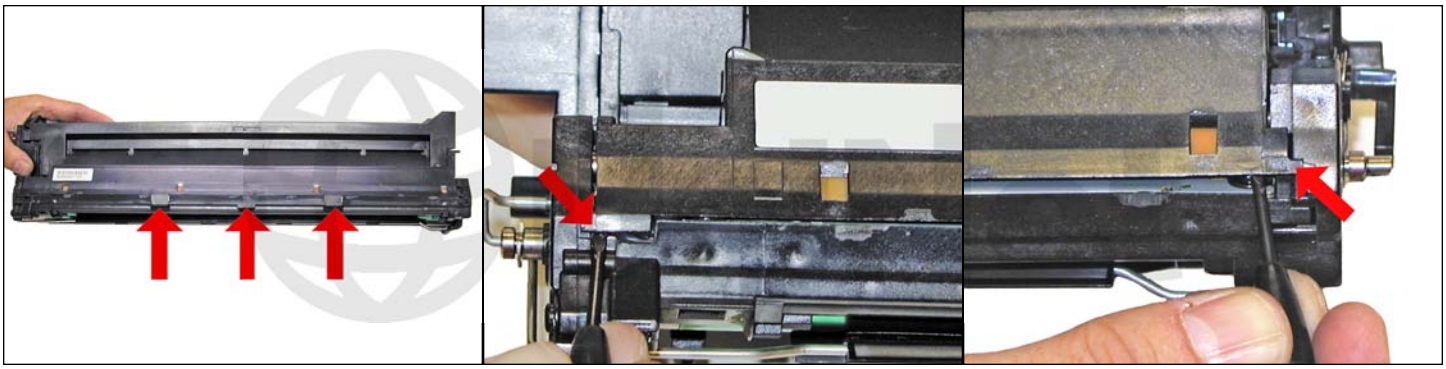
5. Place a tape seal across the bottom of the tube.





6. Fill the hopper with the correct color toner, and replace the fill plug.

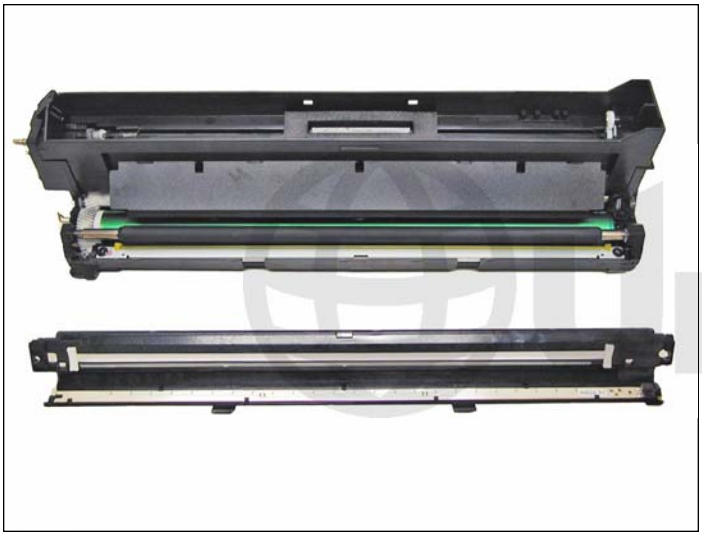
The toner tube is finished!



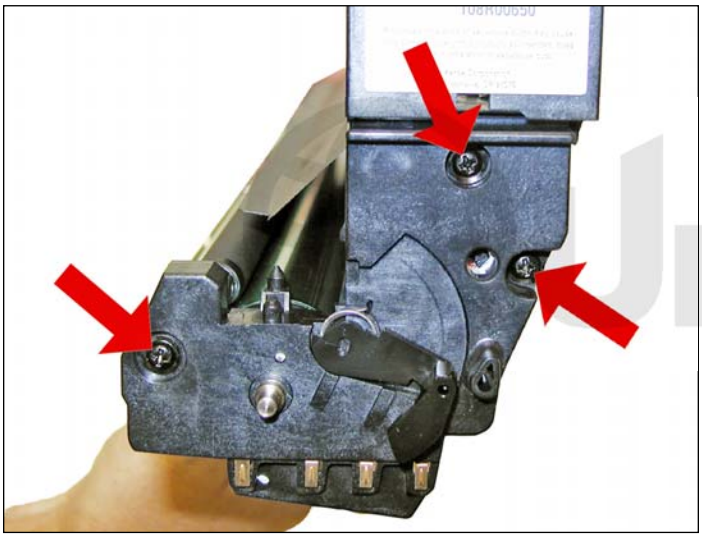
DRUM UNIT

7. On the front edge of the cartridge, release the two large plastic tabs and two small tabs on the side of the cartridge.

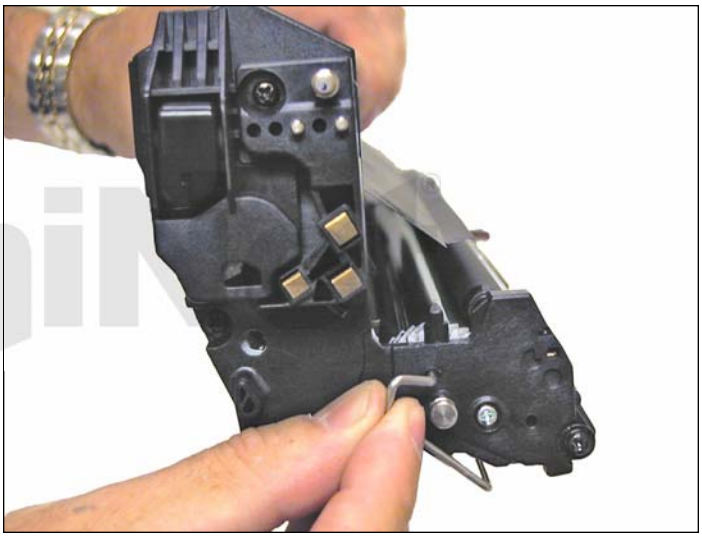
There is one on each side).



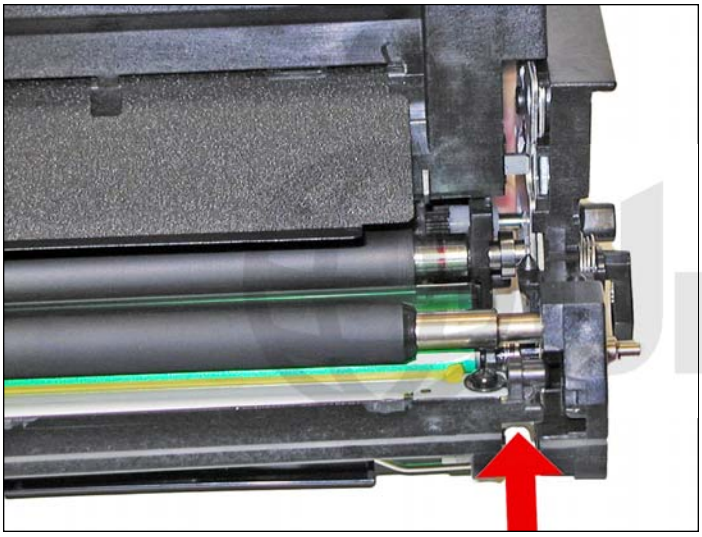
Remove the cover.



8. On the right (label) side of the cartridge, remove the three screws from the end cap.



9. Remove the drum cover arm from the left (non-label) side of the cartridge. Note that the rest of the drum cover assembly is built inside the right end cap. The end cap, drum axle and drum cover will all be removed as one unit. There is no reason for these assemblies to be taken apart further. Put a piece of tape across the drum cover arm so that it does not come loose and you should not have any problems with this assembly.



10. Slowly start to remove the right side end cap. Do not fully remove it yet as many parts will now come loose.

11. Remove the PCR by sliding it over to the right and lifting out. Be careful not to lose the PCR holder and springs. They may come loose.

12. Remove the side screw and waste chamber.

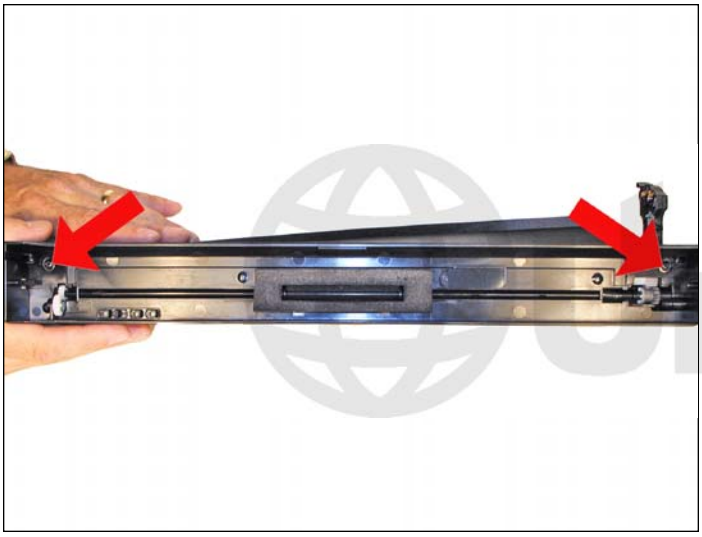
This is done after the left side posts are free from the end cap.

Turn the chamber up and lift out.

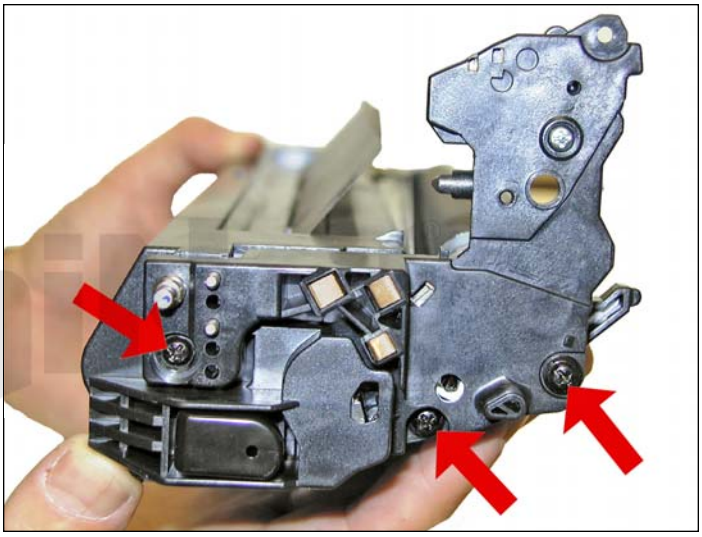
13. Slide the Right end cap completely off.

The drum, axle and cover will come with it.

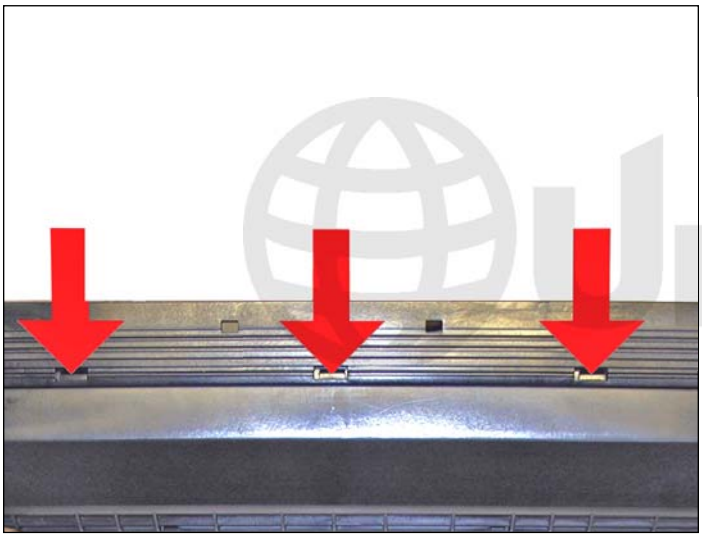
14. Remove the drum from the axle.

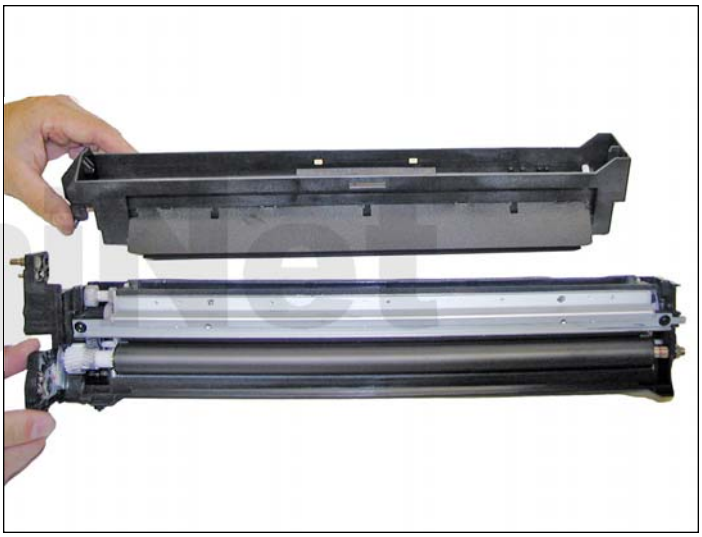


15. Remove the two screws from the inside of the toner hopper.



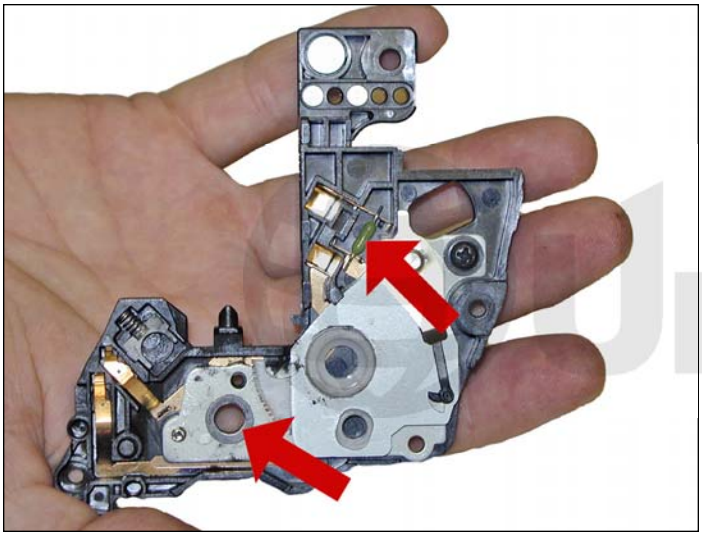
16. On the left (non-label) side, remove the three remaining black screws. The single silver screw does not have to be removed.



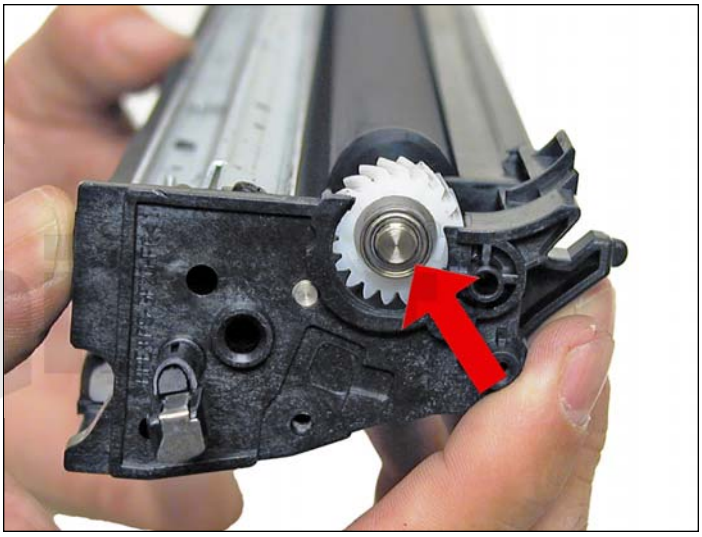


17. Lift up on the front edge of the toner hopper; release the three tabs from the back.

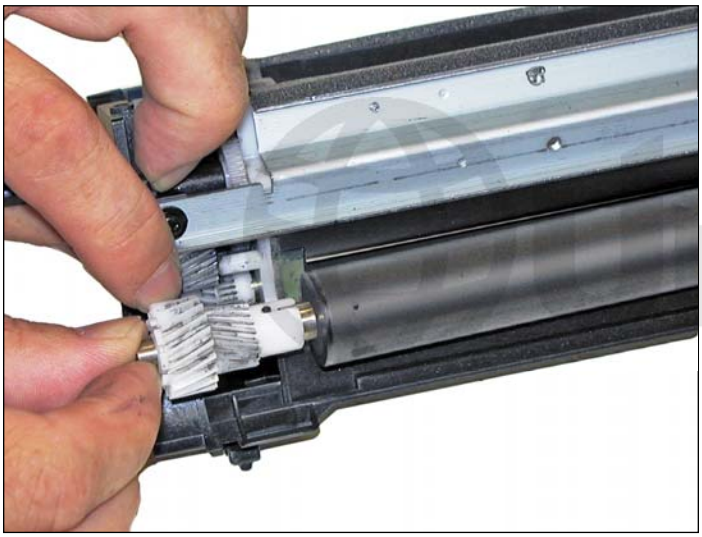
Remove the hopper.



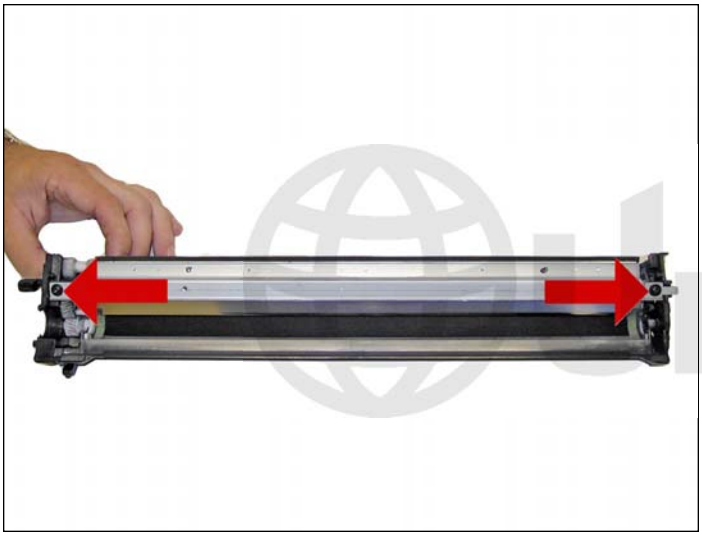
18. Remove the end cap. Note the fuse and flat washer on the metal plate. The fuse needs to be replaced before the cartridge is re-assembled (later step).



19. Remove the bearing from the developer roller shaft.



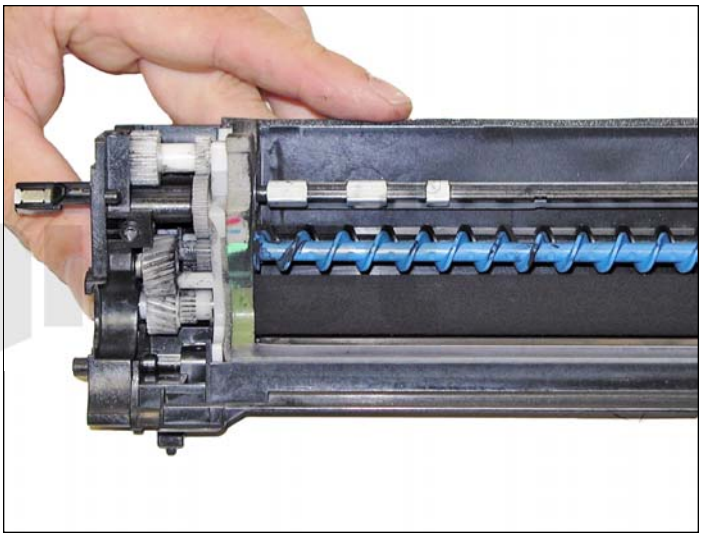
20. Press in on the gear side of the developer roller shaft and lift the roller up and out of the cartridge.



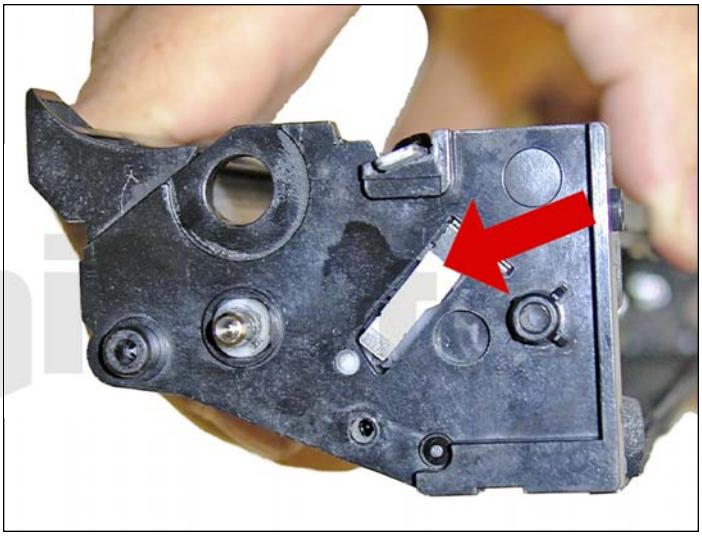
21. Remove the two screws on the doctor blade.

Carefully remove the blade.

22. Clean out all remaining toner from the auger and supply roller.

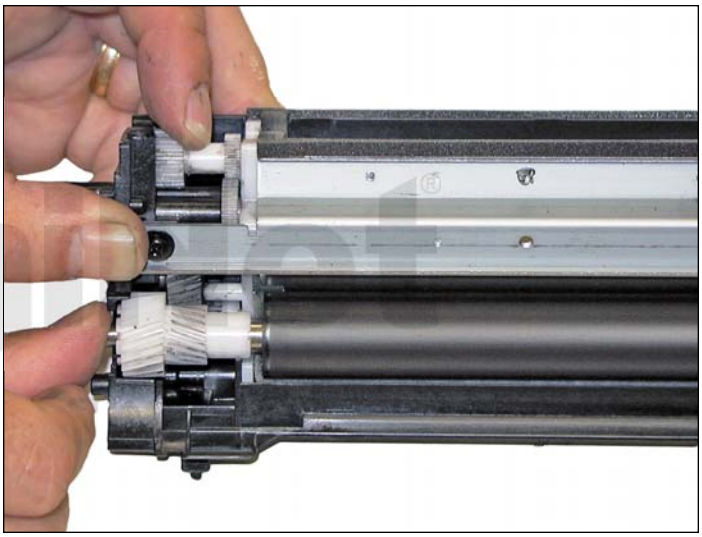


23. There is no need to remove the gear end cap, just make sure the gears are free from excess toner.



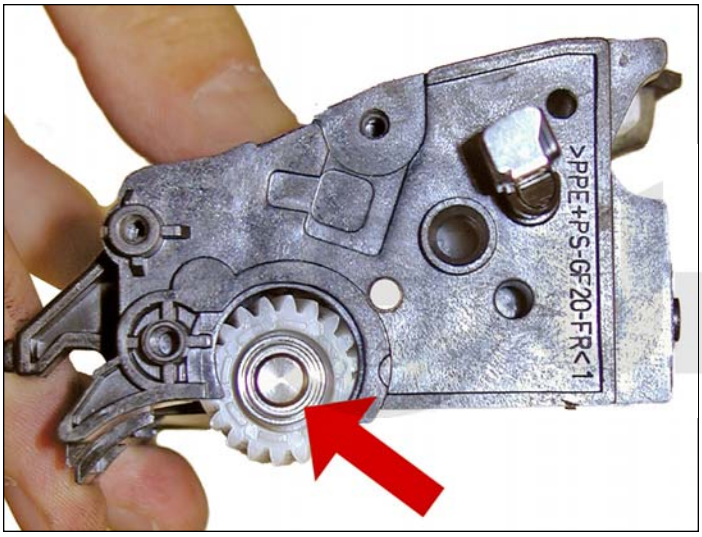
24. Install the doctor blade and two screws.

Make sure you don't lose the side contact plate, it can come loose.

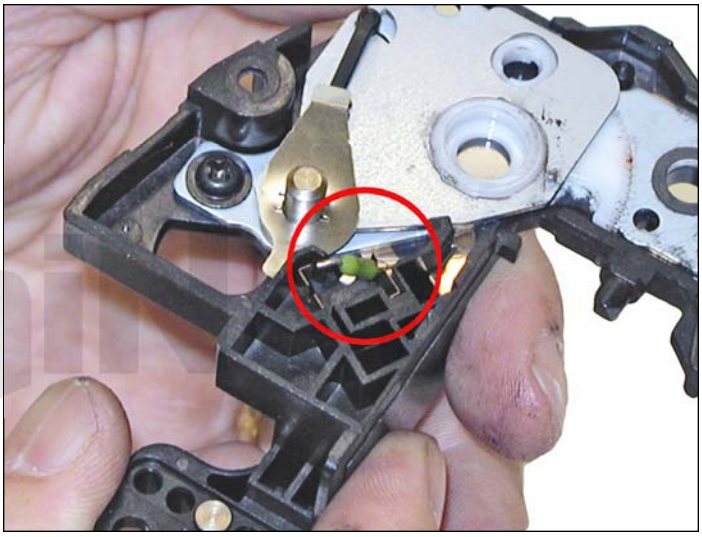


25. Slide the non gear side of the developer roller into the slot on the right side.

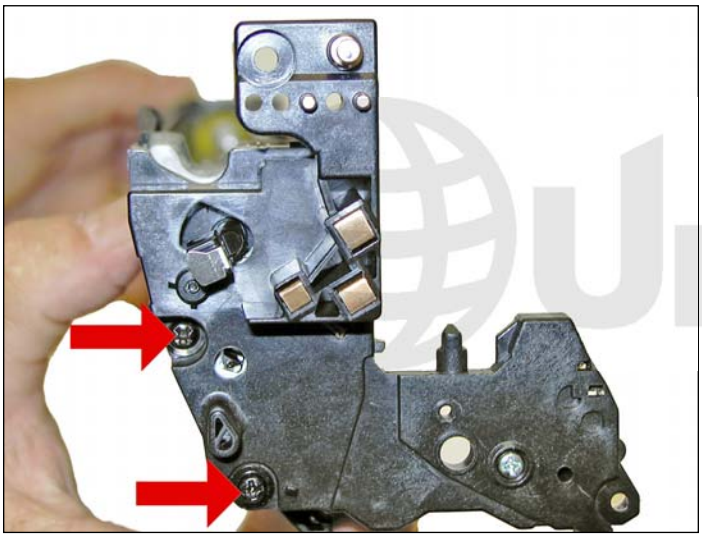
Pull out gently on the gear end cap and drop the developer roller in place.



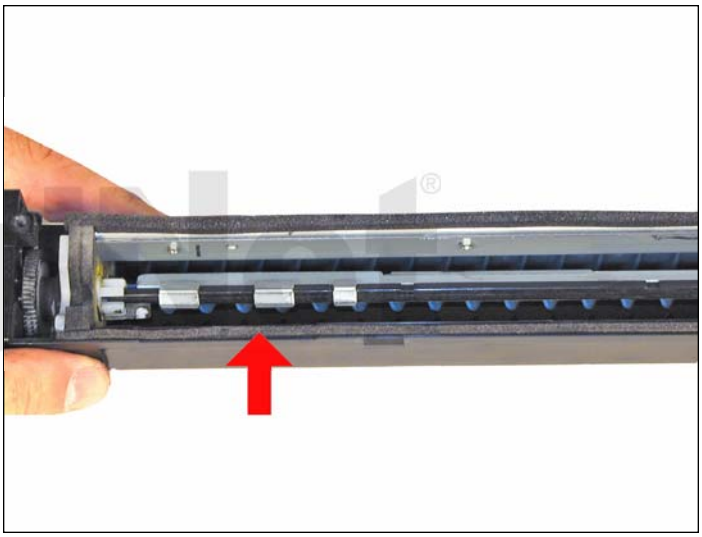
26. Install the bearing onto the gear side of the developer roller shaft.



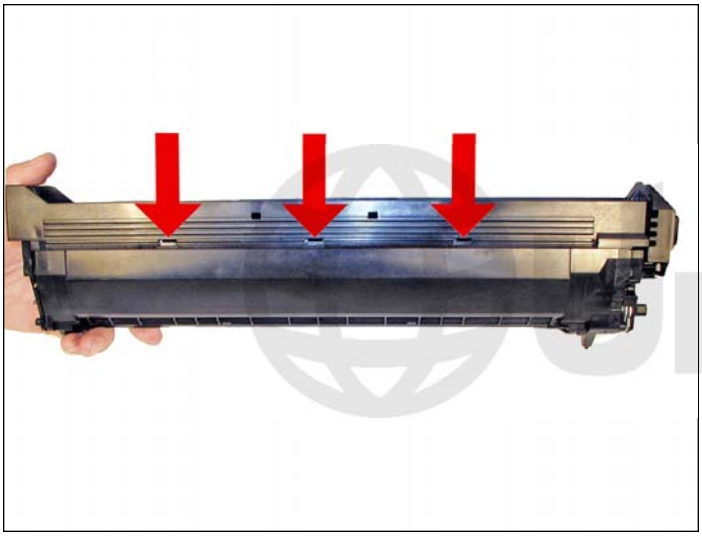
27. Change the fuse in the left end cap. The fuse just snaps in and out, no soldering needed. Make sure the bushing and small gear is sitting properly.



28. Install the left end cap and two black screws as shown.

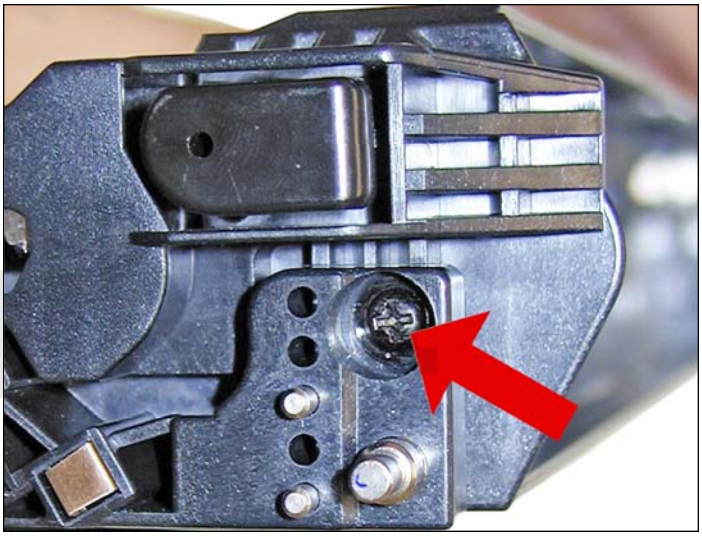


29. If the foam seal came loose, replace it now. You may have to condense the seal a little in order for it to fit properly.



30. Install the toner hopper and two inside screws.

Make sure the three tabs are locked in place.

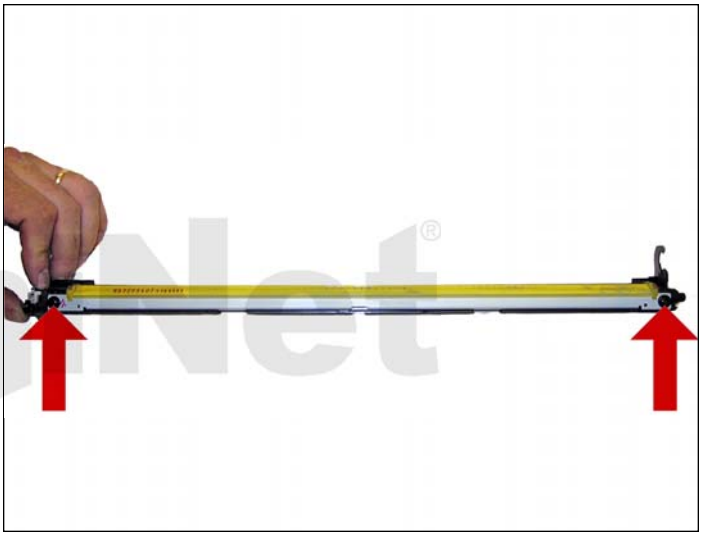


31. Install a black screw into the end cap/toner hopper.

32. Slide a new drum on to the drum axle shaft.

33. Partially install the right end cap/drum/drum cover assembly.

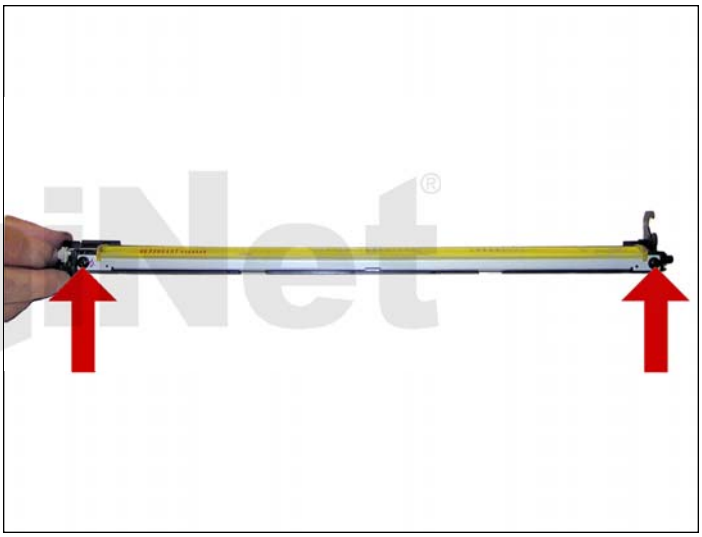
34. Install the PCR into its holders.



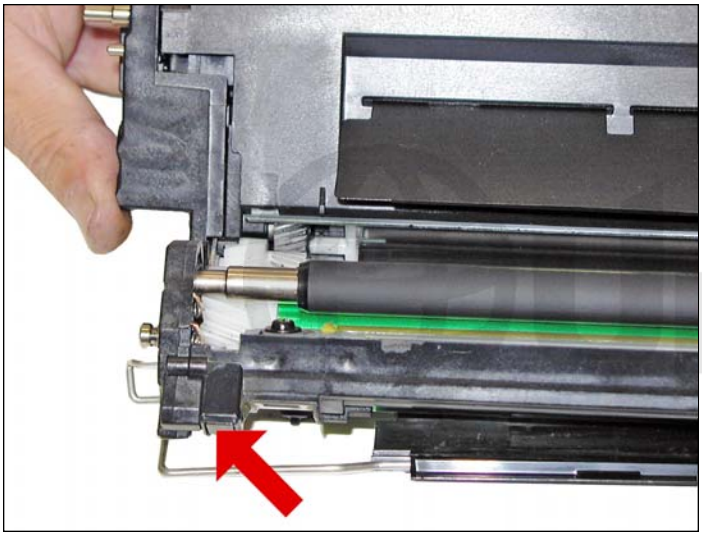
35. Take the waste chamber and remove the two screws from the wiper blade. Remove the blade.

36. Clean out all toner.

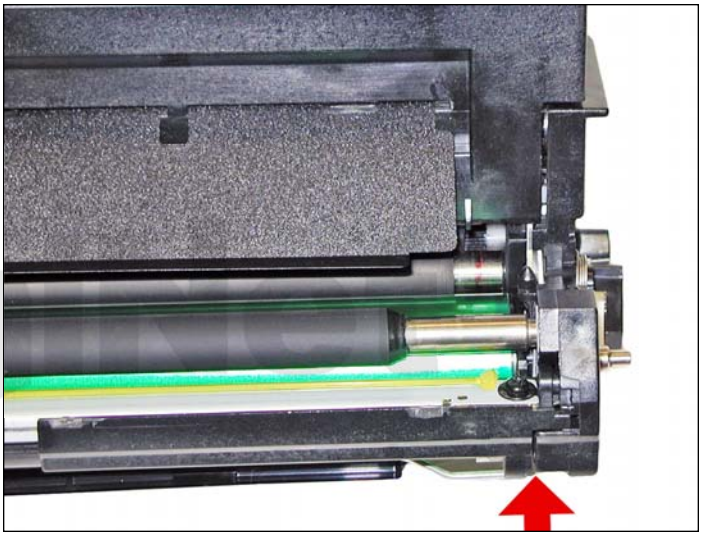
Be careful not to damage the spring auger and felt seal.



37. Coat the new wiper blade with your preferred lubricant and install into the chamber. Install the two screws.

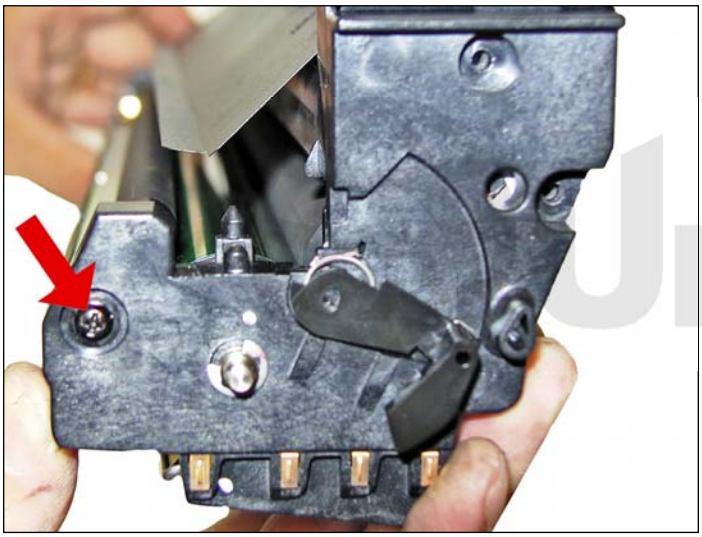


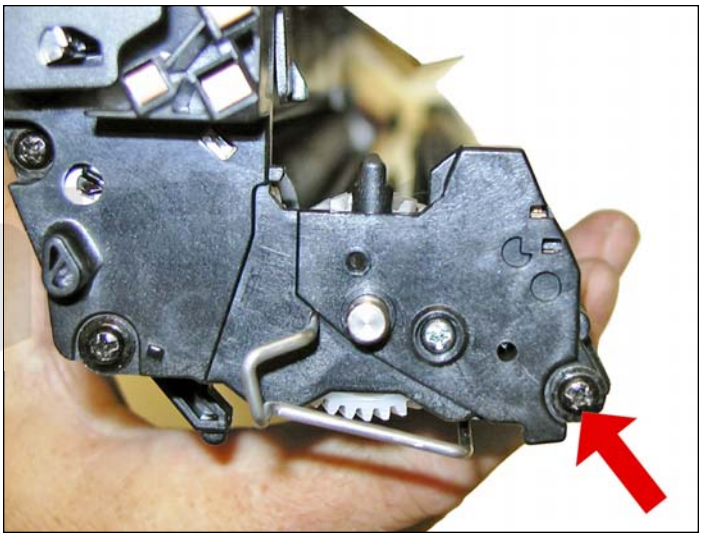
38. Install the waste chamber. Install the left side tabs first.



39. Install the right side end cap the rest of the way.

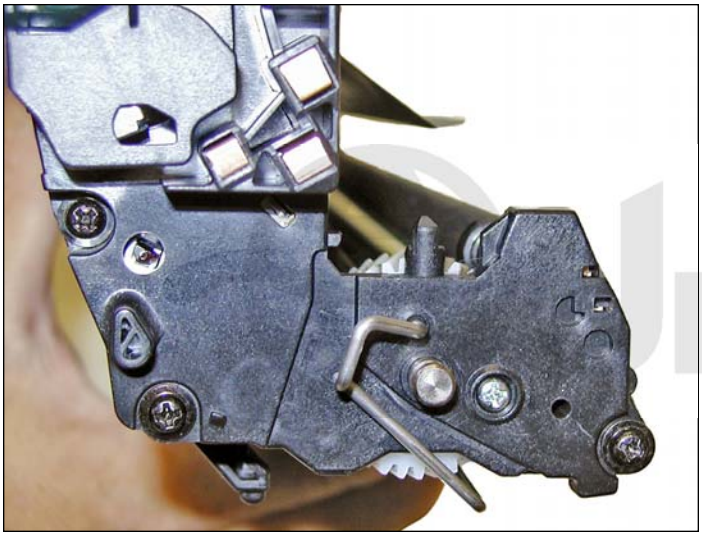
Make sure it seats properly.

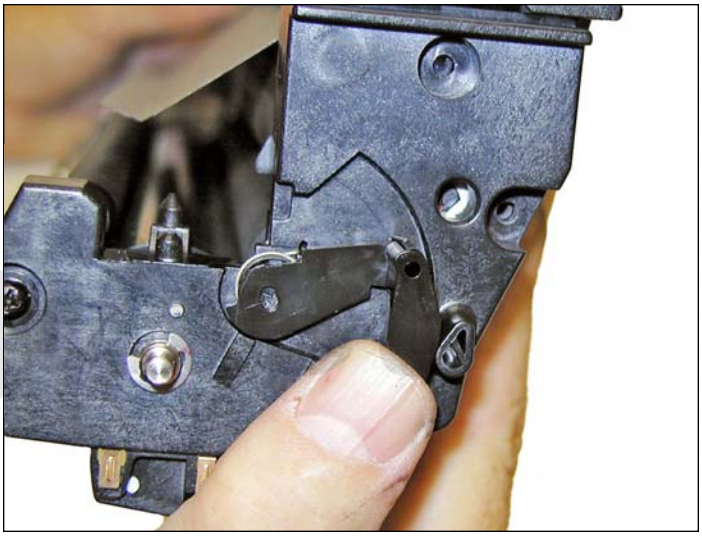




40. Install the two black screws to hold the waste chamber in place.

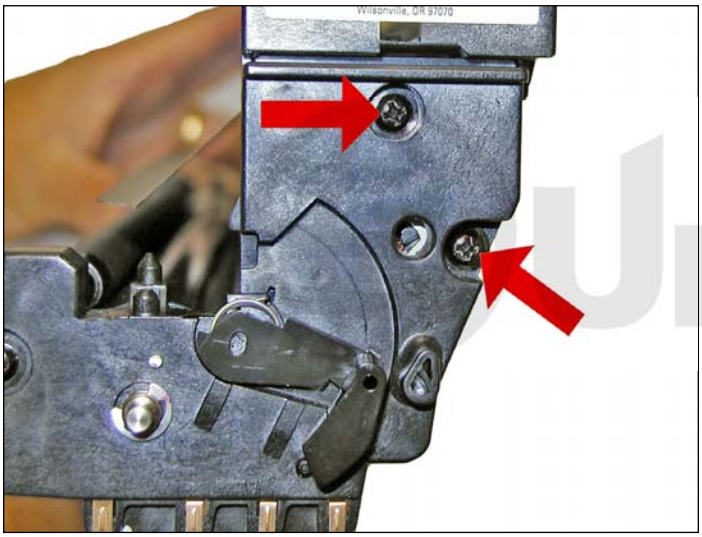
One on each side.

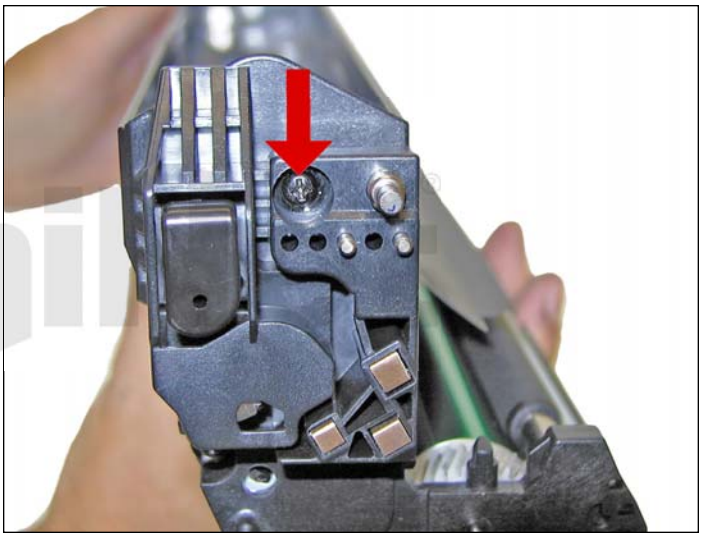




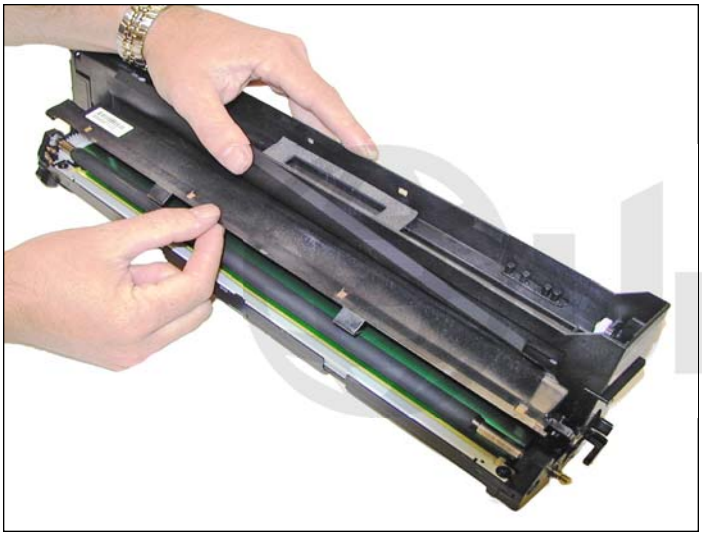
41. Install the left side of the drum cover bar.

Test the cover with the arm on the right side to make sure it works.

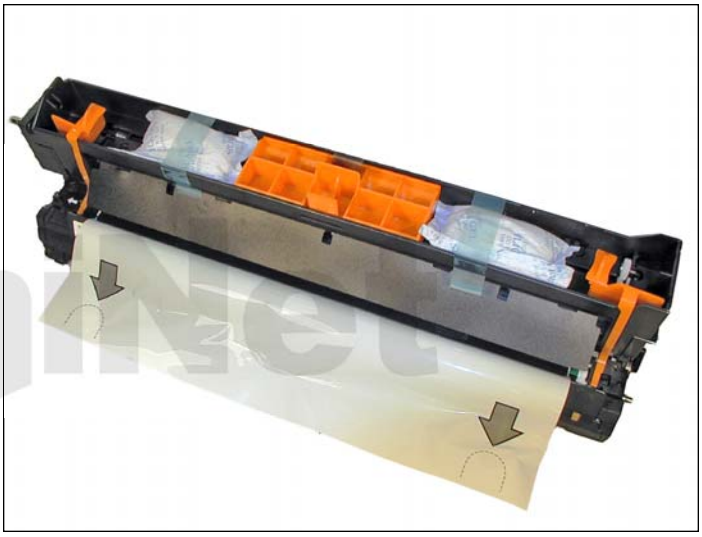




42. Install the three remaining black screws (two on one side, one on the other).



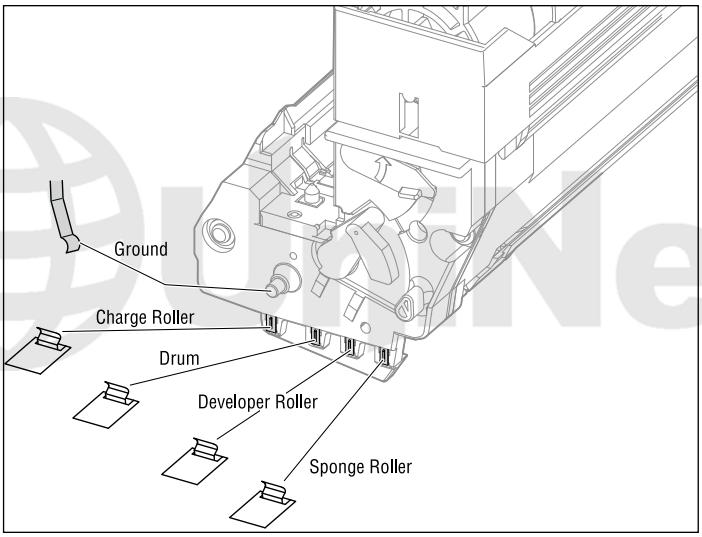
43. Install the PCR cover by rolling the top of the cover so the back tab locks in place. Roll the cover down until the front two tabs lock.



44. Install the toner and shipping locks. Remember that new drum units come complete with toner already installed inside the cartridge. (Thus the need for the toner hopper seal in the drum unit. Because of this, you must include a toner tube with every drum cartridge (make sure it's the correct color).

REPETITIVE DEFECT CHART

Transfer Belt	**706 mm**
Fuser Belt	**124 mm**
Supply Roller	**102 mm**
OPC Drum	**94 mm**
Heat Fuser Roller	**87.3 mm**
Developer Roller	**49 mm**
PCR	**37.4 mm**



It is also possible that dirty drum unit contacts can cause an issue.

Above illustration shows the location of the drum unit contacts.

PRINTING TEST PAGES

1. On the control panel, select INFORMATION, press OK
2. Select INFORMATION PAGES, press OK
3. Select CONFIGURATION PAGES or SUPPLIES USAGE PAGE, press OK

FOR SAMPLE PAGES

1. On the control panel, Select INFORMATION, Press OK
2. Select SAMPLE PAGES, Press OK
3. Select the color page and press OK

COMMON ERROR CODES

There are hundreds of different 2 or 3-digit error codes. Too many to list here, but included below are some of the more common:

T1 **Upper fuser failure**

T2 **Lower fuser failure**

T29 **Temperature sensor bad**

T30 **Humidity sensor bad**

U18 **Yellow LED failure**

U19 **Magenta LED Failure**

U20 **Cyan LED Failure**

U21 **Black LED failure**

U26 **Yellow drum failure.**
Drum out of position (up/down)

U27 **Magenta drum failure.**
Drum out of position (up/down)

U28 **Cyan drum failure.**
Drum out of position (up/down)

U29 **Black drum failure.**
Drum out of position (up/down)

W18 **Cyan imaging unit fuse cut error.**
The printer detected a new fuse (drum unit) but the fuse did not blow (cut)

W19 **Magenta imaging unit fuse cut error.**
The printer detected a new fuse (drum unit) but the fuse did not blow (cut)

W20 **Yellow imaging unit fuse cut error.**
The printer detected a new fuse (drum unit) but the fuse did not blow (cut)

W21 **Black imaging unit fuse cut error.**
The printer detected a new fuse (drum unit) but the fuse did not blow (cut)

940 **Waste toner auger rotation failure.**

941 **CM Toner supply failure.**
Toner sensor failure with Cyan or Magenta toner

942 **YK Toner supply failure.**
Toner sensor failure with Yellow or Black toner