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Remanufacturing the Brother HL-5150 "DR-510" OPC Cartridge (DR-3000 outside North America.)



- **Overview**
- **Supplies Required**
- **Tools Required**
- **Disassembly**
- **Reset Procedure**
- **Troubleshooting**



First introduced in April 2004, the HL-5150 laser printers are the next generation of Brother's newer higher quality engines. The 5150 engine replaces the 1650 (TN-560) engine in the Brother line. As with all previous Brother engines, it has its quirks but is better than the previous engine. Last month we went over the TN-540/570 toner cartridges, this month we finish up with the DR-510 drum cartridge.

The HL-5150D printer is a 21ppm, 1200 dpi machine that comes standard with a duplexer built in. With a list price of \$ 241 including the duplexer, these machines are going to be very popular. In the HL series, only the HL-5140 does not come with a duplexer at this time. In a recent PC magazine test, the HL-5140 came up as the Editors Choice for a personal printer, beating another recently tested 35ppm printer in print speed! Their only problem with this machine, and I have to agree is that the graphics are not what you would expect from a modern monochrome printer.

In June 2004, I found pricing on the DR-510 ranging anywhere from \$98.70 to \$149.88 on the internet.

Currently there are quite a few machines based on the HL-5150 engine:

DCP-8040
DCP-8045D
HL-5130
HL-5140
HL-5150D
HL-5150DLT
HL-5170DN
HL-5170DNLT
MFC-8820
MFC-8440
MFC-8840D
MFC-8840DN

When it comes to the DCP and MFC machines be sure to note the correct model number of your customer's machine. There are several machines with very similar model numbers that use different cartridges! For example, the MFC-8420 uses the HL-1650 engine (DR-500), but the 8440 uses the new HL-5150(DR-510) engine!

The OEM stated yield is ESTIMATED at 20,000 pages. There are disclaimers in the manual that basically say you will not get anywhere near that yield. The following is taken directly from the HL-5150 user manual:

"Under ideal conditions, the average drum life is estimated at 20,000 pages. The actual number of pages that your drum will print may be significantly less than this estimate. Because we have no control over the many factors that determine the actual drum life, we cannot guarantee a minimum number of pages that will be printed by your drum."

Also keep in mind that this is a duplex machine. If the user uses this feature, they may think the yield appears less than it is.

Because of the nature of these machines we have included the cartridge theory here again. It is basically the same as the TN-460/560 cartridges. If you familiar with those cartridges and how they work, you can skip to step 1. If not however, we highly recommend that anyone doing these cartridges read the next section. It can save you hours of needless troubleshooting.

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 charge, the brush will not be able to clean itself, and back grounding 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 developer roller actually contacts the drum, some 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 back grounding. Both cartridges will be contaminated again.

The remaining 80g or so of "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 back grounding. 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

back grounding. 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 contaminated.

SUPPLIES REQUIRED



- OEM DR-510 drum in good shape. (New Drums should be available soon)
- Cotton Swabs
- Isopropyl Alcohol
- Zinc Stearate Drum Padding Powder

TOOLS REQUIRED



- Phillips head screw driver
- Small Common screw driver
- Vacuum approved for toner

DISASSEMBLY



Figures 1 through 12 show the physical differences between the DR-400, DR-500 and DR-510. Note the difference in the bottom slots for the toner cartridge, the different contacts on the side of the cartridge, and the plastic extension at the rear of the cartridges.

These differences make them NOT interchangeable.



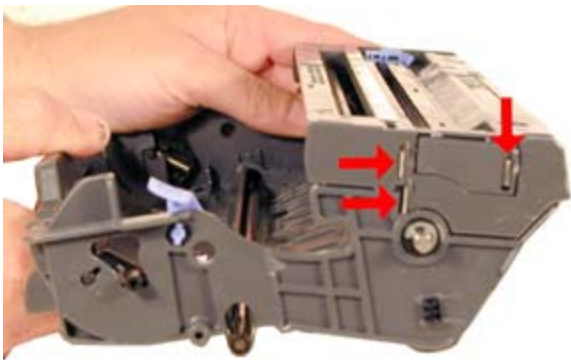
DR-510

Figure 1



DR-510

Figure 2



DR-510

Figure 3



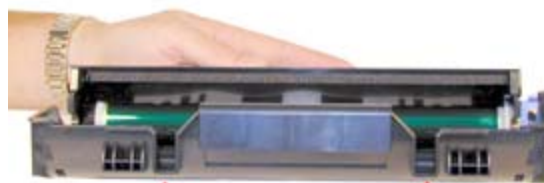
DR-510

Figure 4



DR-500

Figure 5



DR-500

Figure 6



DR-500

Figure 7



DR-500

Figure 8



DR-400

Figure 9



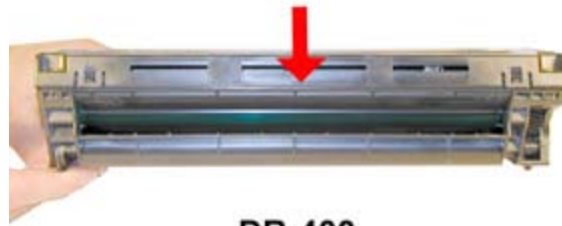
DR-400

Figure 10



DR-400

Figure 11



DR-400

Figure 12

- 1) Remove the top two screws See Figure #13
- 2) Lift the top cover up and remove from the cartridge. See Figure #14
- 3) Remove the E-ring from the Non Gear side of the drum axle shaft. See Figure #15
- 4) Remove the opposite E-ring. See Figure #16



Figure 13



Figure 14



Figure 15



Figure 16

- 5) Remove the drum axle from the Non Gear side of the drum. If you try to pull it out from the gear side, the shaft will jam up on the drum ground contact and damage the contact. See Figure #17
- 6) Be careful not to loose the round drum spacer. See Figure #18
- 7) Carefully remove the drum. Note that the gear side actually has two gears. One attached, one not. The opposite side has a separate hub and spring. Do not loose these parts! See Figure #s 19, and 20.



Figure 17

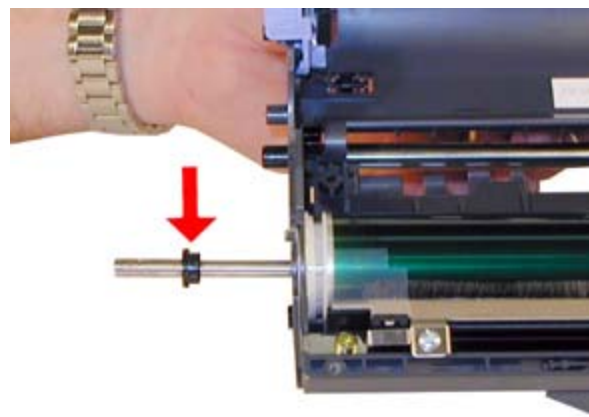


Figure 18



Figure 19



Figure 20

8) Carefully lift out the transfer Roller. Be very careful not to touch the roller with your skin. As with any transfer Roller, the oils naturally present in your skin will be absorbed by the roller and interfere with the transfer process, causing light print. See Figure # 21

9) **IMPORTANT:** Note the small piece of black plastic spacer on the right side of the roller, (side opposite the gear). This spacer keeps the transfer roller touching the electrical contacts on the left side of the cartridge. Be very careful not to loose this spacer! The cartridge will either print very light or 1/2 pages if it is missing. It is best to remove this spacer while cleaning the cartridge. See Figure's 22 and 23

10) With compressed air, blow off the Transfer roller. Unless you have a statically grounded vacuum, do not vacuum this roller.

11) Vacuum or blow off the cleaning felt assembly. Make sure you remove any remaining toner from the felts, or the brush itself. Be very careful not to damage the recovery blade located next to the cleaning brush. Vacuum any remaining toner from the rest of the cartridge. The entire assembly can be removed by removing the two screws, but this is not normally necessary. See Figures 24 & 25



Figure 21

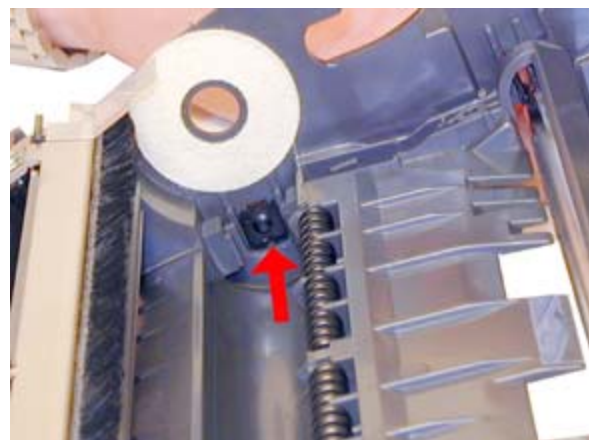


Figure 22

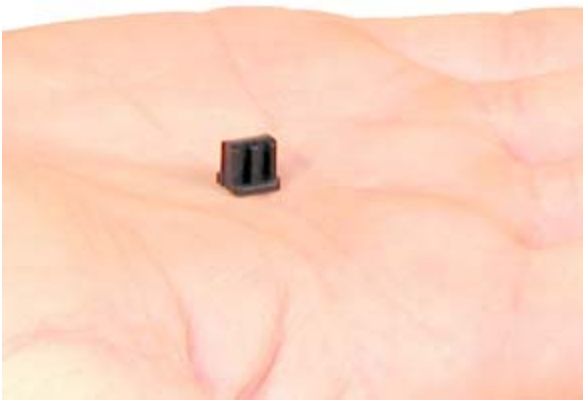


Figure 23



Figure 24

12) Reinstall the small black transfer roller spacer. See Figure 26

13) Install the transfer roller. Make sure the U-shaped holders fit into their respective slots. See Figure 27

14) Check the outside of the cartridge to make sure that the small black spacer is correctly positioned. See Figure 28



Figure 25

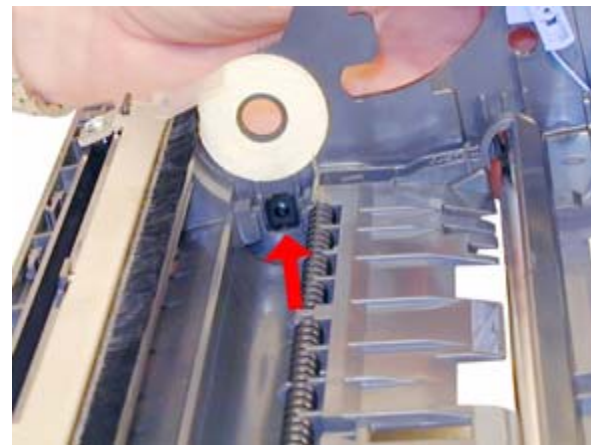


Figure 26

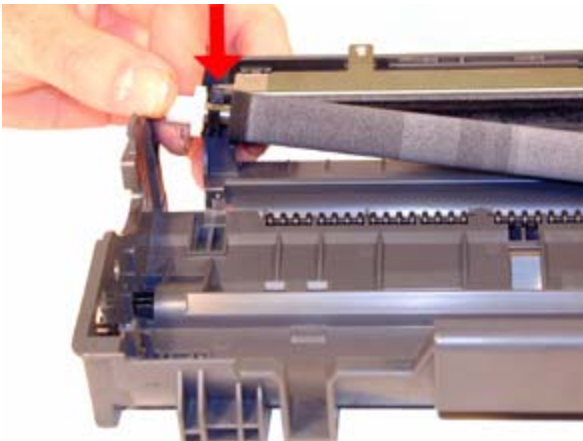


Figure 27

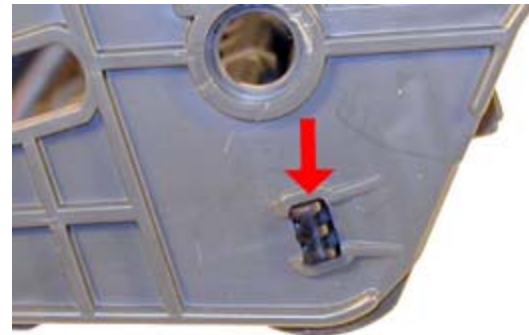


Figure 28

15) Install the drum and associated gear, hub, and spring. See Figure 29

16) Install the drum axle from the drum gear side of the cartridge. See Figure 30

17) Install the black drum axle spacer. See Figure 31

18) Install the two E-rings on each side of the drum axle. See Figure 32

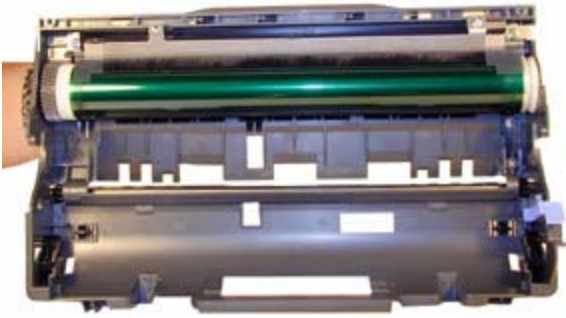


Figure 29



Figure 30



Figure 31

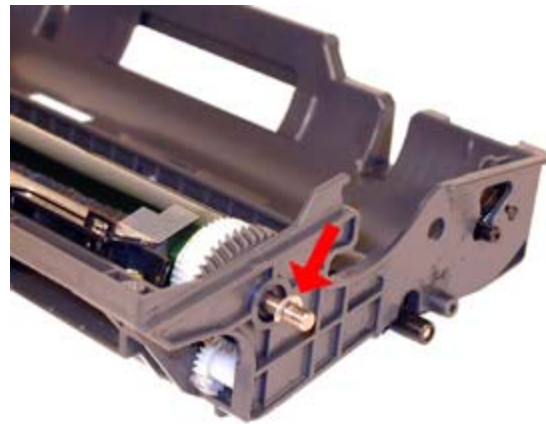


Figure 32

19) Clean the primary corona wire and grid with a cotton swab and alcohol. See Figure 33

20) Install the top cover, hook the back edge over the tab, and press down. See Figure 34

21) Install the top two screws. See Figure 34



Figure 33

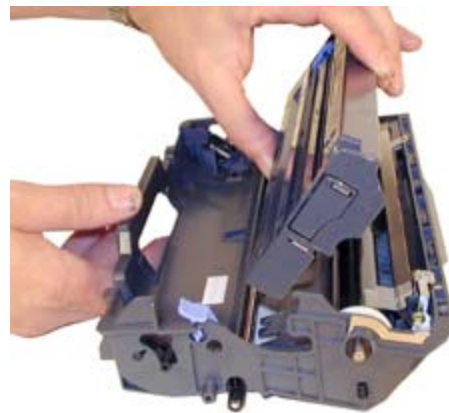


Figure 34



RESET PROCEDURE



If the machine is saying to change the drum unit, do the following. If the drum unit was cleaned because of contamination, the reset is not necessary.

After replacing the drum unit, keep the front cover open (make sure the power is on). Press and hold the "GO" button until all four LEDs are lit. Once the four LEDs are lit, close the front cover. Make sure the Drum LED is off.

The counter is reset!

TROUBLESHOOTING



Back grounding: (Gray Streaks) This is usually caused by contaminated toner. See the explanation at the beginning of this article for more information.

Dark Black Vertical Streaks: This is normally caused by either a dirty primary corona wire, or the blue corona wire cleaner is not in its "home" position on the left side of the cartridge.

Light Print: Can be caused by a dirty or worn Transfer Charge Roller. These rollers are located inside the cartridge. So far in our tests, they should last at least 2-3 cycles. See next section also.

Light or 1/2 page prints: This is caused by a missing transfer roller spacer. The spacer is a small piece of black plastic that sits next to the right end of the transfer roller. This piece keeps the transfer roller touching the electrical contact on the opposite side of the roller. If missing, the roller will move and can cause light or 1/2 page prints.

Black or white horizontal Lines: Black lines normally appear when there is a build up of toner, White when there is a dead spot, or contamination of the roller. If the lines repeat every 94 mm (approx. 3 3/4"); the drum is bad, or dirty. If they appear every 39mm (approx. 1 9/16"), the developer roller in the toner cartridge is bad or dirty.

Solid Black Pages: Bad drum ground contact. Probably from the drum axle shaft to the contact gear inside the drum.

Perfectly straight thin black lines down the page: Scratched drum.

Black dots that repeat every 94mm (3 3/4"): Chipped drum or something is stuck to the drum surface.

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