



How to:

Diagnose Flipper Failure

1. Broken Return Spring - The most common flipper return springs are the compression and expansion springs. A broken expansion spring will cause the flipper to only partially return, but the flipper will move freely when moved manually. The compression spring can also break, twist over itself and cause the plunger to bind, when this happens the flipper will stick in the up position and not return.
2. Bad flipper plunger - Over time the end of the flipper plunger will expand (Mushroom) from striking the coil stop. This condition causes the plunger to bind in the coil sleeve. Usually this results in the flipper sticking intermittently. A temporary repair can be done by grinding the plunger to remove the “mushroom”, both the plunger and coil sleeve are replaced for a permanent repair.
3. Bad Coil Sleeve - Over time the coil sleeve does wear out and should be replaced. You may find that the sleeve will not come out, this is caused by the constant heating and cooling cycles from playing the game. If this happens even if you manage to remove the old sleeve the new one will not fit. Replacing the coil is the only way to repair this issue.
4. Broken end of Stroke Switch - In some cases the End of Stroke Switch (EOS) will break and the actuator on the crank arm will stick on the end of the broken switch. Replacing the switch will correct the problem. Always check the coil for heat damage when there is a EOS failure, if the coil paper has dark lines through it the coil must be replaced.



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5. Flipper bushing - When a flipper bushing wears out the flipper can make physical contact with the playfield and cause it to stick. If this happens you will see marks on the playfield from the flipper rubbing.

6. Crank arm installed incorrectly - An improperly installed crank arm will cause the flipper to stick because the plunger will bind in the sleeve. You will most likely see this on a flipper that has recently been rebuilt. This is caused by the crank arm being too high or too low on the flipper shaft, this is corrected by loosening the crank arm and repositioning it on the flipper shaft. The best way to set the crank arm is using a flipper feeler gauge. Insert the gauge between the crank arm and flipper bushing, Adjust the gap so the gauge slides freely in and out with minimal free play.

7. Bad flipper coil - The flipper coils are activated more than any other coil, over time they get weak and eventually fail. This failure will give the same symptoms of a bad coil sleeve. If the flipper coil fails it's recommended that a full flipper kit is installed.

8. Broken link - A broken link will cause the flipper to remain in the rest position when activated.

You may hear the plunger fire or just the hum of the coil being activated. Although the link can be replaced, it is easier and takes less time to replace the plunger and link as an assembly.



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9. Dirty Cabinet Switch contacts - A bad cabinet switch will cause the flipper to activate intermittently or not at all. In most cases cleaning the contacts will correct the issue. Only non plated contacts can be filed, these are found on electromechanical pinball games and electronic games with directly activated flippers into the mid 1980's. Refer to the game's manual to determine if the flipper is directly activated or electronically activated. If the flipper coil is listed in the coil chart with a drive transistor, it is electronically activated. The contacts on electronically activated flippers can only be cleaned with contact cleaner. Saturate a strip of paper, place between the contacts, pinch them together and pull the strip of paper out. Repeat until a strip of paper comes out clean.

10. Fatigued Switch blade - Over time the switch blade will fatigue, when this happens the gap between the contacts will increase until they no longer make contact. The switch may work for a short time after being adjusted, if this is the case, replace the switch.

11. Loose or Broken Hardware - Loose screws on coil stops and coil brackets are not uncommon, the vibrations from the flipper activating can cause the screws to loosen. The brackets can crack and break from the vibrations too.

12. Modern Stern Diode - A failed diode on a modern stern pinball will cause it to stay activated. The symptom is, once the flipper is activated and stays activated, the game is turned off and the flipper returns. The diode across the coil has opened and the coil cannot discharge. Replace the diode with a 1n4004, make sure the white stripe is on the same side as the diode that has been removed.



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There are flipper rebuild kits available for most pinball games. If you are having flipper problems it may be time to do a complete rebuild. You will find your flippers work better and are stronger after a complete rebuild.