

# HP® LASERJET P3015

## TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS



HP® LASERJET P3015 TONER CARTRIDGE

# REMANUFACTURING THE HP LASERJET P3015 TONER CARTRIDGE

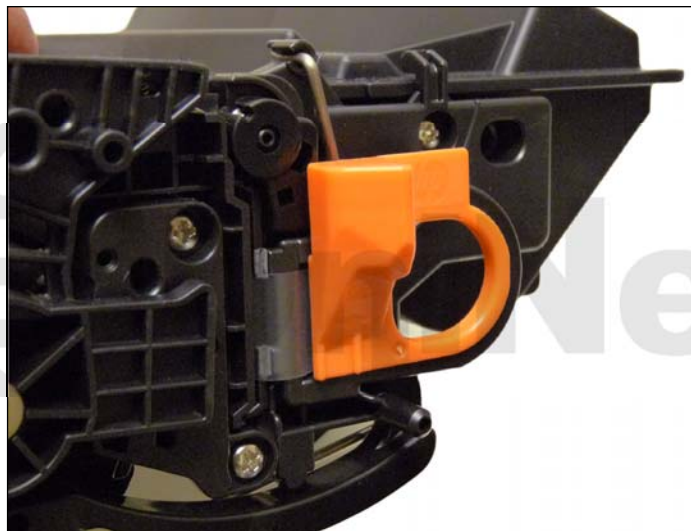
By Mike Josiah and the Technical Staff at UniNet

First released in October 2009, the HP LaserJet P3015 series of printers are based on a 1200dpi, 42ppm Canon engine. As with all the new HP cartridges, these cartridges use a chip to monitor toner low functions. The cartridges for the P3015 series are the CE255A and CE255X which are rated for 6,000 pges and 12,500 pages respectively.

The LaserJet P3015 series of printers use a 540 MHz processor and the most basic unit has 128mb of DDR2 memory expandable to 640mb. They all show a first-page out at less than 7.5 seconds. The entire series has a monthly duty cycle of 100,000 pages per month, but the recommended volume is 1,500 to 5,000. All the machines in this series also have duplex built in.

The cartridges have list prices of \$144.99 for the “A” cartridge, and \$223.99 for the “X” cartridge (pricing in U.S. dollars, as of December 2009).

So far, the machines based on the P3015 engine are the **LaserJet P3015d**, **P3015dn**, and the **P3015X**.

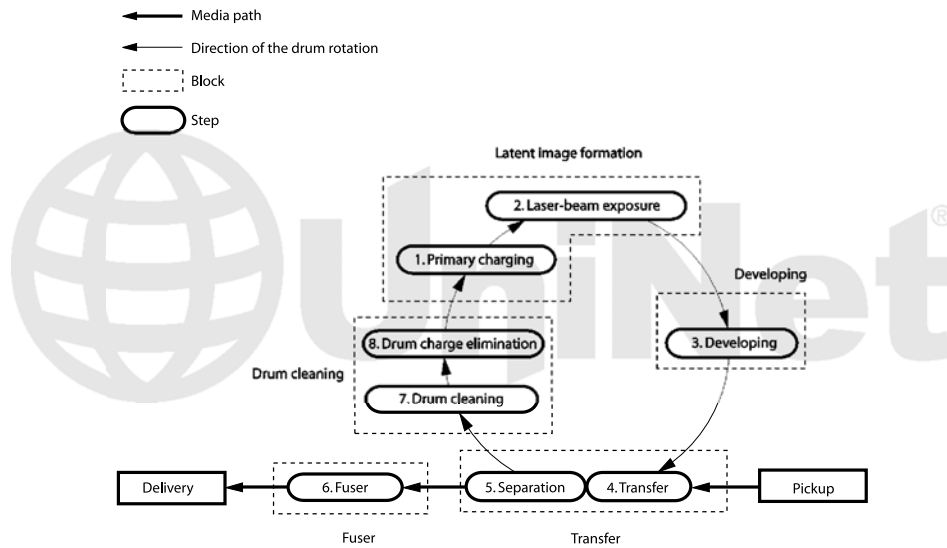


The pull tab for the seal (pictured here) is similar to the 2420. This tab prevents the cartridge from being installed unless the seal has been pulled (and unless the tab has been separated from the seal of course).

A very nice change for this series is that there are no plastic rivets at all in the cartridge. Even better is the fact that the hinge pins are not so recessed that you have to cut a hole in the cartridge to get at them. They can be easily removed from the outside!

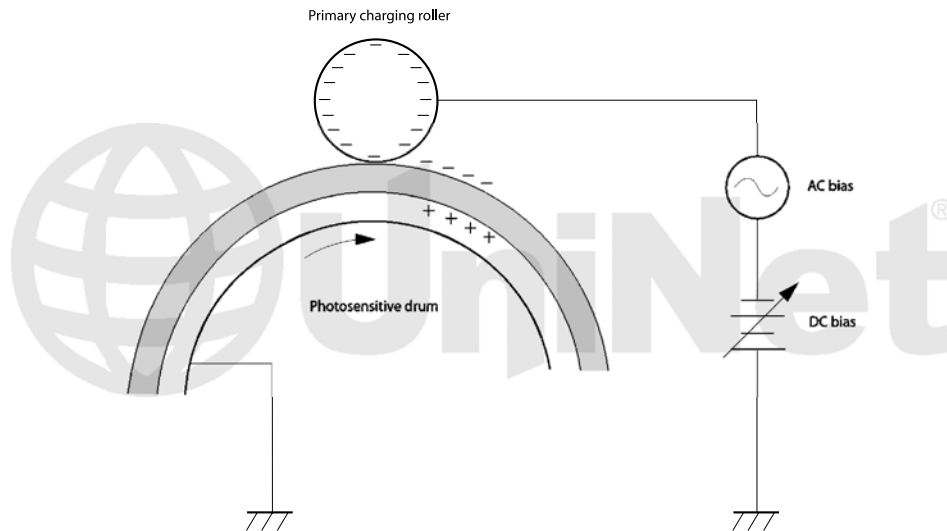
As with all other black HP cartridges, the chips on these cartridges do not shut down the entire cartridge, they disable the toner low features. The cartridge will run if the chip is removed, but the error message must be cleared first. As with past HP chips, the toner low function is disabled if a used chip is installed.

Printing test pages, cartridge troubleshooting as well as some simple machine troubleshooting is covered at the end of the article.

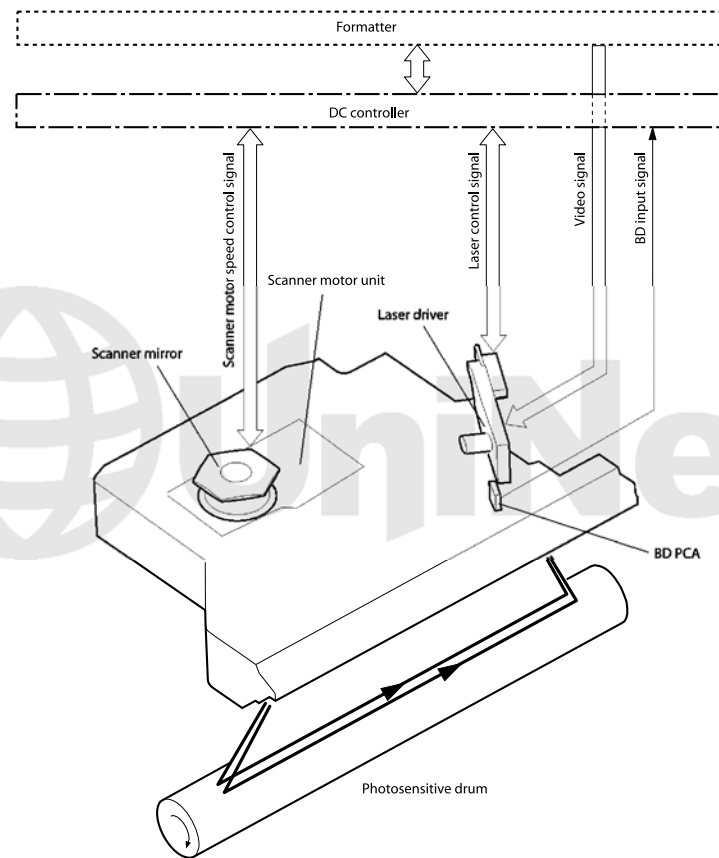
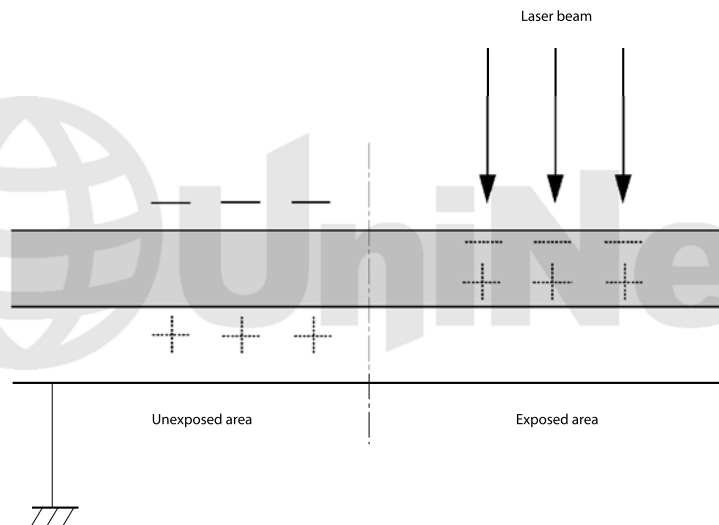


The theory for these cartridges is a little different from past versions so we have covered it here. You don't have to know the theory to remanufacture cartridges, but it sure helps if you have a problem. Troubleshooting time is dramatically reduced.

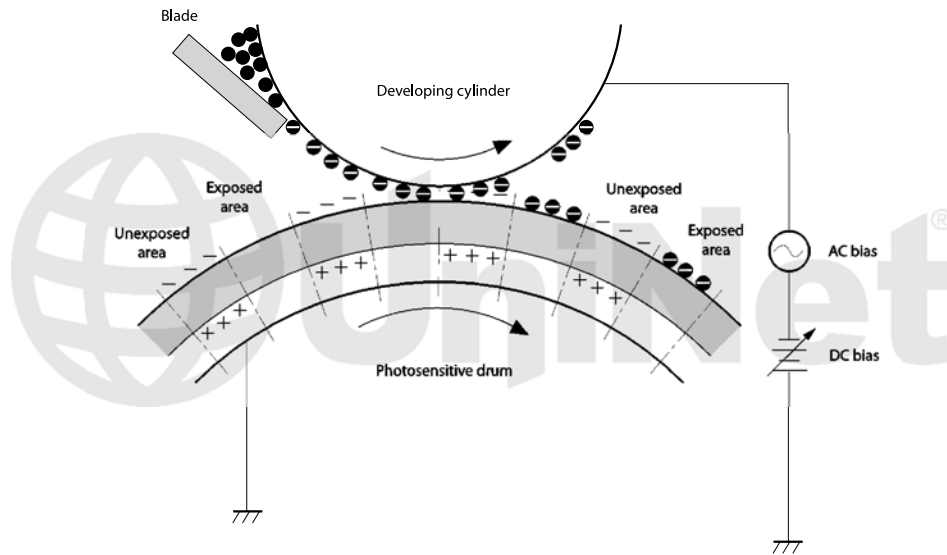
Shown above is a nice block diagram of the printing process. The image formation process consists of seven steps which are split up into five functional blocks (see dotted lines in diagram for blocks).



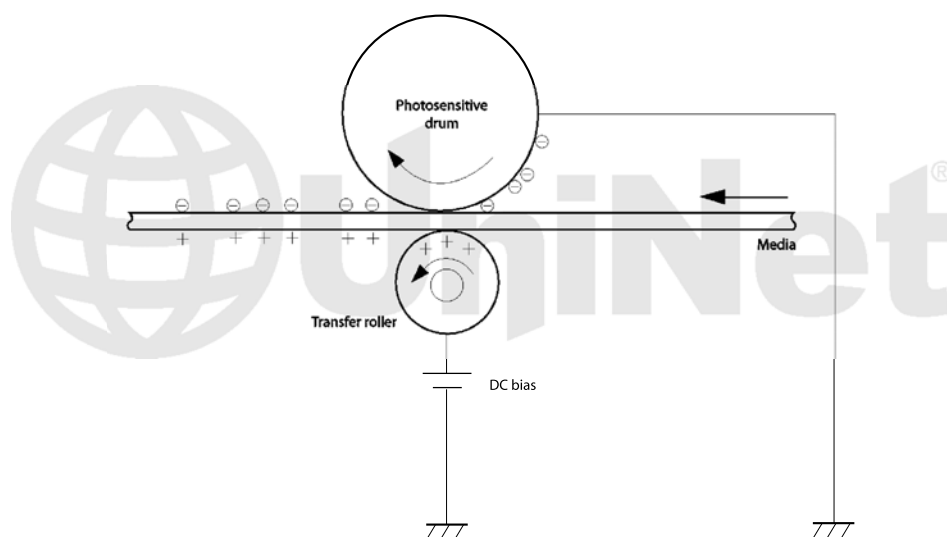
In the **first step**, the Primary Charge Roller (PCR) places a uniform negative DC bias voltage on the OPC drum surface. The amount of the negative DC bias placed on the drum is controlled by the printer's intensity setting. This process is part of the latent Image formation block.



In the **second step** (also part of the latent Image formation block), the laser beam is fired onto a rotating mirror (called the scanner). As the mirror rotates, the beam reflects into a set of focusing lenses. The beam then strikes the OPC's surface, which neutralizes the negative charge on the drum and leaves a latent electrostatic image on the drum. The laser unit actually fires two beams. The service manual does not mention the second laser beam at all, but in other recent printers, the second laser actually helps erase any residual charges on the drum.

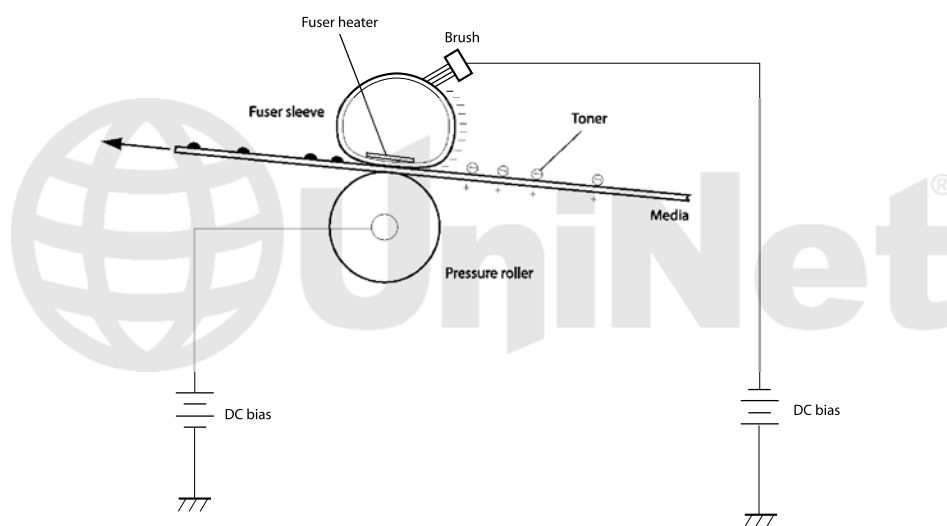


The **third step** (developing block) is where the toner image is developed on the drum by the developing section, (or supply chamber), which contains the toner particles. The toner is held to the magnetic roller sleeve by the stationary magnet inside the sleeve, and a DC bias voltage supplied by the high voltage power supply. This DC bias voltage is controlled by the printer's density setting, and causes either more or less toner to be attracted to the drum. This in turn will either increase or decrease the print density. Both the primary charge roller and magnetic roller DC bias voltages are controlled by the printer's density setting. The amount of toner on the magnetic roller sleeve is also controlled by the rubber doctor blade, which uses pressure to keep the amount of toner on the magnetic roller sleeve constant. This blade also causes a static charge to build up on the toner, which helps keep the coating of toner even, and allows easy transfer to the OPC drum. At the same time an AC signal is also placed on the magnetic roller sleeve. This signal decreases the attraction of the toner to the magnetic roller sleeve, and increases the repelling action of toner against the areas of the drum that was not exposed to the laser beam. This AC potential improves the density, and contrast of the toner on the printed page. As the laser exposed areas of the OPC drum approach the magnetic roller, the toner particles are attracted to the drums surface due to the opposite voltage potentials of the toner, and laser exposed surface of the OPC drum.

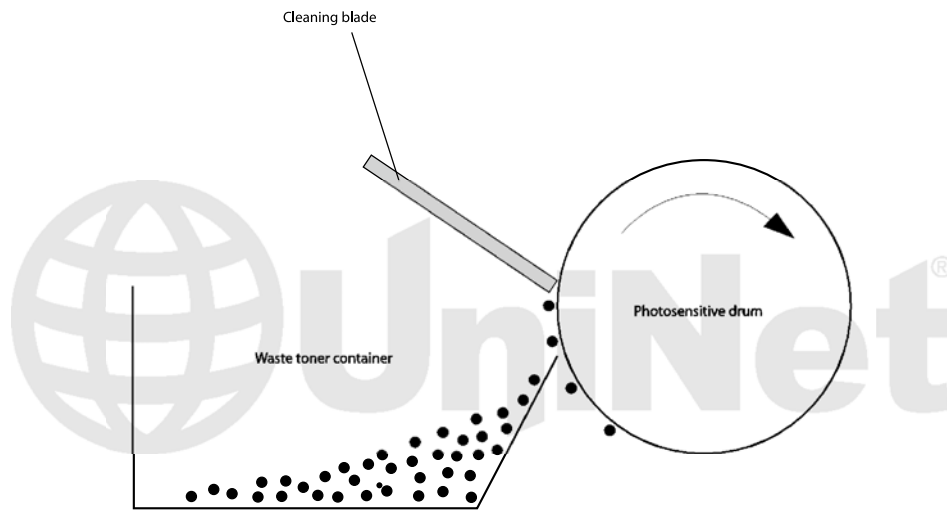


In the **fourth step** (transfer block) the toner image is then transferred to the paper as it passes below the drum by the transfer charge roller, which places a positive charge on the back of the paper. This positive charge causes the negatively charged toner on the drum's surface to be attracted to the page. The small diameter of the drum, combined with the stiffness of the paper causes the paper to peel away from the drum.

In the **fifth step** (also part of the transfer block) the paper separates from the drum. The static charge eliminator weakens the attractive forces between the negatively charged drum surface, and the positively charged paper. This prevents toner dropouts onto the paper at low temperatures and humidity and also prevents paper from wrapping around the drum.



In the **sixth step** (fusing block) the image is then fused on to the paper by the fuser assembly, which is comprised of the upper fixing film assembly and the lower fuser roller. The paper passes between a heated upper fixing film assembly and a soft lower rubber roller. The upper heated element then melts the toner into the paper. The fixing film assembly consists of a Teflon sleeve with a ceramic heating element inside. These fusers are a bit different in that they have a brush which has a DC bias charge on it to help keep the film clean.



In the **seventh step** (drum cleaning block) the OPC drum is cleaned. On average, approximately 95% of the toner is transferred to the paper during the print cycle. As the drum rotates during printing, the remaining 5% of the toner that is on the OPC drum is cleaned off the drum by the wiper blade. It is then guided into the waste chamber by the recovery blade, and stored in the waste chamber.

The **eighth step** is where the residual charge is eliminated. Both the PCR and the laser unit are used for this. The primary charge roller places an AC voltage across the drum surface and the laser unit's second beam erases and residual charges left on the drum. This drum charge elimination is only turned on during the last rotation period of the drum.

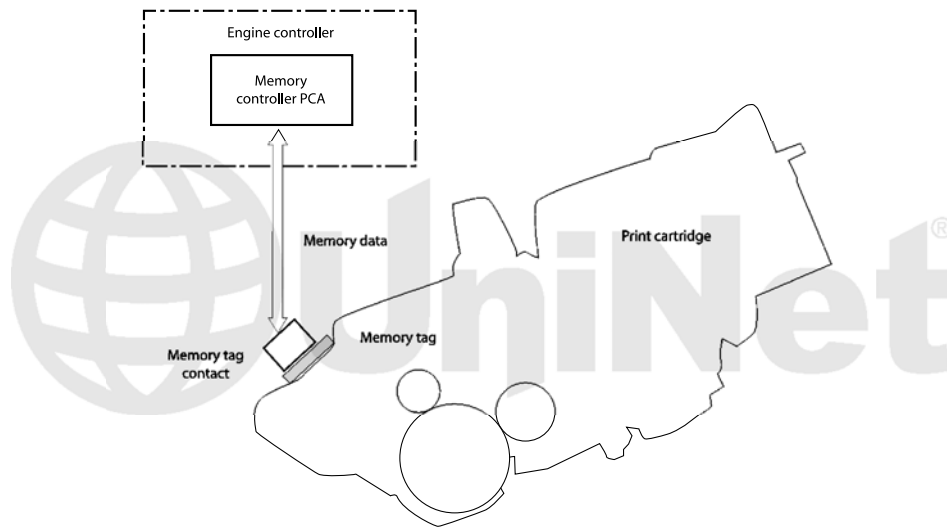


Diagram shows the relationship of the cartridge chip to the printer. The engine controller commands the chip to read or write with the following conditions:

**READ:** Power is on.  
The cartridge door is closed.  
A command is received from the formatter.

**WRITE:** A page of media is printed.  
A command is received from the formatter.

When the engine controller fails to read or write three times in a row, it determines that the chip is bad and sends a bad chip message to the formatter.

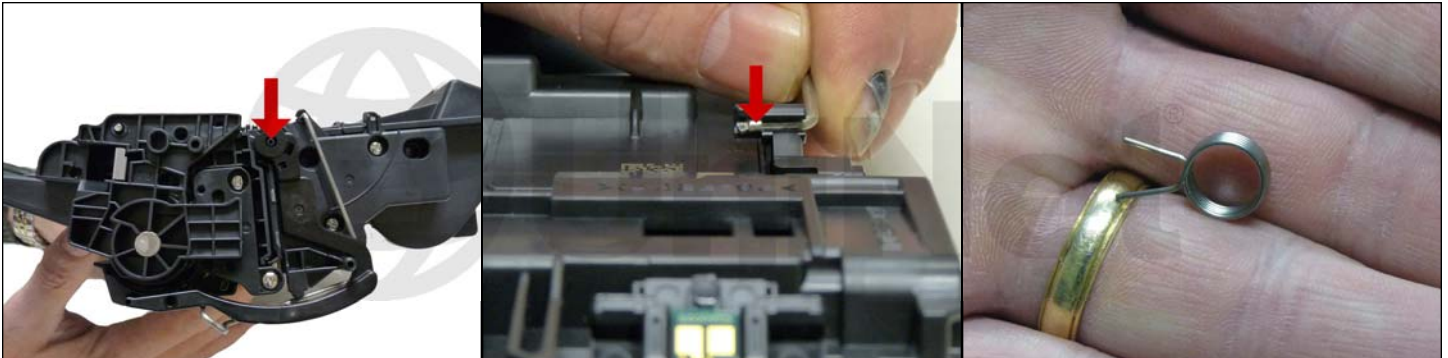
**REQUIRED TOOLS**

1. Toner approved vacuum
2. A small common screwdriver
3. A Phillips head screwdriver
4. Flush cutting wire cutters

**REQUIRED SUPPLIES**

You will notice that many of the supplies used in these cartridges are the same as the 2420 (blades, PCR, small parts, etc). It should be noted that the toner, drum and magnetic roller are not! They are dedicated for this cartridge.

1. Dedicated toner for use in P3015 (295g for "A" and 590g for "X" cartridges)
2. New OPC drum (P3015 specific)
3. New wiper blade
4. Sealing strip
5. Clips (4mm)
6. Sealing rail foam
7. New PCR (optional)
8. New magnetic roller (optional)
9. New doctor blade (optional)
10. 99% isopropyl alcohol
11. Magnetic roller cleaner
12. Drum lubricant
13. Conductive grease
14. White lithium grease



1. Remove the drum cover by prying the spring loaded arm, and then carefully pry off the two metal bars out of their holders.

The cover must be in the closed position in order to pry off the spring loaded arm. Be careful not to lose the spring!

Both of the metal bars should be removed from the front not the end.



2. Note on each end of the cartridge there are small silver pins. Unlike most cartridges these days, the pins are easily accessible from the outside of the cartridge. Use a good pair of flush cutting wire cutters to pull the pins out. The image above on the far right shows what flush cutting wire cutters look like (the blades meet with a flat surface, not curved in like most cutters).



3. Separate the two halves.



4. On the waste section, remove the two screws and drum bushing.



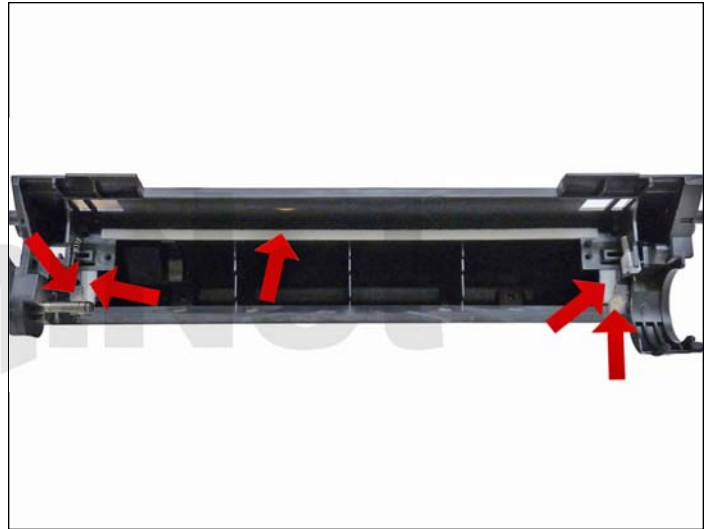
5. Remove the photoconductive drum. Pull it gently from the drum axle pin. The pin can be removed to make removing and installing the drum easier, but the plastic is a bit soft and if not installed back perfectly, the drum axle hole will be enlarged allowing the drum to float.



6. Remove the primary charge roller (PCR), by prying it out of the clips on either end. Clean the PCR with your preferred cleaner and place the aside.



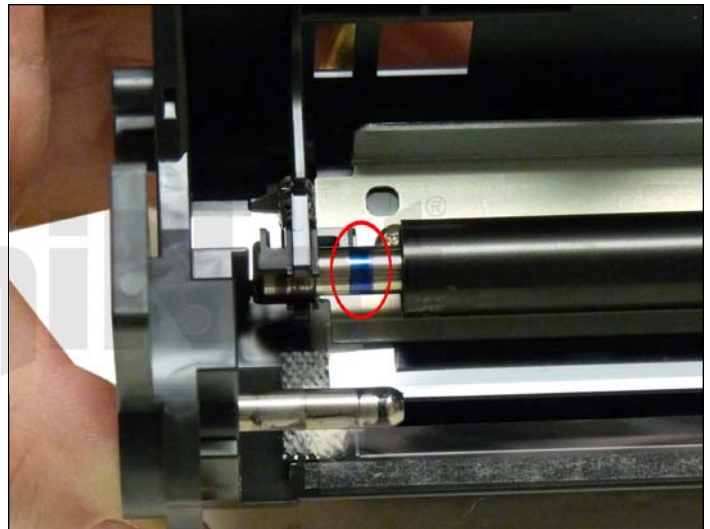
7. Remove the wiper blade and two screws. **NOTE:** Be very careful not to damage or distort the thin mylar recovery blade next to the wiper blade. If this blade is bent or damaged in any way, it should be replaced.



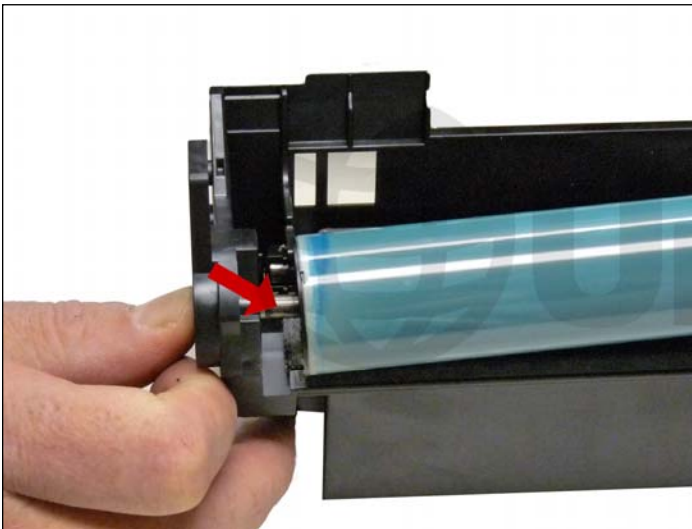
8. Clean out any remaining waste toner. Make sure the foam seals under the wiper blade are clean and not damaged.



9. Lightly coat the new wiper blade with your preferred lubricant. Replace the blade and two screws into the cartridge.



10. Clean the two PCR holders and place a small amount of conductive grease on the black PCR holder, and a small amount of white lithium grease on the white holder. Install the cleaned PCR. Note the colored band on the OEM PCR. It looks like Canon/HP are color coding production lots.

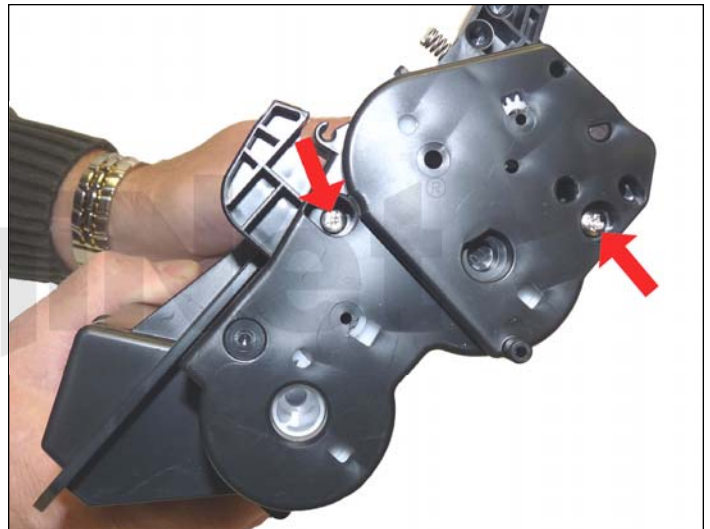


11. Clean and replace the conductive grease on the drum axle pin.

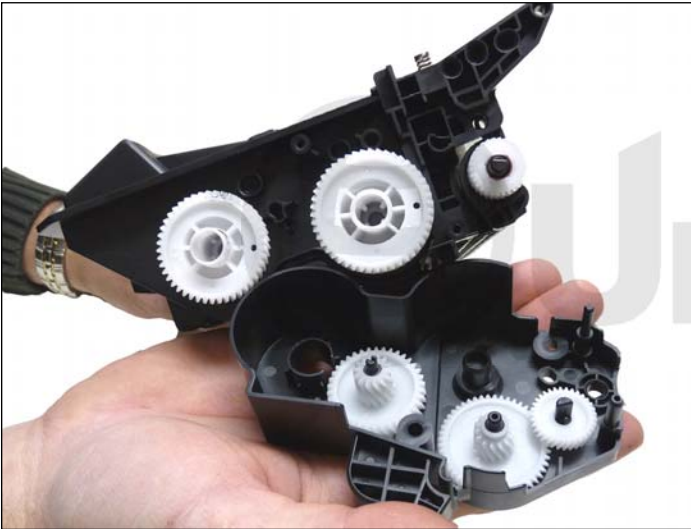
Carefully slide the drum onto the pin until it is seated.



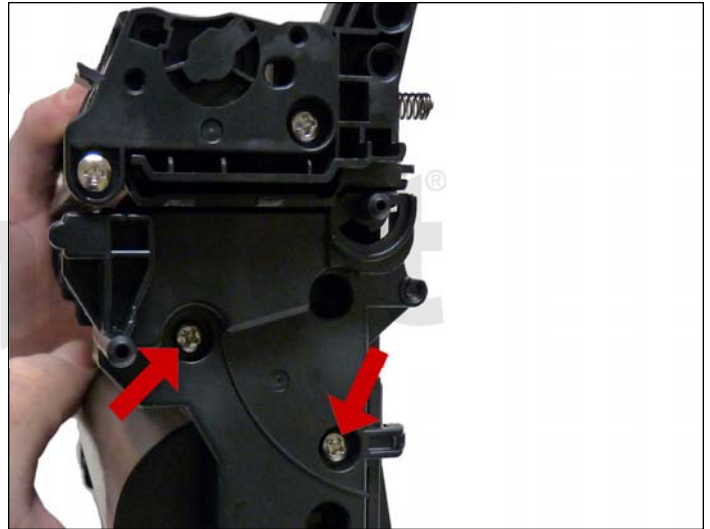
12. Install the drum bushing and two screws.



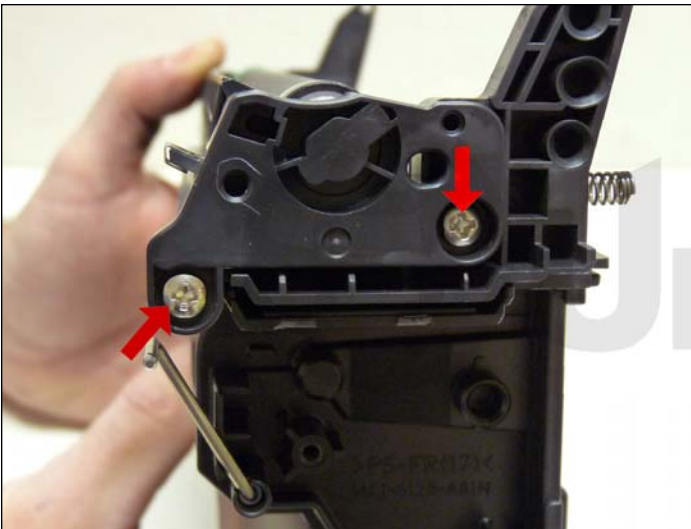
13. On the supply section, remove the two screws from the right side (gear side) end cap.



14. Remove the end cap. Note that three of the gears stay with it. Leave the remaining two large gears alone. They drive the mixing augers and are very hard to replace properly if removed.



15. On the contact side, remove the two screws and end cap.



16. Remove the two screws and the magnetic roller end cap.



17. Remove the magnetic roller assembly from the cartridge.



18. Remove the two screws and doctor blade. Keep these screws separate! They are longer than all the other screws used in this cartridge. Clean out any remaining toner. **NOTE:** The cartridge can be filled now of the hopper split, filled and sealed.

**For filling only, see step 19 and skip to step 25.**

**For splitting, see steps 20 - 24.**



19. There is no fill hole in these cartridges so it must be filled through the doctor blade slot. Fill the cartridge with 295g for the "A" cartridge and 590g for the "X" cartridge of dedicated toner for P3015. **Skip to step 25.**



20. If you want to seal the cartridge, the hopper must be split. This can be done with a sturdy razor knife and screwdriver. Take the knife and split the hopper along the seam.



21. With a long handled common screwdriver, pry the opposite side up.

The two halves should split apart easily.



22. Fill the hopper with dedicated toner for P3015:

295g for the "A" cartridge and 590g for the "X" cartridge.



23. Place the seal on the bottom hopper, and rail foams on the top half of the hopper. Make sure you place the tail of the seal over the correct side (opposite the gear).



24. Place the 4mm clips to keep the two halves together.

Place the clips as shown. It may be necessary to close the clips up a bit for the side that takes five (top side).

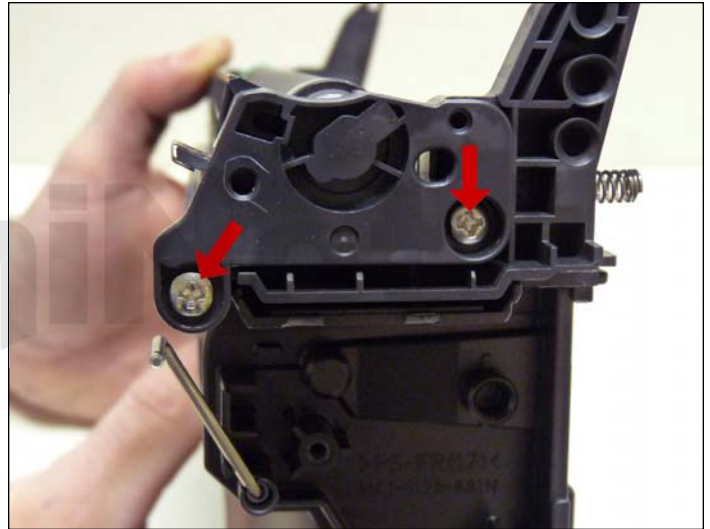


25. Make sure the doctor blade foam seals are clean. If there is any toner on them carefully vacuum it off.

Make sure you don't vacuum up the new toner from the hopper! Install the doctor blade and two screws.



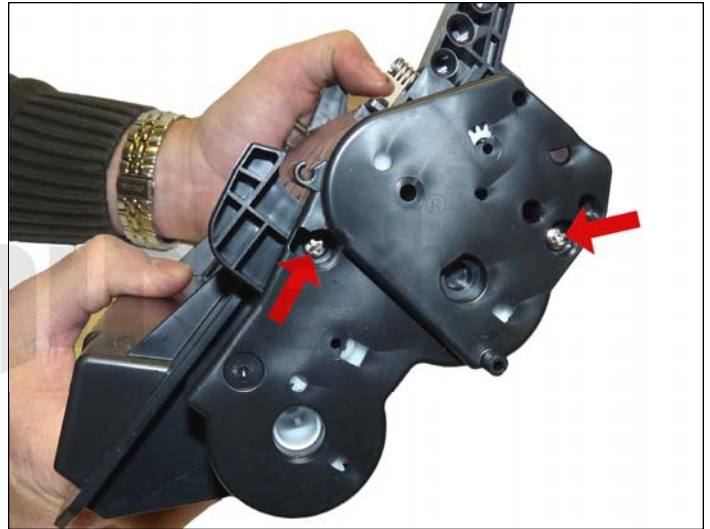
26. Clean the magnetic roller contact plate on the contact end cap. Replace the conductive grease.



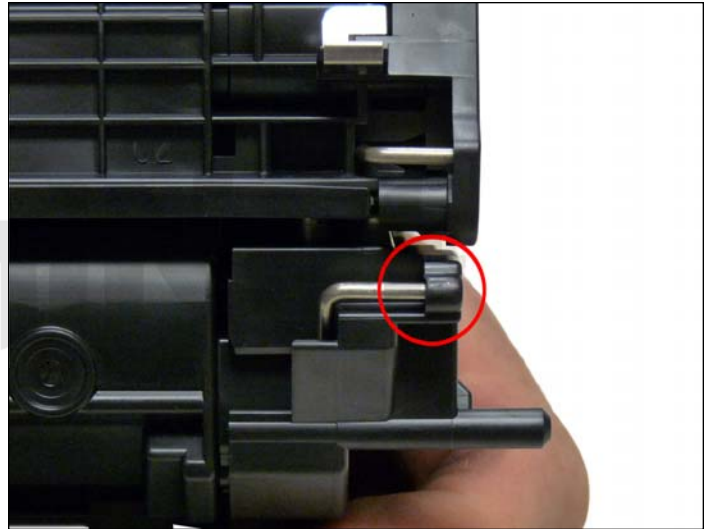
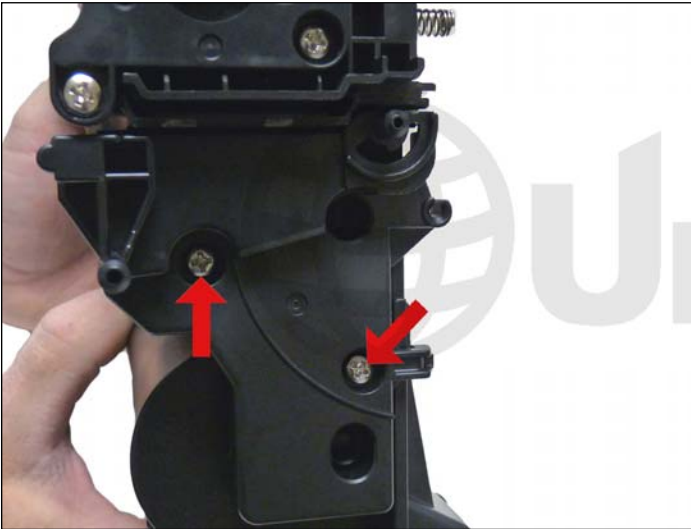
27. On the non-gear side, install the magnetic contact end cap and two screws. Clean the magnetic roller sleeve with a dedicated magnetic roller cleaner.



28. Install the magnetic roller. Turn the stationary magnet so that the keyed end will fit into the end cap. You cannot see the keyed end so you have to set the magnet by feel as you turn it.



29. Install the gear end cap and two screws. If the end cap does not fit, the stationary magnet most likely is not set correctly. The end cap has deep holes. Using a magnetized screwdriver will make your life much easier.



30. Install the opposite side end cap and two screws.

Make sure that the toner low bar fits properly into the end cap.



31. Place the two halves together. Make sure the springs are set, and install the two pins. The pins should not be pushed in until they are flush with the cartridge wall. Install them so they match what the OEM did. They should protrude about 1/16" from the flat wall so you can easily remove them again.

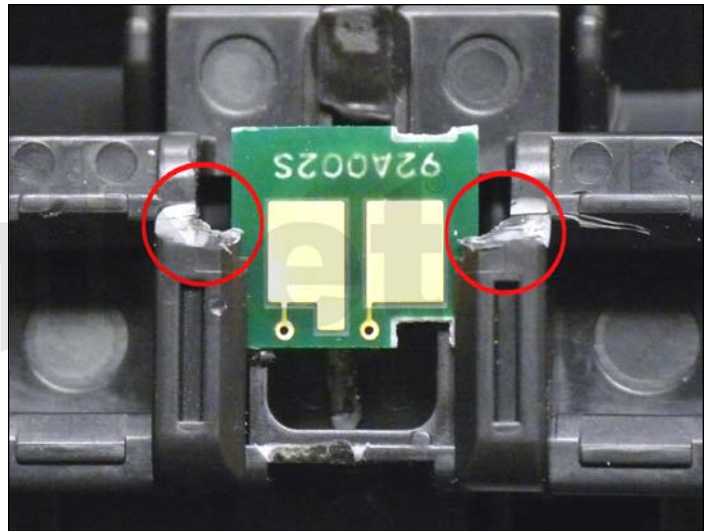
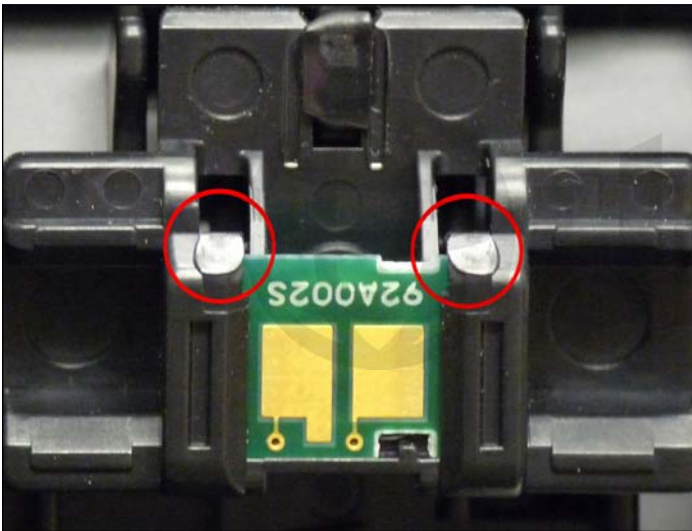


32. Install the spring in the drum cover arm as shown.

Install the metal bar into the hole and slot. Install the arm.



33. Release the tail of the spring so that the cover closes.



34. To replace the chip, cut the melted plastic from the top edge of the chip.

Remove the old chip and install the new chip.

To hold the chip in its slot, place a small dab of hot glue on each top corner.

#### **RUNNING THE CLEANING PAGE**

The cleaning page helps keep the fuser free of toner particles.  
HP recommends that it be run every time a new cartridge is installed.

1. Press the MENU button to open the menus.
2. Press the DOWN arrow until CONFIGURE DEVICE appears on the display.
3. Press the OK button.
4. Press the DOWN arrow until PRINT QUALITY appears on the display.
5. Press the OK button.
6. Press the DOWN arrow until CREATE CLEANING PAGE appears on the display.
7. Press the OK button.
8. Load the cleaning page face down in TRAY 1
9. Press the DOWN arrow until PROCESS CLEANING PAGE appears on the display
10. Press the OK button.

#### **CHANGING THE PRINTERS INTENSITY (DENSITY)**

1. Press the MENU button to open the menus.
2. Press the DOWN arrow until CONFIG DEVICE appears on the display.
3. Press the OK button.
4. Press the DOWN arrow until PRINT QUALITY appears on the display.
5. Press the OK button.
6. Press the DOWN arrow until TONER DENSITY appears on the display.
7. Press the OK button.
8. Press the DOWN arrow until the desired settings (#1 - 5) appears on the display. #3 is the default setting.

**PRINTING TEST PRINTS**

There are a number of test pages that can be run from the menu:

**Menu Map****Configuration Page****Supplies Status Page****Usage Page****PCL Font List**

The Supplies Status Page or the Configuration Page are the best to use. They have Solid Black, Grayscale, and Text.

1. Press the MENU button to open the menus.
2. Press the DOWN arrow until INFORMATION appears on the display.
3. Press the OK button.
4. Press the DOWN arrow until the page you wish to print appears on the display.
5. Press the OK button.

**REPETITIVE DEFECT CHART**

<b>Drum</b>	<b>95 mm</b>
<b>Lower pressure roller</b>	<b>79 mm</b>
<b>Upper fuser roller</b>	<b>76 mm</b>
<b>Magnetic roller</b>	<b>50 mm</b>
<b>Transfer roller</b>	<b>43.6 mm</b>
<b>PCR</b>	<b>38 mm</b>

**PRINTER TROUBLESHOOTING**

Most of the error messages show on the display in plain English so we will not go into them here. Some of the more common numeric messages are as follows:

<b>10.10.00 error:</b>	<b>Bad or missing chip</b>
<b>10.91.00 cartridge error:</b>	<b>An error has occurred in the cartridge</b>
<b>10.XX.YY supply memory error:</b>	<b>Bad or missing chip</b>
<b>13.XX.YY:</b>	<b>Paper jams in printer</b>
<b>50.1 fuser error:</b>	<b>Low fuser temperature (TH1)</b>
<b>50.2 fuser error:</b>	<b>Fuser warm up</b>
<b>50.3 fuser error:</b>	<b>High fuser temperature</b>
<b>50.4 fuser error:</b>	<b>Fuser drive circuit failure</b>
<b>50.8 fuser error:</b>	<b>Low fuser temperature (TH2)</b>
<b>50.9 fuser error:</b>	<b>High fuser temperature (TH2)</b>
<b>51.XY scanner error</b>	
<b>52.XY scanner error (motor)</b>	
<b>57.XX fan error</b>	