

HP® LASERJET 4600

TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS



HP LASERJET 4600 TONER CARTRIDGE

REMANUFACTURING THE HP LASERJET 4600 TONER CARTRIDGE

By Javier Gonzalez and the Technical Staff at UniNet

Released in June 2002, the HP LaserJet 4600 color laser printer introduces a unique and improved printing system. This all-in-one cartridge allows high-speed color printing by means of a single-pass transfer stage. The system enables the HP 4600 to process at 17 ppm, which is significantly faster and more reliable than its 4 ppm HP 4500 predecessor.

To achieve the advantages of a single-pass system, each toner cartridge has its own dedicated imaging system: drum, charge roller, and waste bin. This presents many advantages to the remanufacturing industry. However, the OEM has placed some hurdles that have to be overcome.

REQUIRED SUPPLIES

1. Toner
2. Smartchip
3. Replacement drum (optional, but highly recommended)
4. Wiper blade (optional, but highly recommended)
5. Doctor blade (optional)
6. PCR (optional)
7. Developer roller (optional)
8. Conductive grease

REQUIRED TOOLS

1. Toner-approved vacuum
2. A 3 mm (1/8 inch) flathead screwdriver
3. A Phillips head screwdriver
4. Needle nose pliers
5. Drill with 4 mm (11/64-inch) bit
6. Pliers
7. Hook tool

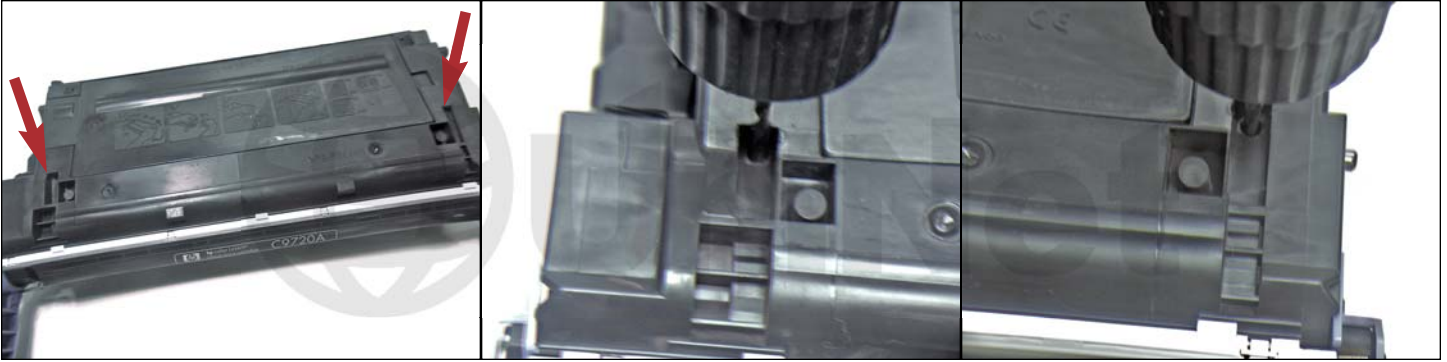


REMOVING THE OEM CHIP

1. Locate the OEM chip that is glued to the rear of the cartridge.

Using a small flathead screwdriver, pry the glued chip off as shown.

Removed chip will be replaced later with a new smartchip.

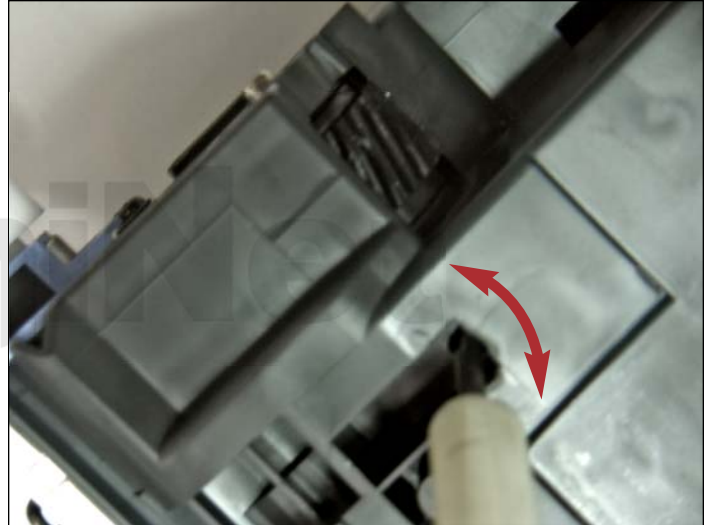


REMOVING THE CARTRIDGE PINS

The first hurdle is noticed when attempting to disassemble the cartridge. As with the HP 1200 cartridge, the end pins cannot be removed without making some minor alterations to the cartridge. The following steps are a guide for disassembling the cartridge without having to purchase any specially designed tools for removing the pins.

It should also be noted at this point, apart from the label and toner, each of the four cartridges appears to be identical. Even the black cartridge uses a rubber-type developer roller, as do the color cartridges. Therefore the following instructions apply to all four cartridges.

2. Locate the slots at both ends of the cartridge as shown. Drill a 4 mm (11/64-inch) diameter hole through each slot angled towards the pin. The drill will not go further than the depth of the pin.



3. Insert a 3 mm (1/8-inch) flathead screwdriver, into the slot hole with the flat portion of the tip facing the pin.

Push the screwdriver in behind the pin and turn in either direction. This action will push the pin out.

Repeat the same action for the second slot.



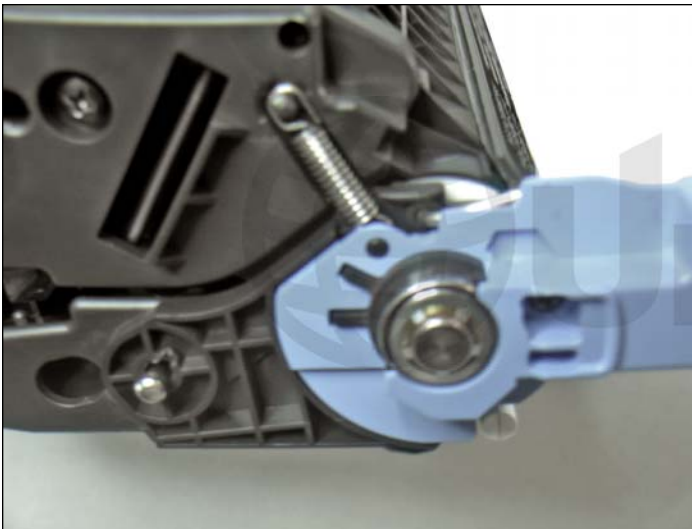
4. Grip the pin head with a pair of pliers.

Maneuver the pin to pull it out.



5. Pin removed.

Remove the opposite side pin in the same manner.



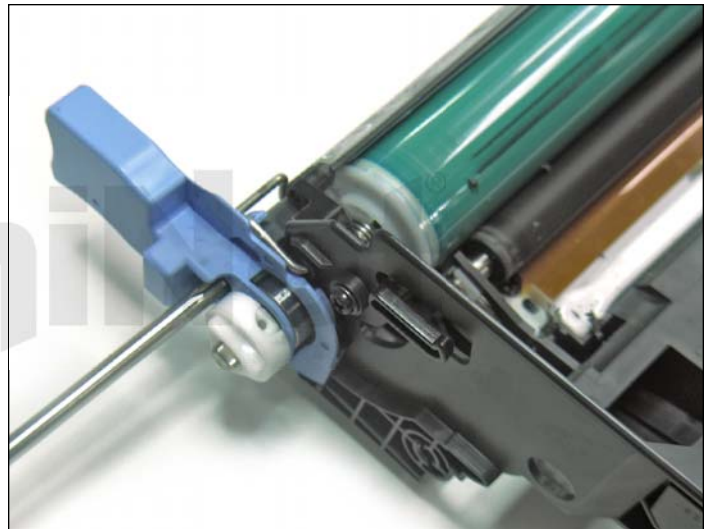
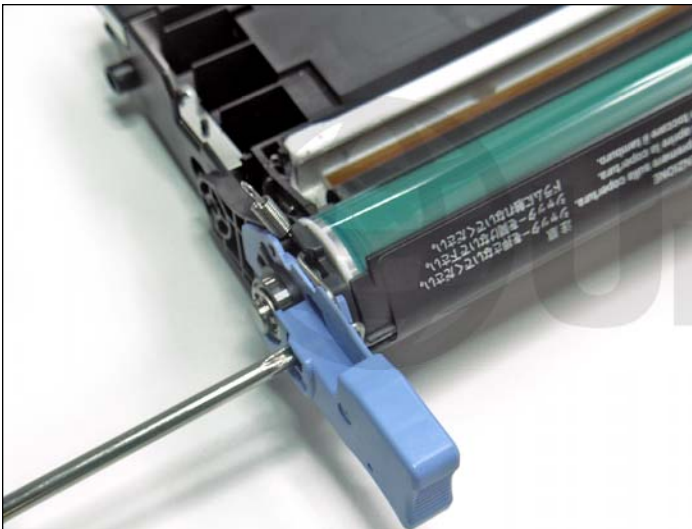
6. Turn the cartridge upside-down.

Locate the tension spring near the blue cartridge handle on the left-side of the cartridge.

Using a hook tool, unclip the spring by lifting it up and over the anchoring tag.



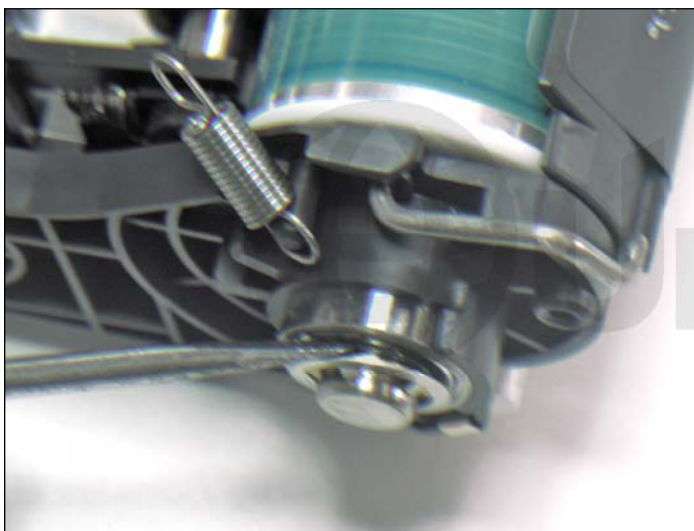
7. Separate the toner cartridge from the drum unit, by lifting it out as shown.



DRUM UNIT DISASSEMBLY

Testing and research indicates that all components can be reused for a number of cycles if qualified. Lab research indicates that the soft chemical toners cause much less wear on components than iron-oxide-based toners.

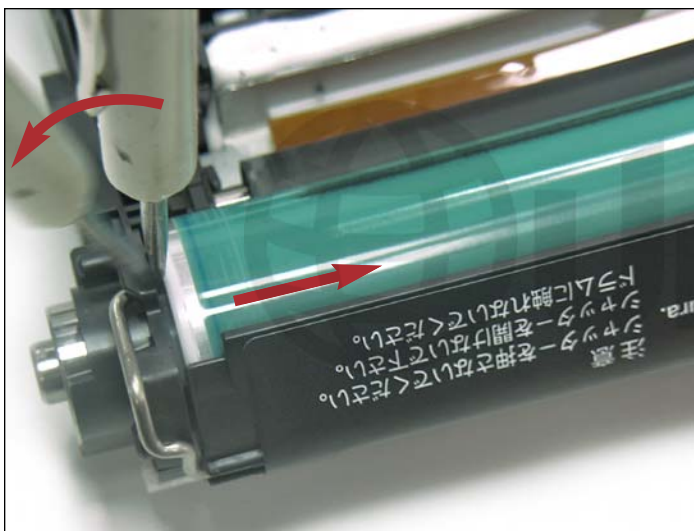
8. Using a small Phillips screwdriver, remove the screws that are located on the blue cartridge handles shown. The cartridge handle on the left-side will easily come off after removing the screw.



9. Remove the star-lock clip shown by pushing it out with a flathead screwdriver.



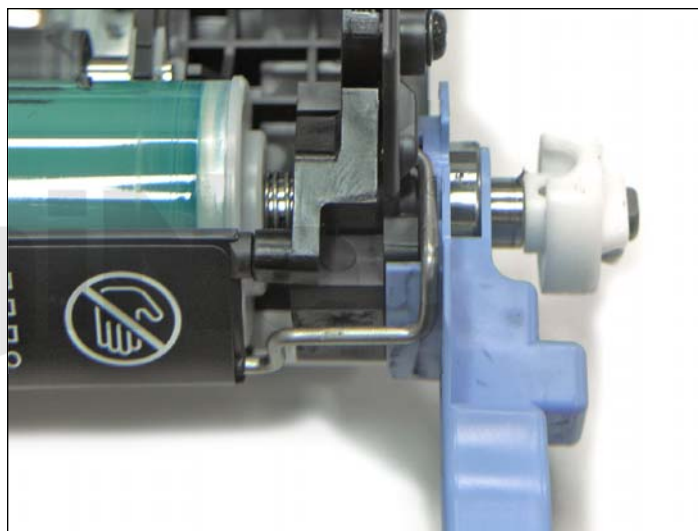
10. Remove the inner washer in the same manner.

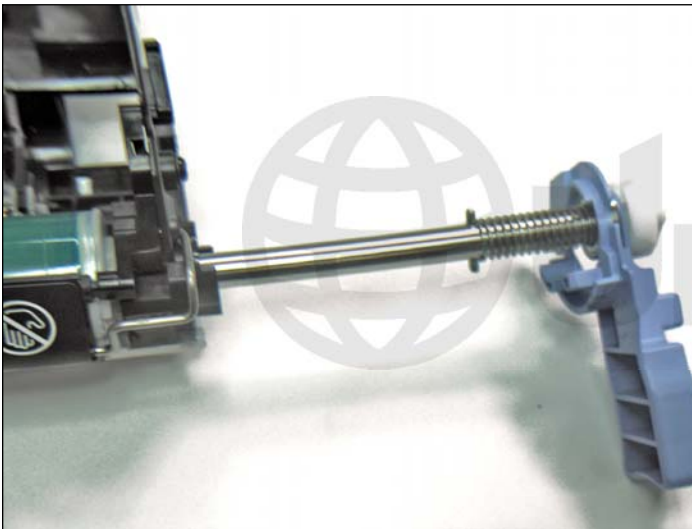


11. Insert a flathead screwdriver down the left side of the drum as shown.

Maneuver the screwdriver to force the drum to the right side. This will also push the shaft out on the opposite end.

The extended shaft will allow you to grip the drive coupler and pull the shaft out.





12. Slide the shaft out completely.

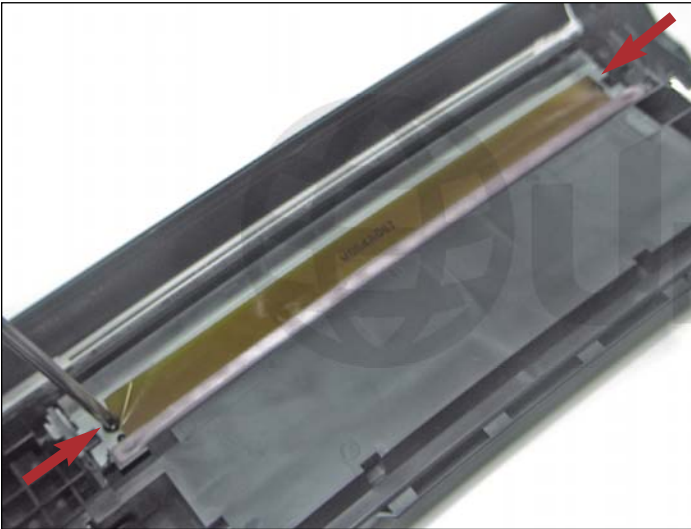


13. Carefully lift the drum out from the left side as shown.
If the drum is reusable, set aside and keep away from light.



14. Remove the PCR and clean with a damp cloth.

Allow it to dry before installing.



15. Remove the two screws from the wiper blade.

Note that the wiper blade is held by a sticky adhesive strip. Carefully pull the wiper blade away without damaging the strip.

Empty the waste bin and clean thoroughly using compressed air or a vacuum.



TONER CARTRIDGE DISASSEMBLY

16. Remove the Phillips screw on the contact side (gearless) end cap.

17. Use a flathead screwdriver to press in and unclip the supporting clip in the area shown. It will be necessary to pull the cap away while pressing the clip in.



18. End cap removed.



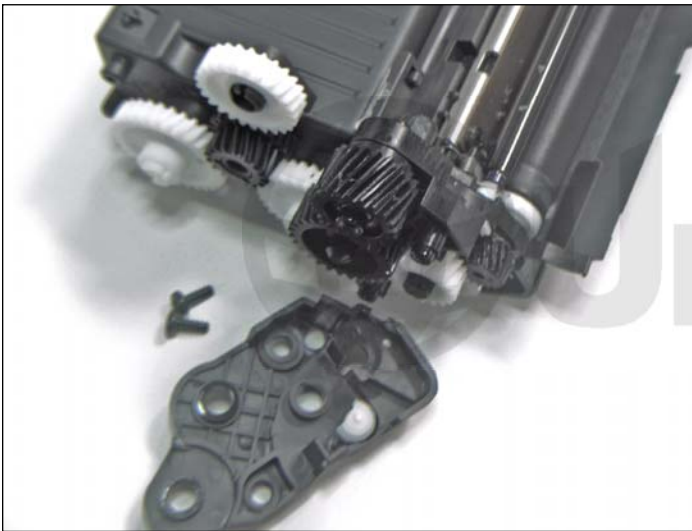
19. Remove the two Phillips screws from the roller support plate shown.



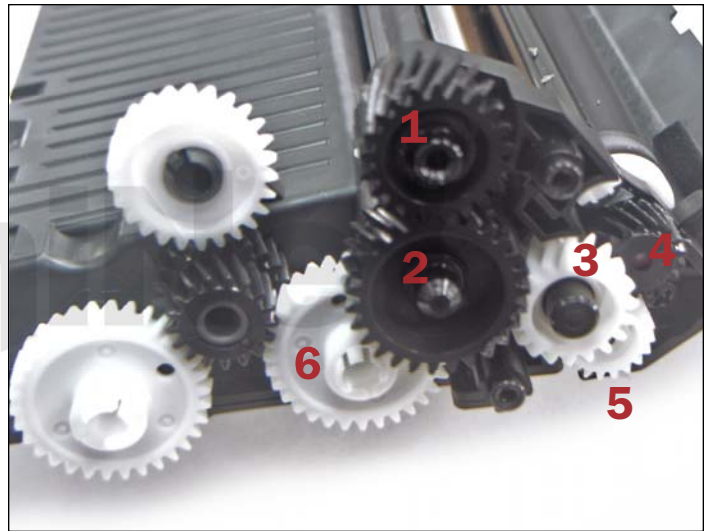
20. Roller support plate removed.



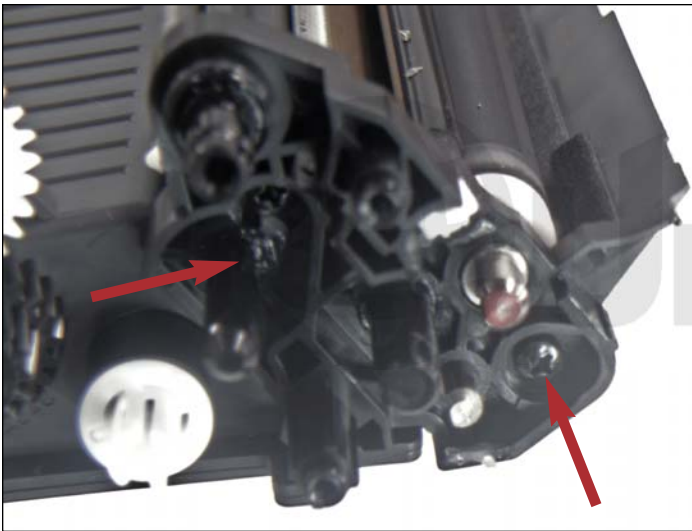
21. Remove the two screws on the gear side end plate.



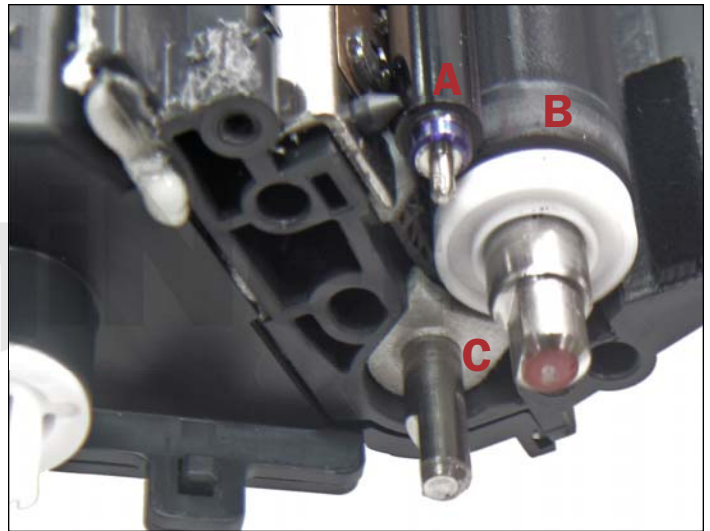
22. End plate removed.



23. Remove the gears in the numbered order shown.
The last gear (#6) will need to be carefully unclipped.



24. Remove the two screws on the roller support plate.
Slide the plate out.



25. Note the three rollers of the HP 4600 developing system:
A. Toner charging roller
B. Developer roller
C. Adder roller



26. First, remove the toner charging roller by pulling it out sideways.



27. Remove the developer roller by pulling it sideways. Be careful not to lose the white bushings on each end as they can easily fall off.



28. Remove the two screws from the doctor blade.

Remove the blade



29. Using needle nose pliers, pull out the toner fill plug. Remove residual toner and clean the hopper thoroughly using compressed air or a vacuum. Fill with new toner and install the fill plug.



TONER CARTRIDGE ASSEMBLY

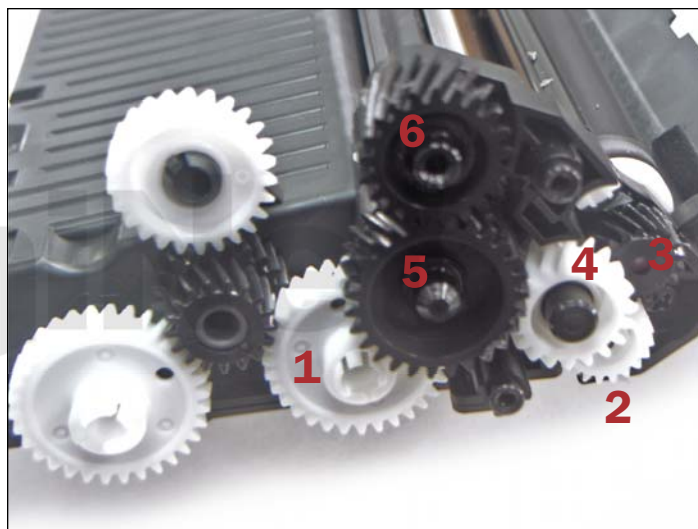
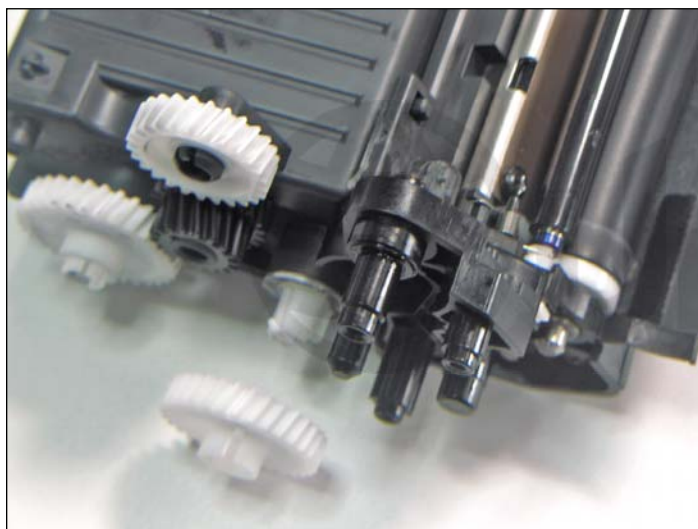
30. Install the doctor blade and two screws.



31. Install the developer roller as shown.



32. Install the toner charging roller as shown.



33. Install the gear side roller support plate.

Install the gears back in the order shown.

Make sure that the locking slot of the **first** gear matches with the key of the paddle drive shaft.



34. Install the gear side end plate.



35. Install the contact side (gearless) end plate.



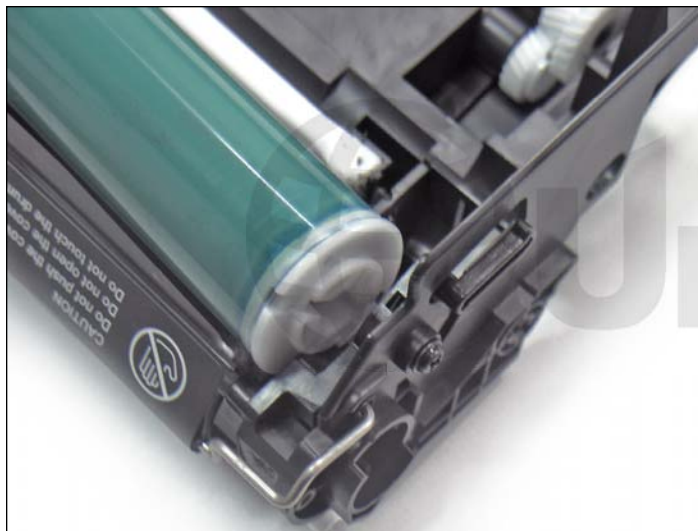
DRUM CARTRIDGE ASSEMBLY

36. Install the wiper blade and two screws.

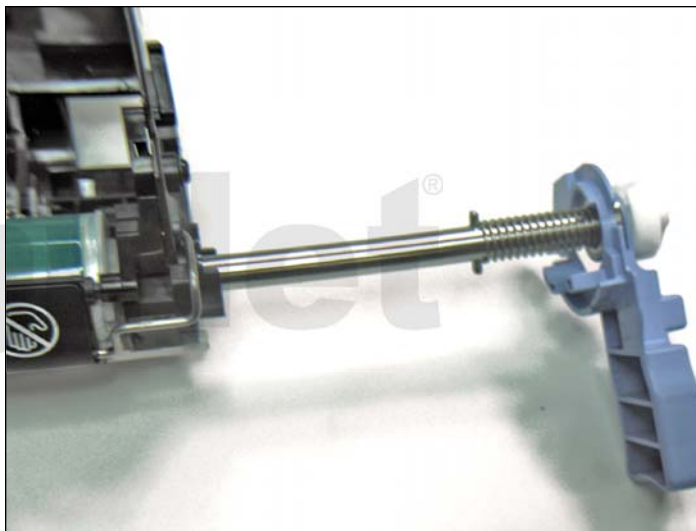
Make sure the back is sealed properly.



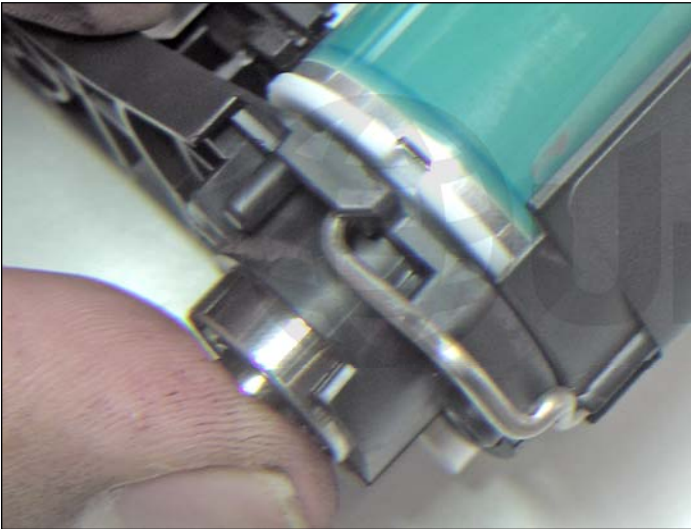
37. Install the PCR onto the PCR saddles.



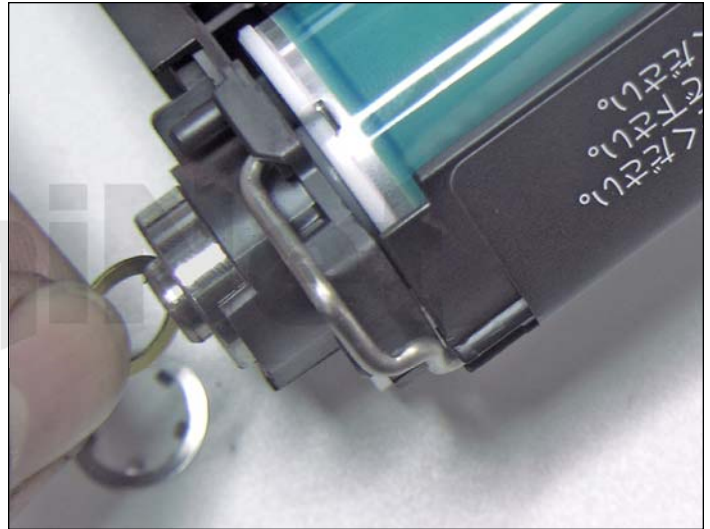
38. Insert the keyed end of the drum into the right side of the cartridge.



39. Carefully slide the drum shaft into position.



40. Hold the left end bearing in place while inserting the shaft. The shaft will need to be turned slightly to engage the shaft-locking pin into the drum key slot.



41. Apply the washer, then press the star-lock clip back over the shaft. Check that each end of the shaft is sitting in place correctly.



42. Assemble the two halves together. It is important to raise the drum shutter upward and lower the toner hopper downward under the shutter to prevent damaging the shutter blade.



43. Insert the two cartridge pins, pressing fully into place.



44. Install the drum cartridge tension springs.



45. Install the blue cartridge handles.

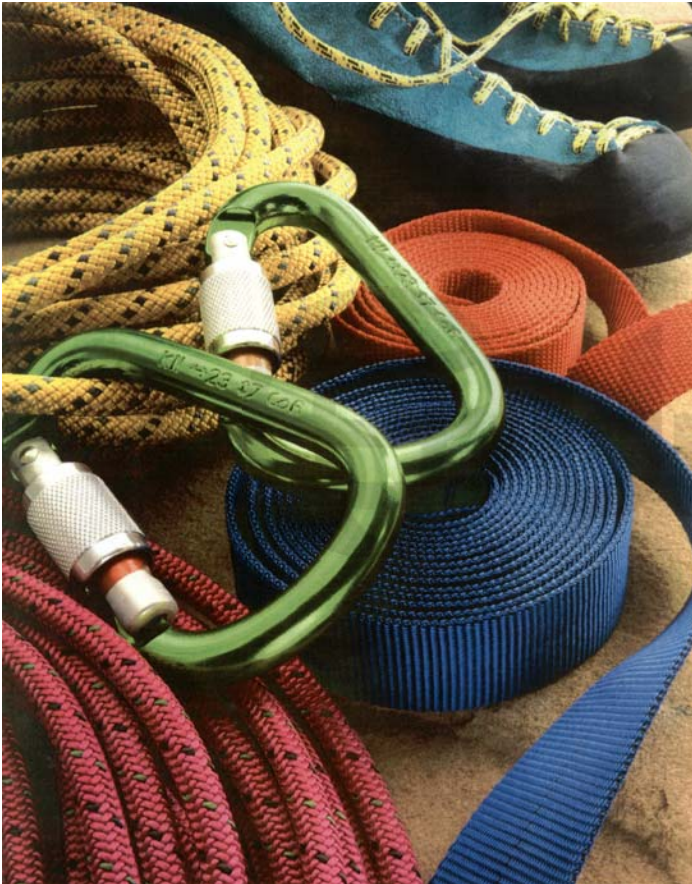


46. Assembly complete.

NOTE: A new smartchip must now be installed before testing the cartridge.

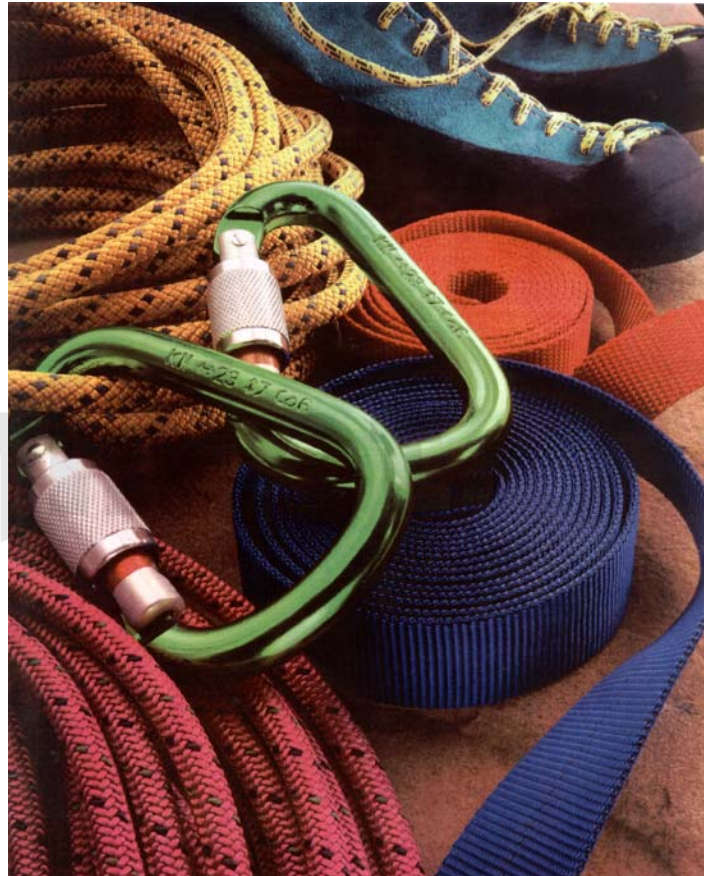
COLOR CALIBRATION

1. From the READY position display, press the green check button, which will take you to the menu.
2. Select option #3 (CONFIGURE DEVICE) and press the check button again.
3. This will take you to the next window.
4. Select option #2 (PRINT QUALITY) and press the check button.
5. In the next window, scroll down to CALIBRATE NOW, then press the check button once more.
6. The machine will take several minutes to complete the calibration.



WITH CALIBRATION

True color representation shown with calibration.



NO CALIBRATION

Poor color representation shown without calibration.

The Image seems to have a reddish tint.

Note the “blue” belt in the picture has turned purple.

DEFECTS DUE TO IMPROPER CARTRIDGE REMANUFACTURING

Problem: Toner leakage and dark spots on printed image (toner build-up).

Details: During printing, toner accumulates between doctor blade and developer roller. If extensive, spots develop on printed images.

Causes:

1. Defective doctor blade or developer roller.
2. Improper cartridge assembly (especially with side leakage): imbalance in tightening of doctor blade.
3. Improper cartridge assembly (especially with side leakage): worn out end felt of developer roller.
4. Weak charging of toner, possibly due to improper storage condition.

Suggestion:

1. Care in regeneration of cartridge components, and not using damaged components.
2. Precise control of blade gap, and replacement of end felt.
3. Maintaining the charging power of toner, and proper toner storage.

Problem: Backgrounding.

Details: Toner speckles printed in the margin of printed image.

Causes:

1. PCR contamination, defective PCR or wiper blade.
2. Lack of re-usability of OPC drum (defective surface or improper cleaning).
3. Calibration error due to worn out transfer belt.
4. Weak charging of toner, possibly due to improper storage condition.

Suggestion:

1. Replace PCR and/or wiper blade.
2. Replace OPC drum.
3. Replace transfer belt.
4. Maintaining the charging power of toner, and proper toner storage.

Problem: Streaking.

Details: Development of streaks on printed images.

Causes:

1. Physical or chemical damages to the doctor blade and/or:
2. Physical or chemical damages to the developer roller surface (scratches, surface coating damage, etc.).
3. Toner coating forms on blade due to an insufficient gap between doctor blade and developer roller.

Suggestion:

1. Proper regeneration of the components and selection of good components.
2. Change the cartridge assembly method.

Problem: Scattered toner in the edge of paper.

Details: Traces of toner in the paper margin and edge section, and contamination of transfer belt.

Causes:

1. Localized wear of OPC drum, wiper blade, PCR, developer roller, and/or doctor blade.
2. Side leakage (toner build-up).

Suggestion:

1. Replace the worn component.
2. Make sure components are sealed properly during assembly (end felt, sealing blade, recovery blade, etc.).

DEFECTS DUE TO IMPROPER TONER

Problem: Image density or ID.

Details: ID of printed images is either too low or too high, and the color gradation deviates too much from the linearity.

Causes:

1. Weak charging power of toner, possibly due to improper storage.
2. Defective OPC drum, doctor blade, developer roller, and/or adder roller.
3. Calibration error due to defective smartchip and/or worn out transfer belt (possibly at printer startup).

Suggestion:

1. Maintain the charging power of toner, and proper toner storage.
2. Replace worn components.
3. Replace the smartchip or the transfer belt (calibrate at least three or more times before deciding to replace).