

Fuser Comparison:

HP LaserJet 4200/4240/4250/4300/4345/4350

With the proliferation of new laser printers, often released in groups with similar model numbers and appearances, it's getting harder and harder to tell which parts interchange between models and which do not. A case in point is HP's upgrade to the LaserJet 4000/4050/4100 series of printers – another whole new series including 6 basic models (with variations of most of them): the 4200, 4240, 4250, 4300, 4345, and 4350. Many parts do interchange between two or more of these models, but the fusers (probably the part replaced most often) generally do not, even though they all look identical at a casual glance (see Figure 1), and any of them will mechanically fit into any of the printers. In this article, we will take a closer look at these fusers and the differences between them, and show you how to tell them apart. We will also describe some of the errors that come up when the wrong fuser is installed in one of these printers.

There are four different fusers for the six printer models (so there is some interchangeability):

RM1-0013	4200
RM1-0101	4300
RM1-1043	4345
RM1-1082	4240/4250/4350

All these fusers come in both 110 V and 220 V versions. The part numbers given are for the 110 V versions. Note that the 4240, 4250, and 4350 all take the same fuser. Other than that, the only allowable interchange between any two of the fusers listed is between the 4300 (RM1-0101) and the 4345 (RM1-1043). These fusers are similar enough to work in each other's printers without causing any errors or problems. Any other attempted interchange will produce an error code – but not always the same error code! To see the reason for this, let's take a closer look at some of the differences between these fusers.

HP uses the presence or absence of jumpers (shorts) across certain pins on the fuser's connector to distinguish one fuser from another. Theoretically, if the printer sees a jumper where it doesn't expect one (or vice versa), it generates a 50.5 "incorrect fuser" error. Unfortunately, when this scheme was originally designed, there were only two models in the series -- the 4200 and the 4300 – and they failed to make the scheme versatile enough to accommodate additional models. So if you put a 4240/4250/4350 fuser into a 4200 printer, it will not detect the jumper in the wrong place, because it isn't even looking at those pins. But fortunately, there are other differences that cause other errors.

When one of these printers is powered up, there are three feedback signals that it looks for from the fuser: (1) the presence or absence of the appropriate jumper, as described above; (2) the voltage across the thermistor, which tracks fuser temperature (the printer wants to see this within a certain range initially, and then decreasing as the fuser warms up); (3) the output voltage from the paper exit sensor (it wants to see this at logic "low" or near 0 volts; if the signal is "high" (significant positive voltage or "floating"), the printer assumes a paper jam condition). The 4240/4250/4350 fuser has a second thermistor (built into the paper exit flag, it senses the temperature of the paper as it exits the fuser), so those printers are also looking for a certain voltage



Figure 1: 4200, 4300, and 4240/4250/4350 Fusers.
Can you tell which is which?

across this thermistor (although it will not change like the other one until paper is actually fed). Since the different fusers have their connectors wired differently, an incorrect fuser will always fail to satisfy at least one of these conditions, thereby generating an error code. Details follow:

4200 fuser (RM1-0013) installed in a 4300 or 4345 printer: For the most part, these fusers are wired the same, so the only significant difference is the aforementioned jumper. The printer will see an open where it expects to see a short, and it will generate the 50.5 error.

4200 fuser (RM1-0013) installed in a 4240 or 4250 or 4350 printer: In this case, wiring differences will produce several discrepancies:

1. The printer will see an open where it expects to see a short (i.e., jumper), and this should generate the 50.5 error.
2. Both thermistor circuits will be essentially open. This will make the thermistor voltages read higher than expected, which could generate 50.2, 50.4, or 50.6 errors (although it's not clear that the printer pays any attention to the thermistors during power-up).
3. The exit sensor output line will be in a logic "high" state. This should generate the 13.20 error.

The printer can only display one of these error codes, so it's a question of priority. In all of our experiments, this case resulted in a 50.5 error, but be aware that the other errors listed above are also possible.

4300 (RM1-0101) or 4345 (RM1-0143) fuser installed in a 4200 printer: The only discrepancy is the "fuser type" jumper. The printer will see a short where it expects to see an open, and this will generate the 50.5 error.

4300 (RM1-0101) or 4345 (RM1-1043) fuser installed in a 4240 or 4250 or 4350 printer: Same as with a 4200 fuser in these printers (see above). There are several possible errors, but in our experiments, the one that always came up was 50.5.

4240/4250/4350 fuser (RM1-1082) installed in a 4200 printer: The fuser has a jumper, and the printer isn't expecting to see one, but there's no conflict, because the printer isn't looking at the pins where the jumper is. Where it is looking, it sees an open just like it expects to. The thermistor voltage may not be as expected, but again, it's not clear that the printer cares about this during power-up. What definitely won't be right, though, is the exit sensor output line. This will be in a logic "high" state, which will generate the 13.20 error, and that is indeed what we always got when

we tried this combination.

4240/4250/4350 fuser (RM1-1082) installed in a 4300 or 4345 printer: This is similar to the previous case, except that the 4300 (or 4345) is looking for a short (rather than an open) on the "fuser type" pins. Because the 4240/4250/4350 fuser has the jumper on different pins, it will see an open. Therefore, this case can generate the 50.5 error as well as the 13.20. In our experiments, we saw both of these errors, but the 13.20 seemed to be more common.

The conclusion to all this is that, whenever you see either a 13.20 or 50.5 error after installing a fuser in one of these printers, you should double-check to make sure that it's the correct fuser for that printer. How can you tell for sure which fuser it is? The easiest way is to check the bar code label above and to the right of the connector (see figure 2) – it has the fuser's part number on it.



Figure 2: Part Number Label on 4240/4250/4350 Fuser (RM1-1082)

If the label has been removed or is unreadable, there are other ways to distinguish these fusers from each other:

1. Look at the connector. All of the fusers except the 4200 have 6 large pins and 2 rows of small pins. The 4200 fuser (RM1-0013) only has 5 large pins (and 2 rows of small pins). The extra pin on the other fusers is for the lower pressure roller bias voltage, which is not used on the 4200.
2. Look at the film on the upper roller. On the 4200, this is a Teflon-like film (as in most fusers of this type), and is usually gray. On all the other fusers, the film is metallic, and is usually brown.
3. Look at the bushings that support the lower pressure roller. These are usually green on the 4240/4250/4350 fuser, and red on all the other fusers. It looks like these bushings will interchange, though, so this may not be a reliable indicator if the fuser has been rebuilt.

4. Look at the exit sensor flag and delivery guide (see Figures 3 and 4). The 4240/4250/4350 fuser has a different style flag than the others. The flag is also positioned differently, and the delivery guide has an extra cut-out to accommodate the flag.

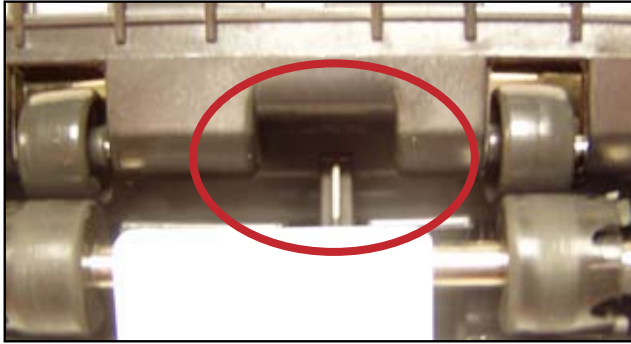


Figure 3: 4200 or 4300 fuser. Exit sensor flag and delivery guide cutout are circled.

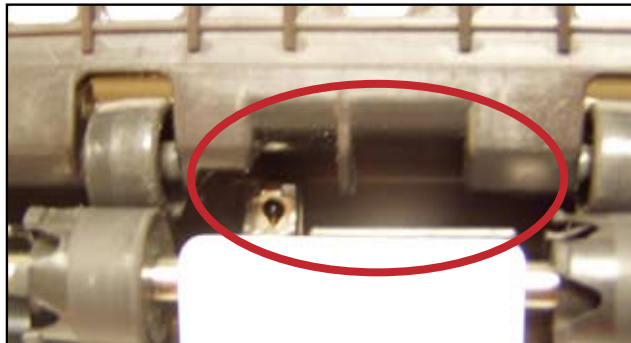


Figure 4: 4240/4250/4350 fuser. Exit sensor flag and delivery guide cutout are circled.

Items 1 to 4 above should be sufficient to determine which fuser you have, but if you have a 4240/4250/4350 fuser and you're curious, you might also want to remove the rear cover of the fuser (observe the orientation of the blue clips – they will come out when the cover is removed) and observe the electrical connections to the exit sensor flag. Only this fuser has these connections, because it's the only one with a thermistor in the flag.

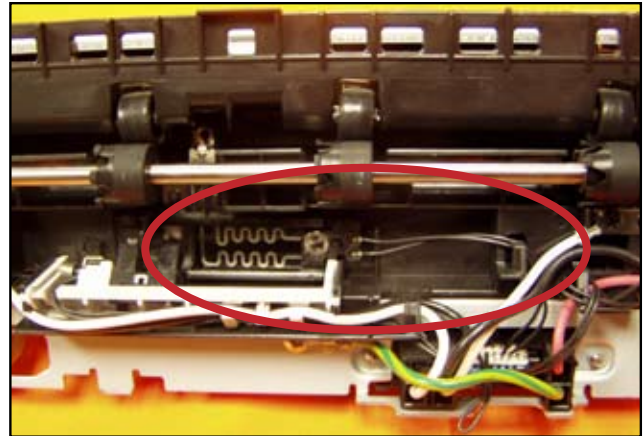


Figure 5: 4240/4250/4350 fuser, showing electrical connections to exit sensor flag.

In conclusion: all the fusers in this series of printers look pretty much the same, but they are generally not interchangeable. When you need to replace the fuser in any of these printers, make sure you get the right one for that printer. This article should help you determine which fuser is the right one. And be alert for the telltale error codes: 13.20 or 50.5 errors are usually the result of an incorrect fuser installation.

—Dennis Kosterman

©2007 Liberty Parts Team