

BROTHER® HL-2140 • 2170 • TN330 • 360 TONER CARTRIDGE REMANUFACTURING INSTRUCTIONS



BROTHER TN360 TONER CARTRIDGE

REMANUFACTURING THE BROTHER HL-2170W SERIES/TN360 TONER CARTRIDGE

By Mike Josiah and the Technical Staff at UniNet

Released in January 2008, the Brother HL-2170W printer engine is based on a new 22ppm, true 1200 DPI laser engine. These machines have a first page out in under 10 seconds and come standard with 8, 16, or 32MB of memory depending on the machine. The HL-2170W also is wireless capable. All machines come with a starter cartridge rated for 1000 pages. The first section of this article covers the theory behind these cartridges. The first three paragraphs have some interesting information on the reset gears and how they work. The rest is standard Brother theory. If you are not familiar with Brother cartridges, it would be best to read through this entire section. It may save you a few very frustrating hours.

CURRENT MACHINES RELEASED SO FAR:

HL-2140

HL-2150N

HL-2170W

There are two different yielding toner cartridges available for these machines: the TN330 and TN360 (TN2110/2120 Europe and TN2130/2150 Asia). The TN330 cartridge is rated for 1,500 pages at 5%. The TN360 is rated for 2,600 pages at 5%.

The drum unit is new as well (part # DR-360 [DR-2125, DR-2100]) and is rated for 12,000 pages. It will be covered in a future article.

There is a set of reset gears that reset the printer each time a new toner cartridge is installed. Previous Brother cartridges have used a reset gear before, but this is the first time a set of gears has been used. The starter cartridges that come with new printers do not have these gears. Both the TN330 and the TN360 cartridges use different reset gears sets. The TN330 gears, in addition to being a different color from the TN-360, have a shorter gear train. That is how the machine knows if there is a standard or high-yield cartridge installed. New reset gears (at the time of this writing) are being developed.

An interesting point in the reset procedure is what happens in addition to the counter being reset. 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. This was also done in the TN550/580, but after a time, Brother just went with the high yield gear for both cartridges. Time will tell on what they do with these cartridges.

UPDATE: Brother has switched over to using one style reset gear set for both the TN330/360 in their new cartridges. A single aftermarket reset gear set is available that works in both TN330/360 cartridges as well.

Another interesting item of note is that these machines use a filter which seems to be located after the fan. The service manual doesn't mention anything about it, and it's not listed as a consumable. I think it's something to watch though as the machine get older if you do repairs.

BASIC CARTRIDGE THEORY

As with previous Brother cartridges the waste toner is repelled out of the drum cartridge and picked up by the developer roller in the toner cartridge and brought back into supply chamber. That is why there will always be a good amount of toner left in the supply chamber when the cartridge is finished. This remaining toner **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 will 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 cleaning section of the drum cartridge consists of a "cleaning brush" and a recovery blade. The cleaning brush has two opposite charges placed on it during the print cycle. The first attracts any remaining toner off the drum. The second repels the toner off the brush back onto the drum where it then transfers back into the toner cartridge. This is all done in a timing sequence that does not interfere with the printing process. If the cleaning brush becomes contaminated with bad toner that will not accept a charge, the brush will not be able to clean itself and backgrounding will occur. It seems to be the nature of contaminated toner that it will accept most of the charge to be cleaned off the drum, but it will not accept the charge that would allow the brush to clean itself off at all. A properly working cleaning brush will at any given time have only a small amount of toner on it. Once contaminated, toner will accumulate which will only cause the problems to get worse.

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 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 with out doing anything to it, the cartridge will shade. 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. In the event that they forget, and you have a shading cartridge.
The toner must be completely cleaned out again (do not use the toner over) and new fresh toner must be installed.
3. The drum unit has to be taken apart and cleaned out with emphasis on the cleaning brush area.
This is a very simple process but very necessary once it is contaminated.

According to our tests, there will be approximately 65-70g of toner left when the cartridge is spent.

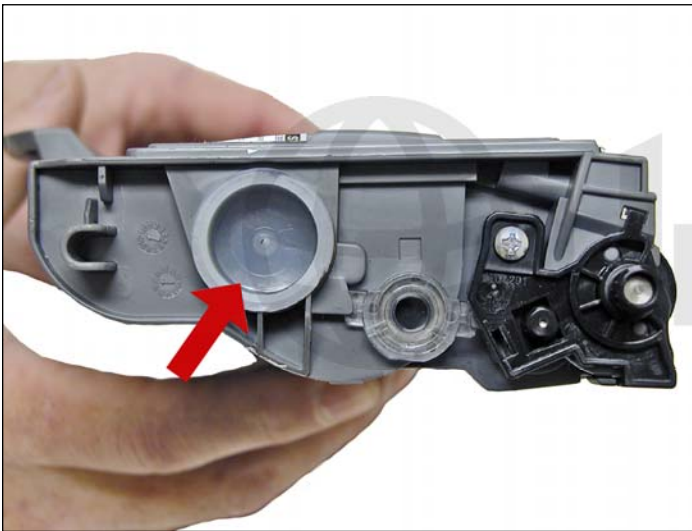
How to run test pages, printer troubleshooting, common cartridge problems, as well as how to read the cartridge serial number will be covered at the end of this article.

REQUIRED TOOLS

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

REQUIRED SUPPLIES

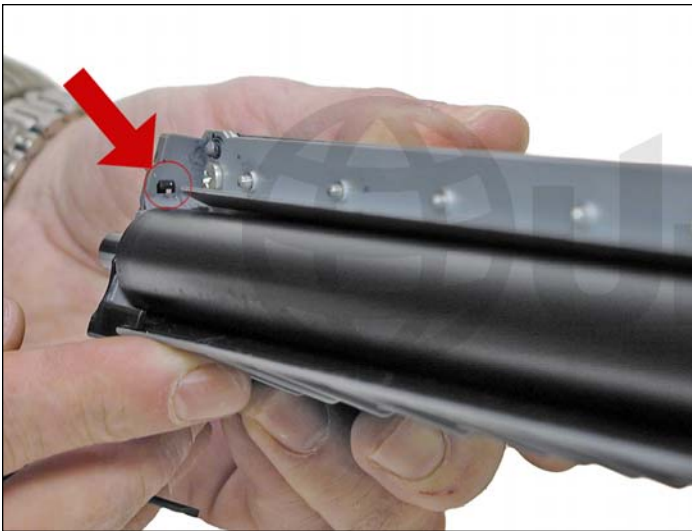
1. Black toner for use in Brother HI-2170 (65g for the TN-330, 90g TN-360)
2. Reset gear for the starter cartridge
3. Lint free cotton cloths
4. Toner magnet cloths
5. White lithium grease



1. Vacuum the exterior of the cartridge. Remove the fill plug from the toner cartridge. Dump the remaining toner and vacuum/blow out the cartridge. Make sure that the gear area is clean. Leaving any toner in the teeth of the gears may cause a tooth to be damaged and cause a clicking noise. We have found it best to use compressed air to clean them out, but to also keep one hand over the gears to protect them.



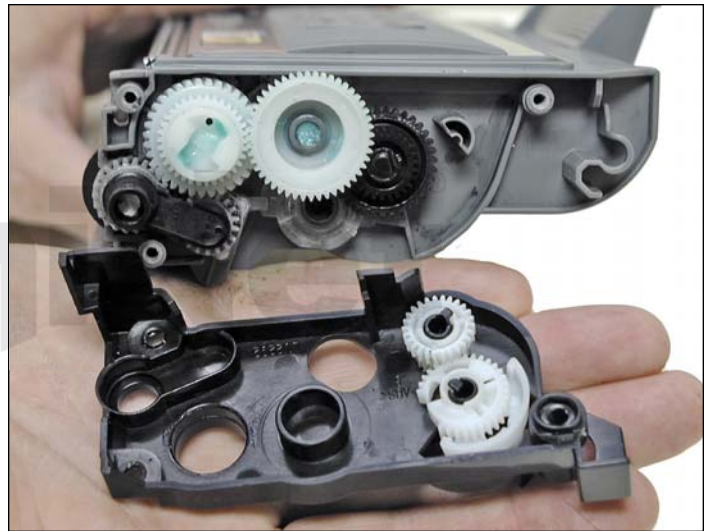
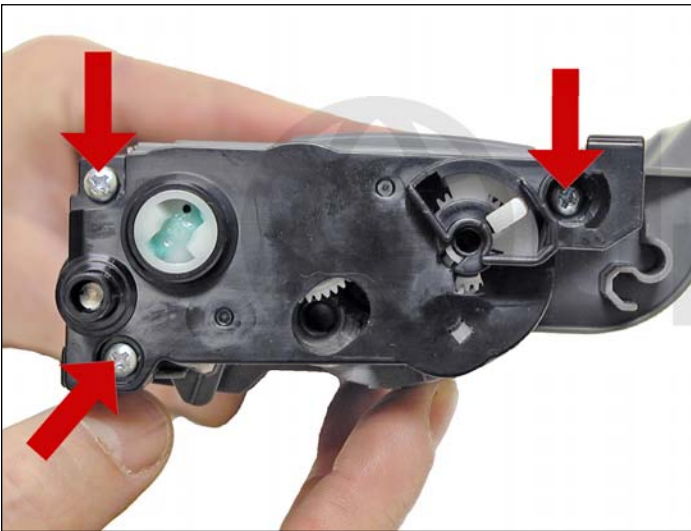
2. On the non gear side of the developer roller, remove the screw.



3. Remove the drum axle plate by pressing on the two tabs as indicated, pry the plate off.



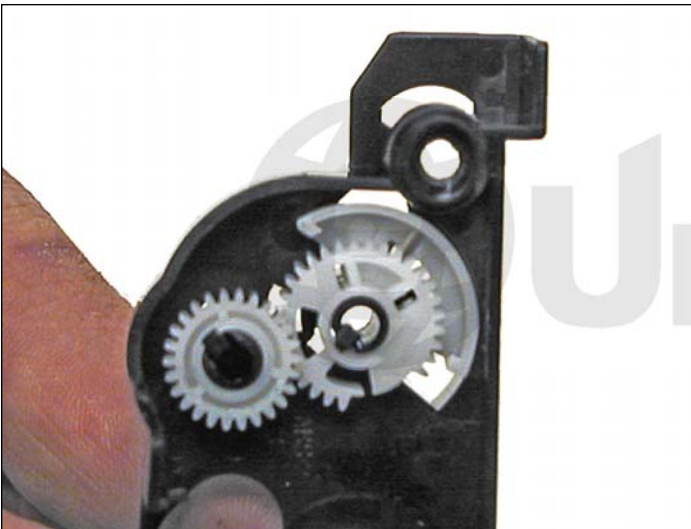
4. On the gear side, remove the three screws and cover plate.



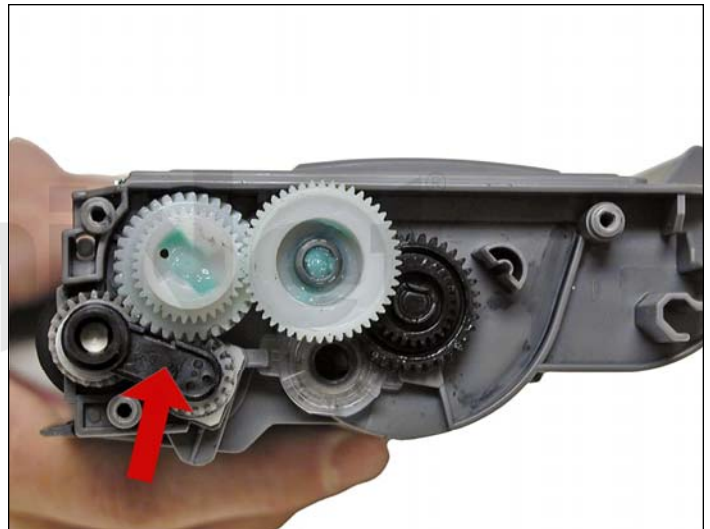
5. The reset gears are attached to the cover plate. These gears reset the printer when a new cartridge is installed.

New starter cartridges do not have these gears.

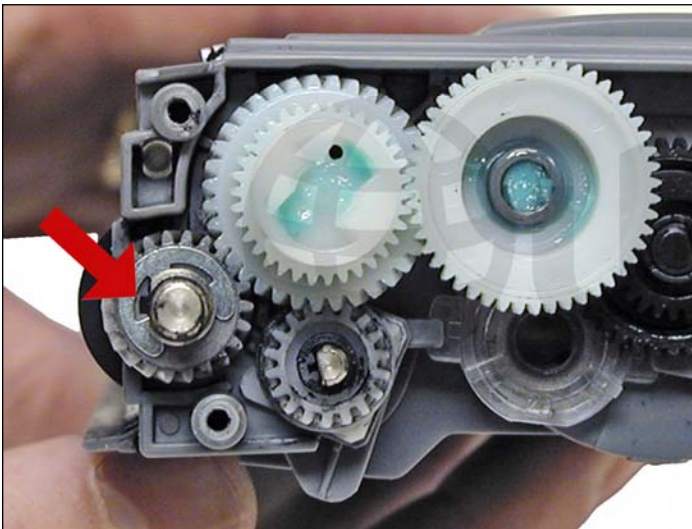
New replacement gears are available, and are required for remanufacturing these cartridges.



6. Remove the black plastic spacer from the developer roller shaft.



7. Remove the E-ring and small gear.



8. Remove all the remaining gears.



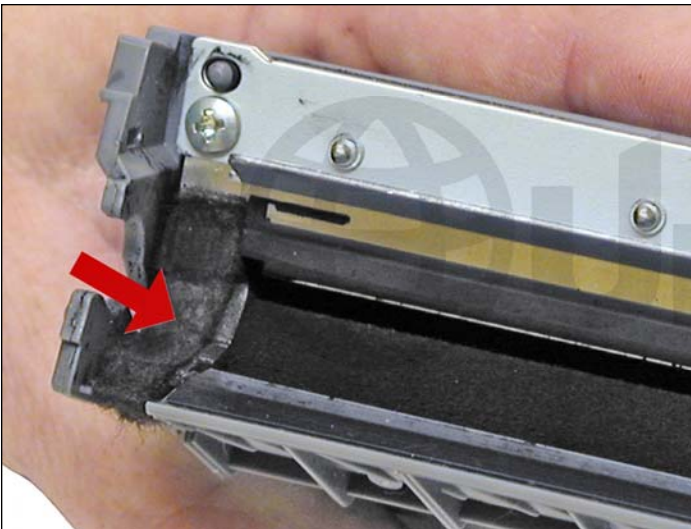
9. On the gear side of the developer roller, press in on the locking tab and rotate the developer roller lock up.



10. Remove the developer roller. 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 easily cleaned by blowing the excess toner off, and wiping down with a lint free cloth. Be very careful not to leave any lint behind.



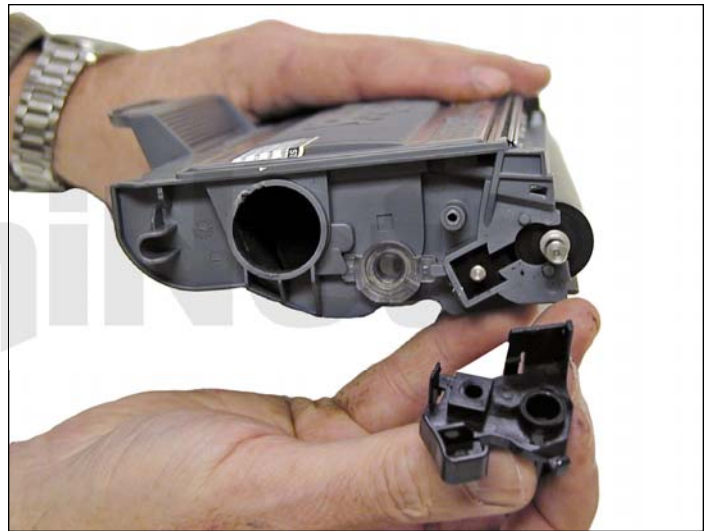
11. Inspect the magnetic roller felts. If they are compressed, (shiny) rough them up with a small screwdriver. Clean the developer roller with a lint free cloth. Do not use any chemicals other than a dedicated cleaner for Brother rollers to clean the roller. A dry clean cloth will work fine.



12. Re-install the developer roller long shaft side to the gear side and white lock pointing up.

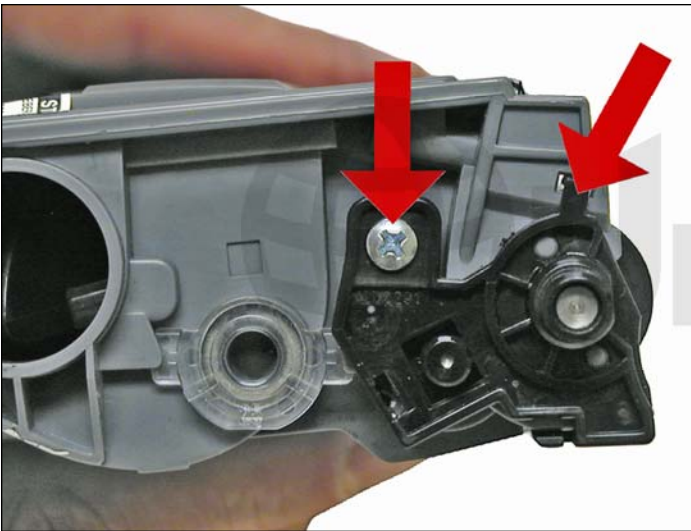
Turn the lock towards the doctor blade until it locks in place.



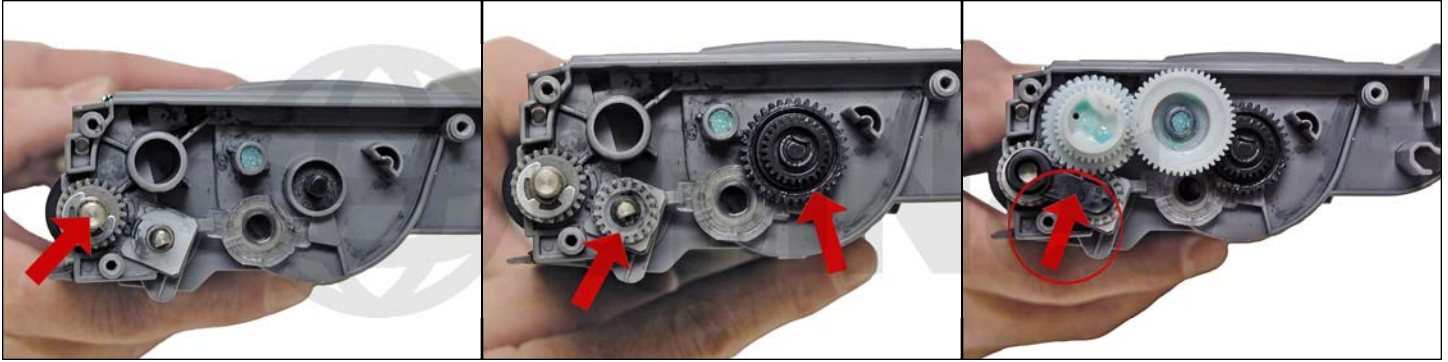


13. Install the small outside end plate and screw on the non-gear side.

Make sure the clear plastic plug for the optical sensor is locked in the proper position.



14. 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.



15. Install the developer roller gear, e-ring, black axle spacer, and the rest of the gears.

Install the two large white gears last.

Make sure all the gears are meshing properly.



Depending on the cartridge you have, set the two reset gears as shown:

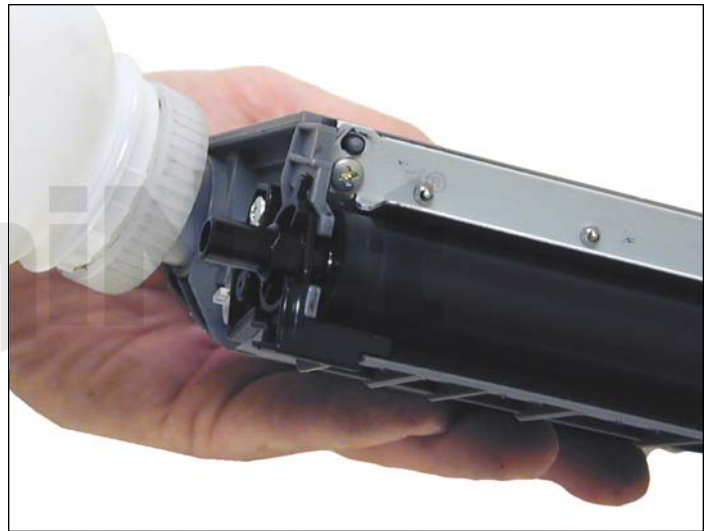
TN330.



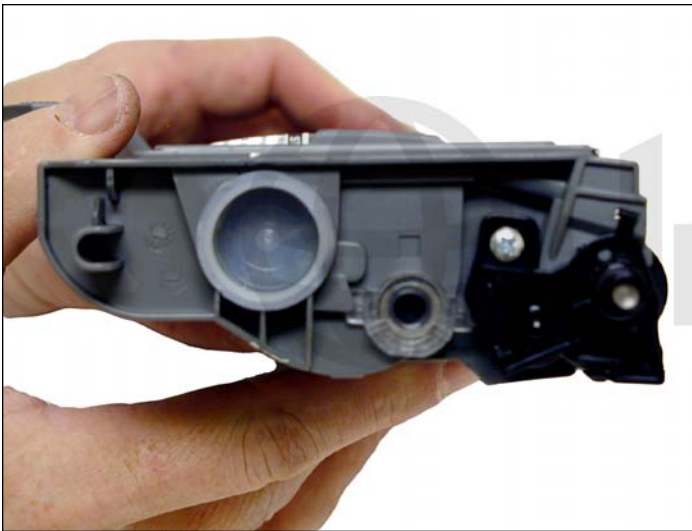
TN360.



16. Install the gear cover plate, and three screws.



17. Fill the cartridge with black toner for use in Brother 2170.



18. Replace the fill plug.



19. Install the developer roller cover.

Wipe the cartridge down to remove any remaining toner dust.

TEST PAGES

1. Press the "GO" Button 3x with the front cover closed, and the ready light on.
2. Depending on the machine, one to four pages will print out.

MACHINE TROUBLE SHOOTING

The HL-2100 series of machines have four LED's to indicate the status or various problems. We have listed some of the more common LED errors here:

Toner light blinking and status light on:	Toner low
Toner light on and status light on:	Toner out
Drum light blinking:	Drum life over soon
Drum and error lights blinking:	Drum error
Error light on:	Paper out
Error light blinking:	Cover open, paper jam, memory full
All four lights blinking:	Call for service

DEFECT CHART

OPC drum:	75.0 mm
Upper fuser roller:	78.5 mm
Lower pressure roller:	78.5 mm
Developer roller:	41.0 mm

If you are experiencing horizontal black streaks, and changing cartridges does not help, look in the bottom of the paper tray. There is a small metal ground terminal. If it gets bent or dirty, it can cause this.

TONER & DRUM CARTRIDGE SERIAL NUMBER BREAKDOWN (HOW TO READ IT)

All the brother toner and drum cartridges in this series have a unique serial number. It contains information such as the month and year of manufacture as well as other manufacturing data. Here is the breakdown:

1. The first character is a letter and represents the month of manufacture (the letter "A" is January, "B" is February, and so on).
2. The second character is a number and is the year of manufacture (number "8" is 2008, etc.).
3. The third character is the manufacturing plant, and the fourth is the filling amount.
4. The next are the serial numbers, and the last is the assembly line designation.