

# BROTHER® HL-6180 SERIES TN720 • 750 • 780 TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS



BROTHER TN720 • 750 • 780 TONER CARTRIDGE

# REMANUFACTURING THE BROTHER HL-6180 SERIES TONER CARTRIDGE - TN720/750/780

By Mike Josiah and the Technical Staff at UniNet

Released in August 2012, the Brother HL-6180 printer engine is based on a new 40-42-ppm, 1200-DPI laser engine. These machines have a first page out in less than 8.5 seconds, and come standard with 64Mb of memory depending on the machine. The HL-6180 series also have duplexing built in. Our HL-6180 machine came with a TN720 starter cartridge, which is rated for 3,000 pages. The starter cartridge does not come with any reset gears.

There are three different toner cartridges available for these machines. The TN720 is rated for 3,000 pages, The TN750 is rated for 8,000 pages and the TN780 is rated for 12,000 pages. The TN780 will only fit into the HL-6180 and MFC-8950 machines.

There are different part numbers for these cartridges depending on your region. They are as follows:

| Region                  | Standard | High Yield | Super High Yield | Drum   |
|-------------------------|----------|------------|------------------|--------|
| North/South America     | TN720    | TN750      | TN780            | DR720  |
| Europe                  | TN3330   | TN3380     | TN3390           | DR3300 |
| Asia/Middle East/Africa | TN3320   | TN3350     | TN3370           | DR3355 |
| Oceania                 | TN3310   | TN3340     | TN3360           | DR3325 |



Figure shows how the toner and drum cartridges are shipped in a new machine.



Figures show a **starter cartridge** top, bottom and gear end cap.



Figures show the same for a **TN750**.



Figures show a **TN780**.

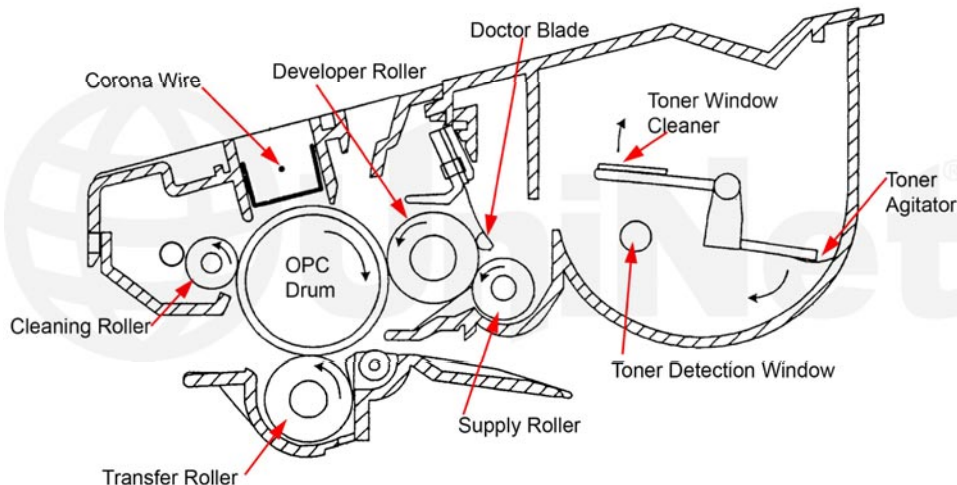
**CURRENT MACHINES RELEASED SO FAR FOR THIS SERIES**

|            |            |            |            |            |             |
|------------|------------|------------|------------|------------|-------------|
| HL-5440D   | HL-5450DN  | HL-5450DNT | HL-5470DW  | HL-5470DWT | HL-6180DW   |
| HL-6180DWT | DCP-8110DN | DCP-8150DN | DCP-8155DN | DCP-8250DN | MFC-8510DN  |
| MFC-8520DN | MFC-8710DW | MFC-8810DW | MFC-8910DW | MFC-8950DW | MFC-8950DWT |

There is a reset gear that resets the printer each time a new toner cartridge is installed. In our machine, the starter cartridge was a TN720 and did NOT have a reset gear installed. The TN750 and the TN780 cartridges use different reset gears. The TN750 gears, in addition to being a different color from the TN780, have one large white flag instead of two smaller gray flags on the TN780. That is how the machine knows if there is a high yield or super high yield cartridge installed. New high yield and super high yield reset gears are available so that starter cartridges can be made into high yield or a super high yield cartridge. The OEM super high yield cartridge is slightly larger than the standard or high yield cartridges, but we feel at this point that there is enough room to make them super high yield (as of April 2013, this is still preliminary info).

Reset gears serve two purposes. First they reset the printer so it knows a new toner cartridge was installed. Secondly they tell the printer which cartridge was installed. When the printer senses a new toner cartridge, the bias voltage is set to a high voltage. As the cartridge is used, the bias voltage is reduced gradually down. This process is necessary because according to Brother, a new toner cartridge has a tendency to print light. As the cartridge is used, the density increases. To keep the density level even throughout its life, the density bias voltage is reduced accordingly. Each time a new cartridge is installed, the bias voltage is reset to the high voltage point, and the cartridge page count is reset to zero. Since different yields would dictate different decreases in density over time, Brother uses different reset gears, which tell the printer how fast to reduce the bias voltage.

**NOTE:** There have again been some major changes in the way the toner cartridge AND the drum cartridge works in this series. Because of this we are covering the theory again...

**NEW BROTHER PRINT THEORY**

As with previous Brother cartridges, the waste toner is repelled off of the drum to be transferred to the toner unit, but the method of how this works is now very different.

Figure shown is a general layout of the component locations.



The waste toner still is transferred to the supply chamber, and this remaining toner still **MUST** be completely removed from the supply chamber before adding new toner. Failure to do this will cause backgrounding. In addition to contaminating the toner cartridge, this may also contaminate the cleaning section of the drum cartridge, which in turn will contaminate the toner cartridge again. The reasons for this are explained in the following cartridge theory section.

The first new item in this engine is there is now a paper-cleaning roller in the printer itself. This roller cleans off any extra paper dust before the printing process even starts. It is located just after the paper feed rollers.

The cleaning section of the drum cartridge no longer consists of a "cleaning brush" it is now a paired system of the cleaning roller assembly and the transfer roller but these rollers only play a minor part. The developer roller now has two jobs. In addition to transferring the good toner to the OPC for printing, it also now cleans off the majority of the waste toner off the drum. This is done by a very complicated series of different electrical charges and a series of directional changes on the drum and developer rollers. The developer roller and drum change direction and charge four times per full drum rotation. This is such a complicated process that the printers actually have a rotation controller PCB with a microcomputer on it to control it all.

The cleaning roller cleans off any remaining toner that the developer roller did not remove. The transfer roller basically self cleans itself of any residual toner or paper dust that might have accumulated in the printing process

When the drum is cleaned by the transfer roller the surface potential of the drum is dropped (from 900V to about 200V) at this point the transfer roller and cleaning roller will release the waste toner to the drum. This waste toner is actually then charged by the corona wire so that the developer roller can pick it up and bring it back into the toner hopper. Both rollers release the waste toner at the same time. This was done to keep the print speed high, the power supply smaller and the cost on the two rollers and cartridges down.

The drum unit also now has a small waste chamber next to the cleaning roller. The reason for this waste area is for things like paper dust that do not transfer well. Since there is a paper-cleaning roller before the cartridges in the printer this area in theory should stay fairly empty. The metal roller next to the cleaning roller helps keep the cleaning roller free of anything that does not transfer.

Since the developer roller now does most of the cleaning work, the condition of the roller while always important, is now much more so. If the roller has any contamination on it from the toner additives, (OEM or aftermarket) it will interfere with the cleaning cycle and ghosting/backgrounding will result. If the cleaning roller gets contaminated and not cleaned properly the same thing will result. The main culprit for this used to be the charge felt. It is now the developer roller. It is very important that the developer roller be cleaned with a dedicated developer roller cleaner. Never use alcohol of any type, as this will strip the conductive coating off the roller.

Since the waste toner is transferred back into the supply of the toner cartridge. Once you print with a bad toner cartridge, the drum unit will become contaminated. Even when you change out the toner with a good properly recycled or new OEM cartridge, the drum unit will transfer some of the bad toner back into the good toner cartridge, which will again cause backgrounding. Both cartridges will be contaminated again. It can be a vicious circle.

The remaining "toner" in the toner cartridge when toner low is reached is just below the bare minimum that can maintain the proper charge level. When the change toner light comes on, the toner will not charge up to the proper level and will cause the backgrounding. As the toner cartridge reaches the end of its useful life, the printer senses the low charge level in the toner supply and will try to keep the charge level up. This constant charging keeps an almost "empty" cartridge from backgrounding. Once the printer cannot get the remaining toner up to the minimum charge, the change toner light comes on. The cartridge at this point will still be printing properly. If you were to take that same cartridge out of the machine for a few days, and then put it back in the printer without doing anything to it, the cartridge will background. This will happen because the charge level that the printer was trying so hard to keep up has dissipated out and the materials left can no longer accept a proper charge.

**WHAT DOES THIS ALL MEAN?**

1. Make sure that your cartridge technicians thoroughly clean out the supply chamber of the toner cartridge.
2. Clean the developer roller with an approved developer roller cleaner, NOT alcohol! That will strip the conductive coating off.
3. In the event that they forget, and you have a backgrounding cartridge. The toner must be completely cleaned out again (do not use the toner over!), and NEW fresh toner MUST be installed.
4. Clean the developer roller (again) with an approved developer roller cleaner, NOT alcohol!
5. The drum unit then has to be taken apart and cleaned out with emphasis on the cleaning roller and transfer roller. This is a very simple process but very necessary once it is contaminated.

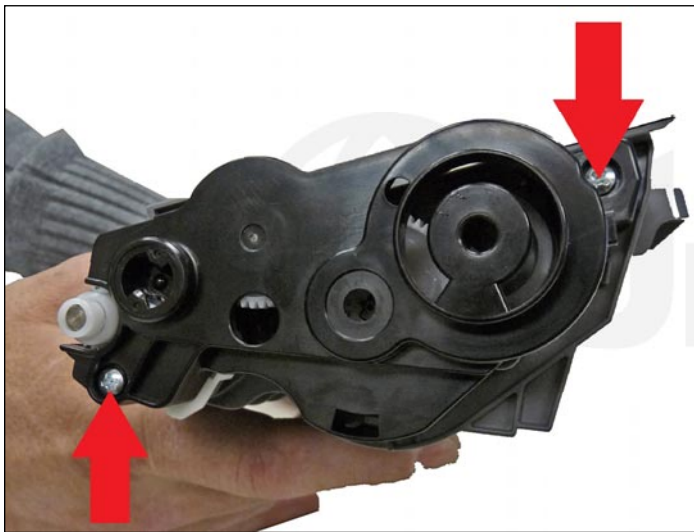
According to our tests, there will be approximately 60g of toner remaining when the cartridge is spent; this is normal. The remaining toner however, as stated above, is waste toner/paper dust only and must be thrown out or there will be backgrounding issues.

**REQUIRED TOOLS**

1. Toner approved vacuum
2. Phillips head screwdriver
3. Small common jewelers screwdriver
4. Needle-nose pliers

**REQUIRED SUPPLIES**

1. Toner for use in the Brother HL-6180 series of cartridges
2. Developer roller cover
3. New developer roller (optional)
4. Dedicated developer roller cleaner (not alcohol; see text above)
5. Lint free cotton cloths
6. Toner magnet cloths
7. White lithium grease

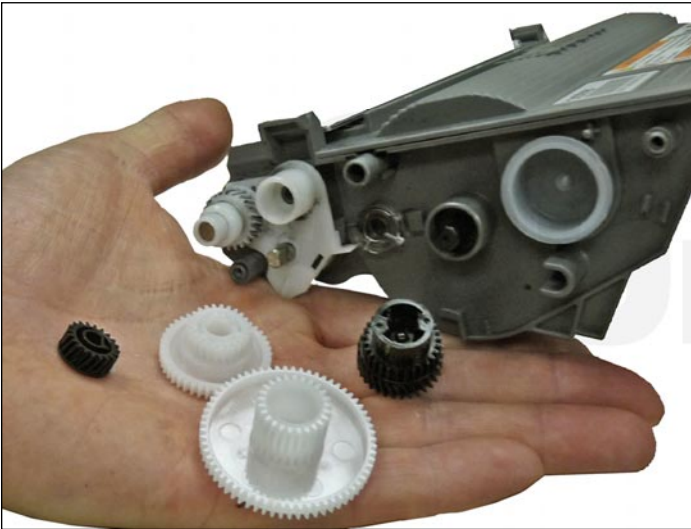


1. Vacuum the exterior of the cartridge.



3. Press in on the bottom tab and remove the end cap.

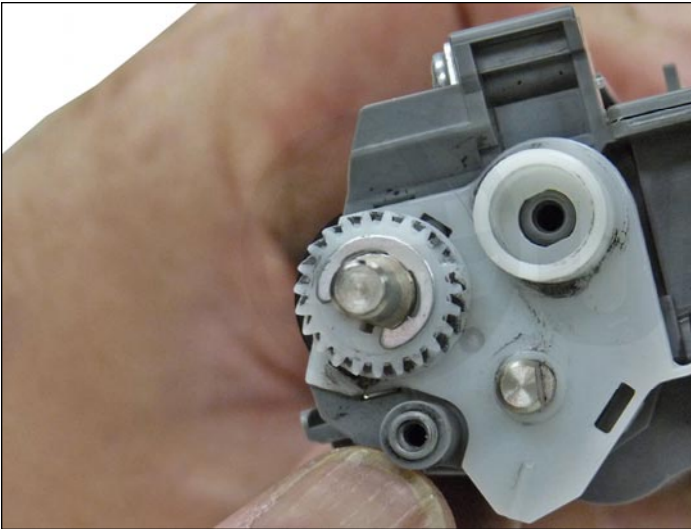
2. On the **gear** side, remove the two screws on the end cap.



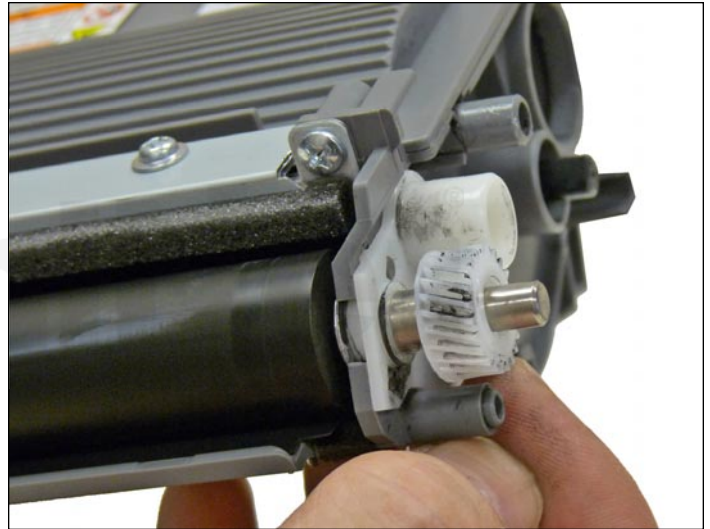
4. Remove the gears as shown.

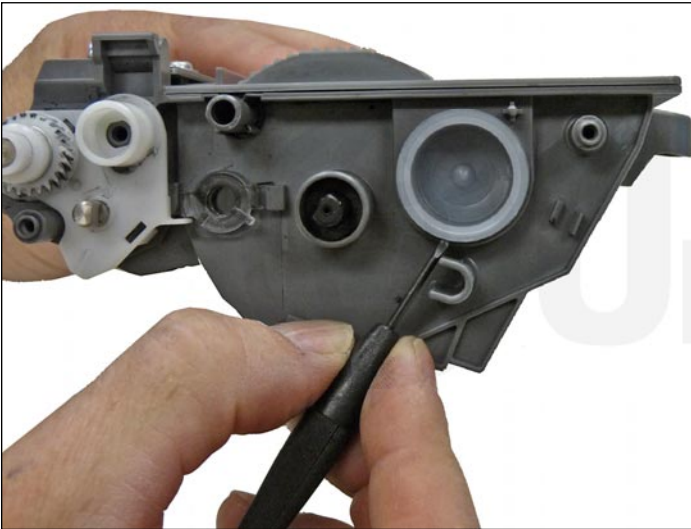


5. Remove the white plastic spacer from the developer roller shaft.



6. Remove the E-ring and the developer roller drive gear.



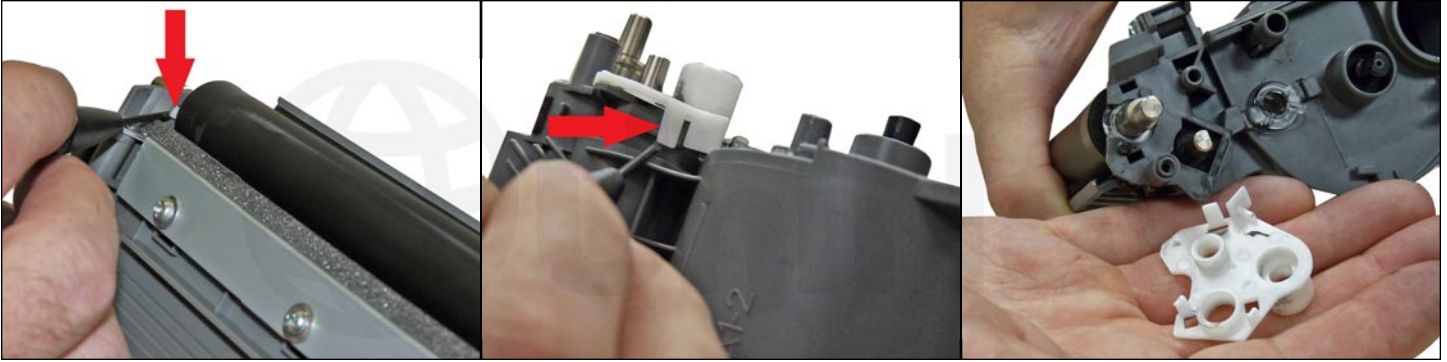


7. Remove the fill plug from the toner cartridge. Dump the remaining toner and vacuum/blow out the cartridge.



8. On the **non-gear** side of the developer roller remove the screw, press in on the locking tab and remove bushing plate.





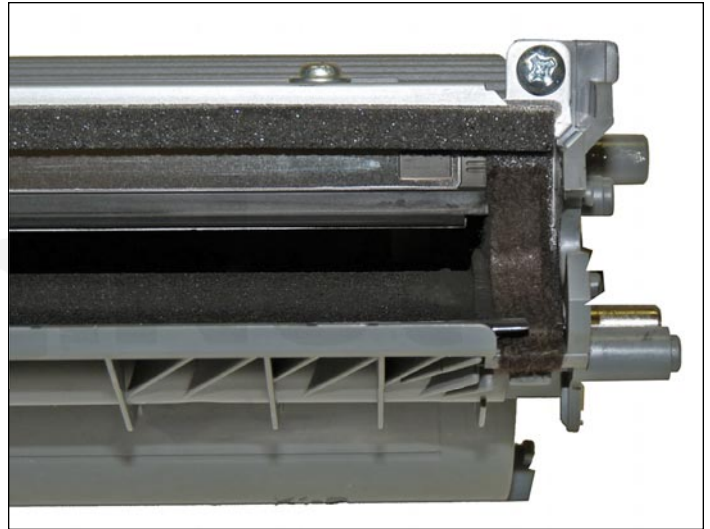
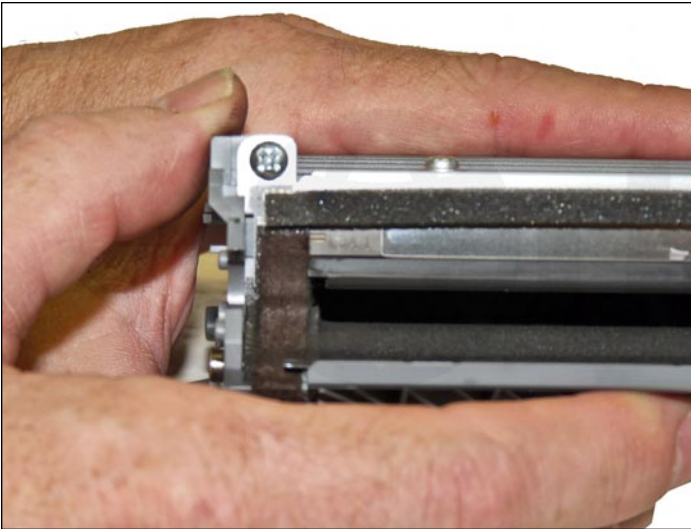
9. On the **gear** side of the developer roller, press in on the three locking tabs and remove the white plastic bushing plate.



10. Remove the developer roller.



11. Vacuum the doctor blade and foam feed roller clean. Until new blades are available, we do not recommend that the doctor blade be removed or the developer roller felt seals disturbed. The doctor blade can be cleaned easily by blowing the excess toner off, and wiping it down with a lint-free cloth. Be very careful not to leave any lint behind!



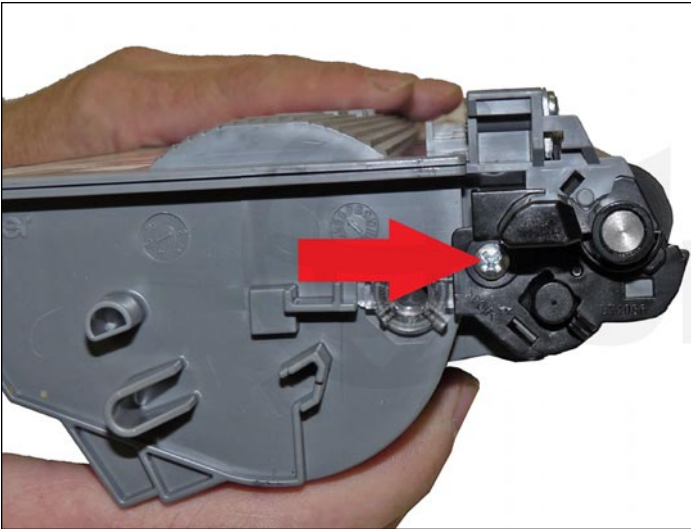
12. Inspect the magnetic roller felts.

If they are compressed (shiny), rough them up with a small screwdriver.

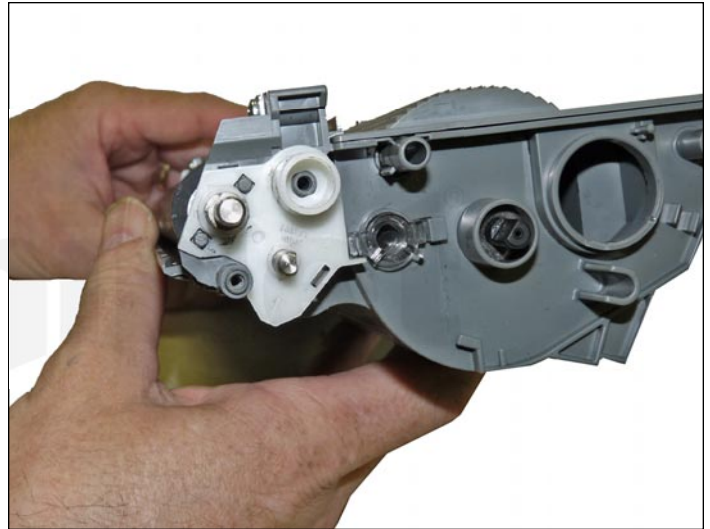


13. Clean the developer roller with a lint-free cloth and a dedicated developer roller **cleaner**. Do not use any chemicals other than a dedicated developer roller **cleaner** to clean the roller. Any type of alcohol cleaner will strip the conductive coating off the roller.

14. Re-install the developer roller with the long shaft to the **gear** side.

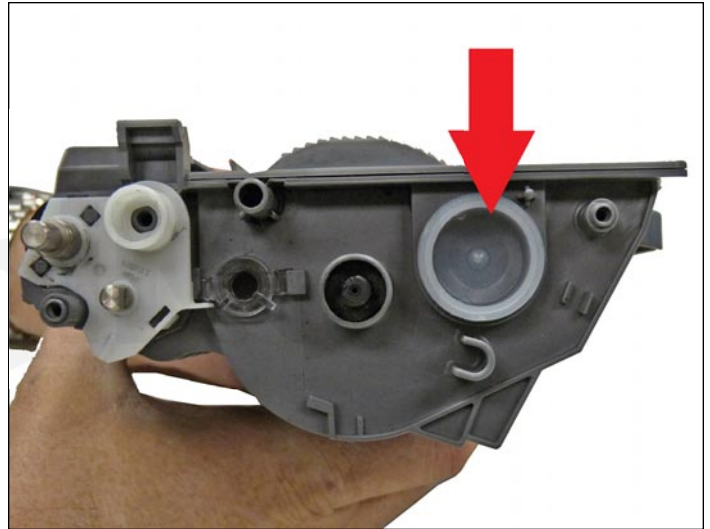


15. Install the **non-gear** side developer roller bushing and screw.



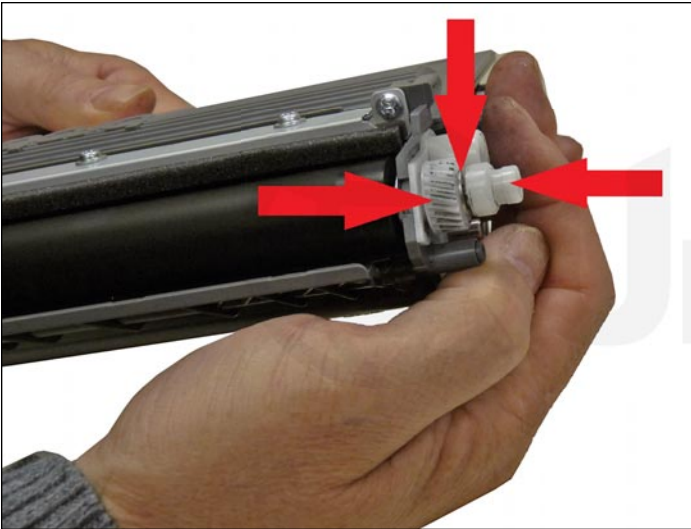
16. Install the gear side developer roller bushing.

Make sure it snaps in place.



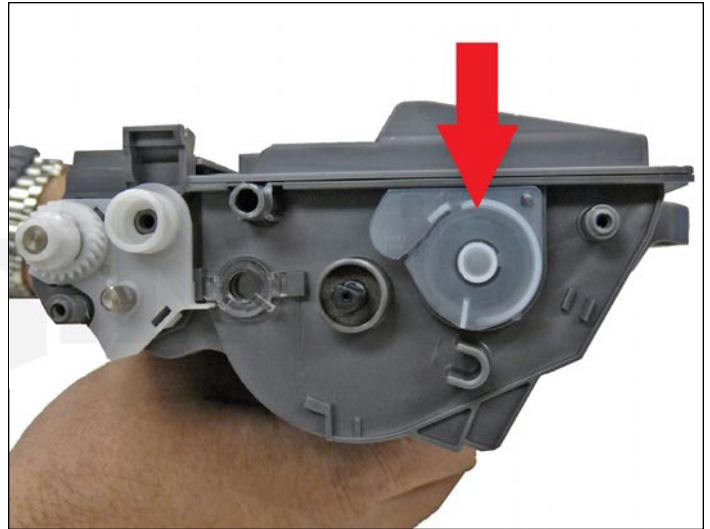
17. Fill the cartridge with toner for use in the Brother HL-6180 series of toner cartridges.

Replace the fill plug.



18. Clean the gears, making sure that they have no toner on them. This is a good time to also check the gear shafts to make sure there is enough grease. If the shafts appear dry, or the grease is contaminated with toner, clean the shaft and inside of the gear. Replace the grease with white lithium grease.

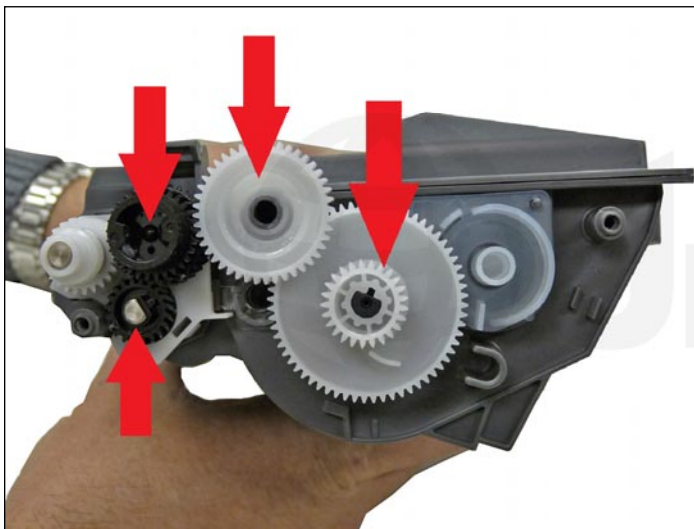
19. Install the developer roller gear, E-ring, white axle spacer.



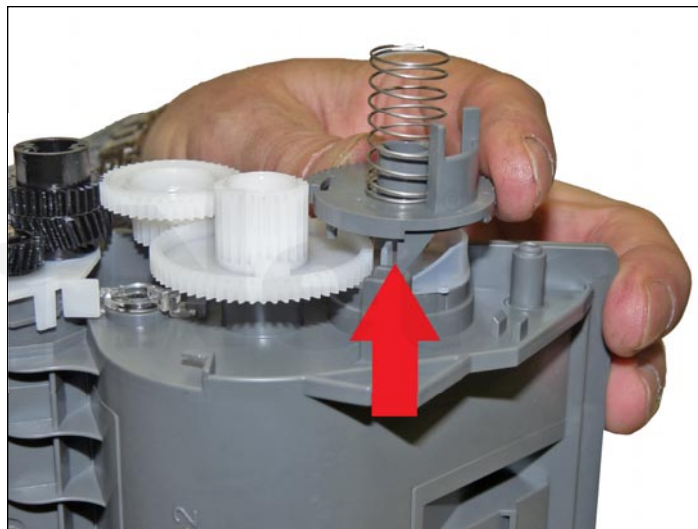
20. The cartridge we are remanufacturing is a starter cartridge and did not come with a retaining plate, reset gear or spring. These items need to be installed for the printer to accept a starter cartridge as new.

21. Install the retaining plate over the fill plug.





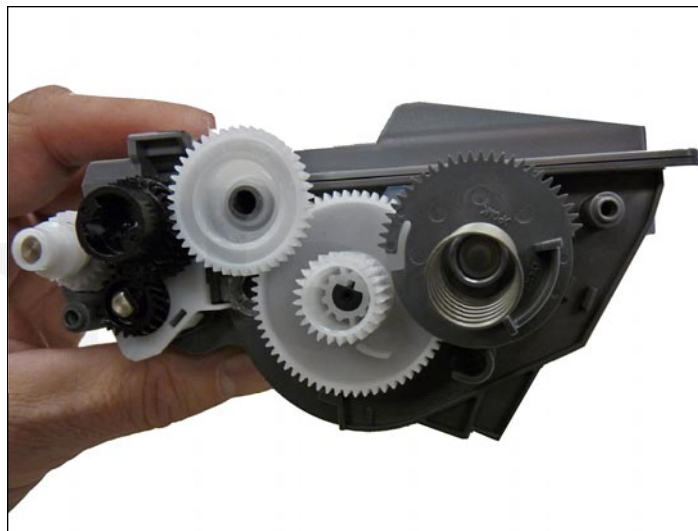
22. Install all the gears as shown.



23. Depending on the cartridge you have, set the reset gears as shown. Make sure the reset-gear tab and the tab on the retaining ring are next to each other.



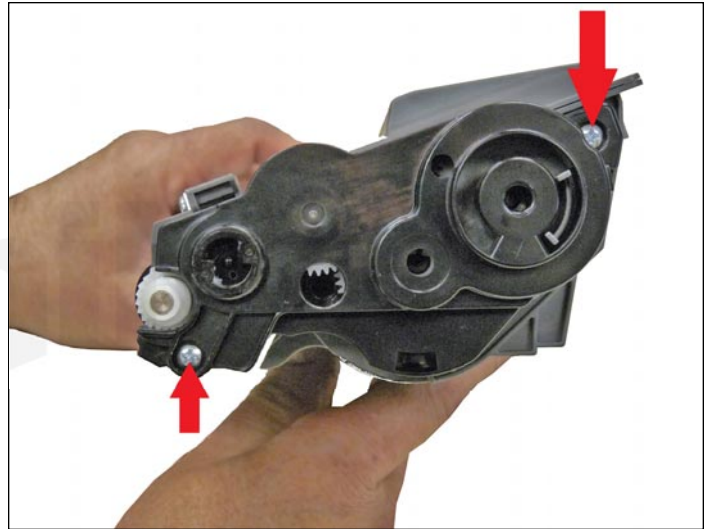
For the **TN750...**



For the **TN780...**



24. Install the gear side end cap, and two screws, for the **TN750**...



For the **TN780**...



25. Wipe the cartridge down to remove any remaining toner dust. Be careful not to touch the developer roller!

26. Install the developer roller cover.

### TEST PAGES

1. Take the machine offline by pressing any of the arrows, "OK" or "Back" buttons.
2. Press the up or down arrows until you see "Machine Info."
3. Press "OK" or "Go."
4. Press the up or down arrows until you see either "Demo Print" or "Test Page."
5. Press "OK" or "Go."
6. The page selected will print.