

Mikuni Choke Mechanism

This may be the age of fuel injection, but our old friend the carburetor is still in use in millions of cars. One of the more unique designs is the Mikuni carb, found on many Mitsubishi, Mazda, and Chrysler vehicles.

The Mikuni is unique in many ways. But perhaps the most unique aspect is its choke mechanism. This month, we'll concentrate on a common problem which causes poor idle quality when the engine is first started. The choke unloader diaphragms in the first three Mikunis we tore down were all bad. Our first car, a Colt Vista, chugged and stumbled when first started—there was no choke break at all.

When a cold engine is being cranked, the choke should be closed. But as soon as it starts, the engine needs extra air to mix with the rich mixture. A choke unloader pulls the choke blade open (in this case about 1.5 mm) to allow that extra air into the engine. When the vacuum diaphragm in the unloader ruptures, it doesn't pull the choke blade open. The result is an overly rich mixture which makes the engine chug and stumble.

The choke on the Mikuni is opened by a thermo wax valve, heated by engine coolant. If the choke unloader is bad, the choke stays fully closed until the coolant temperature rises far enough to open the choke blade. The choke break should operate as soon as the engine generates vacuum. If it doesn't, the engine will run rich until there's enough coolant heat to open the valve.

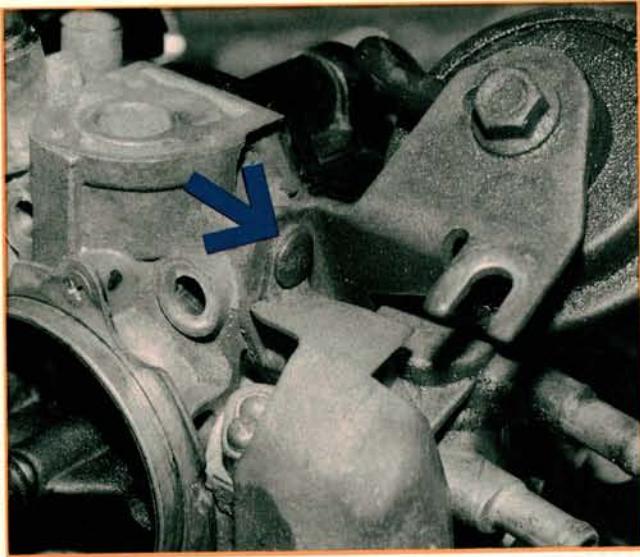
There seems to be a certain mystique about the Mikuni. Many techs we've talked to, including some dealer techs have been reluctant to do any repairs on the Mikuni. One of the carbs we tore down had actually been replaced with a new one simply because the choke unloader diaphragm was bad.

We hope this article helps you diagnose and repair this common driveability problem.

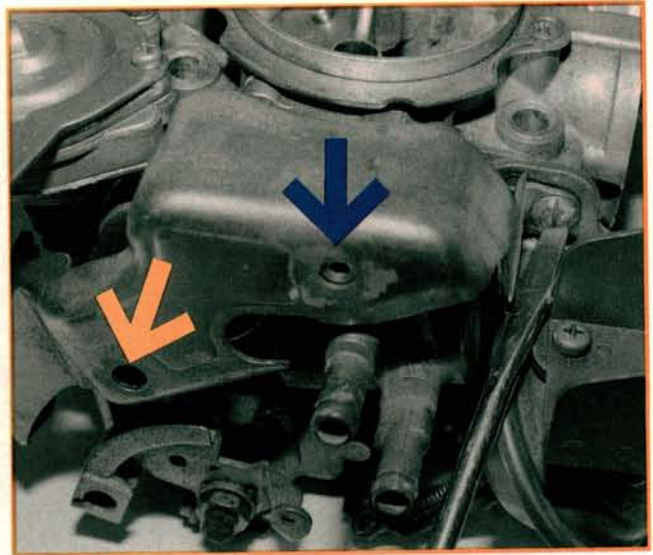
We also suggest that you refer to this month's Tech Tips section for a good tip from Bill Stewart of Prescott, Arizona. Bill has managed to diagnose and repair an entirely different problem common to the Mikuni.

See there! You can fix these crazy plastic carbs.

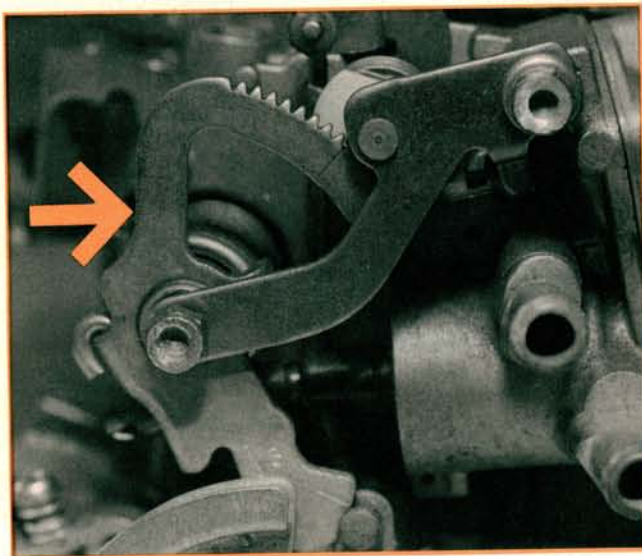
DRIVEABILITY CLINIC



1 Normally, choke unloaders aren't hard to replace. You pop off the cover and spring beneath it, remove a linkage clip or two, and slide a new diaphragm into place. But the Mikuni's choke linkage is more elaborate than most. First of all, its choke mechanism is hidden beneath a steel cover which must be removed. The cover is held in place by five fasteners. There are two Phillips head screws at one end, and a screw (arrow) which has a round head like a carriage bolt. Use a sharp punch to spin the bolt and remove it.



2 Once you've removed the round headed screw, take your Dremel tool and grind a slot in the head of the screw. That way you can easily tighten it with your screwdriver when you reinstall the cover. Don't put your grinder away yet. In the center section of the cover, there are two peened over rivet heads still holding the cover in place. Grind away the thin metal rivet heads (arrows). These won't screw out until you remove the cover since the rivet heads are part of two bolts beneath the cover which hold the choke pinion assembly in place.

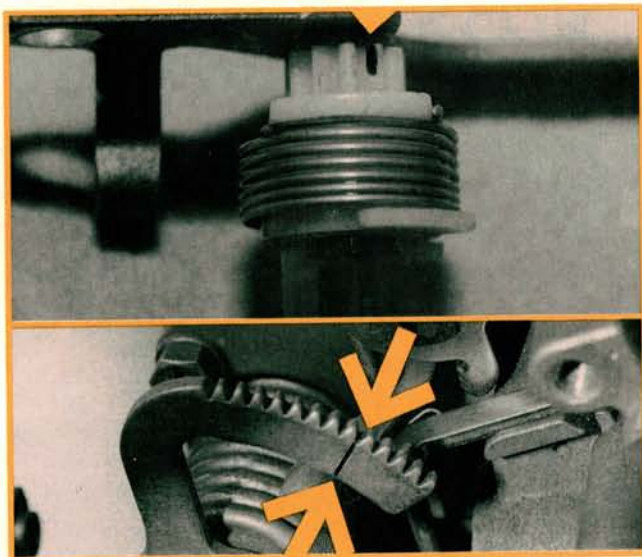


3 So what's a choke pinion, you ask? The choke pinion is a plastic gear which opens and closes the choke plate. The plastic gear is driven by a curved metal choke lever gear. And that choke lever gear (arrow) is in turn driven by an expandable thermo wax element. The thermo wax element is warmed by engine coolant and expands to push against the curved metal choke lever gear. As the lever arm moves, its geared teeth rotate the pinion's plastic gear. The slow rotation of the pinion gear opens the choke plate gradually for smooth, even warm ups.

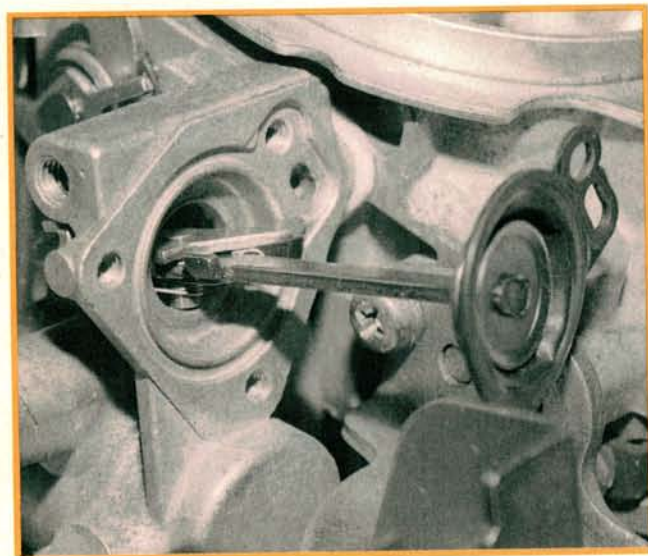


4 Remember the rivets we ground off? Beneath them, we find two bolts which hold the choke pinion. There are two important adjustments on the choke pinion lever. Before you remove the bolt on the right, clean the area shown by our arrow so you can see the tiny punch mark on the carb, and the marks on the edge of the pinion bracket. This close up view of the bracket shown in our inset photo shows the marking. The notch in the bracket aligns with the punch mark when we reinstall the bracket and tighten the bolt.

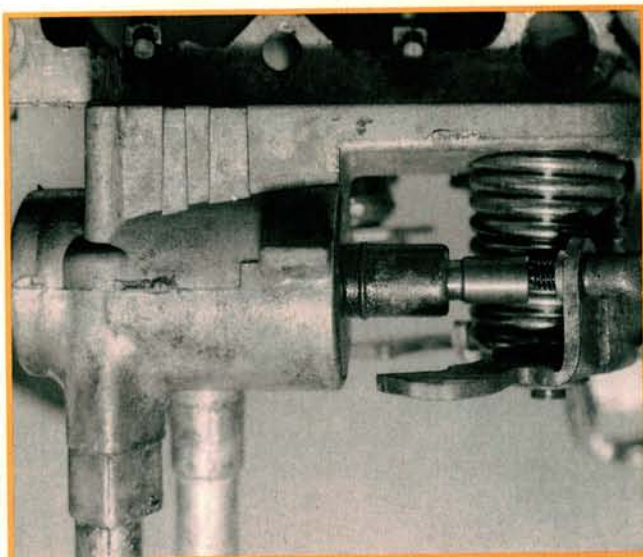
DRIVEABILITY CLINIC



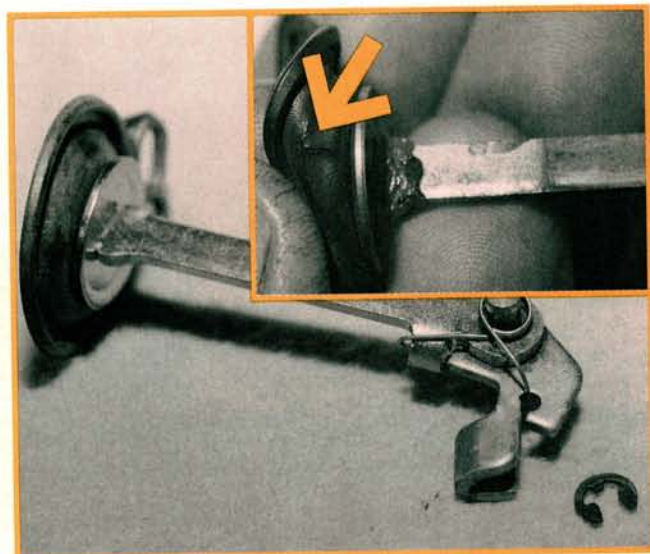
5 One of the plastic teeth on the pinion is marked with a dab of paint. The paint mark may be faint since the paint wears away over time, and sometimes you'll have a hard time seeing it. This mark is very important. Later, when we reinstall the pinion lever, we must align the paint mark on the plastic pinion with the index mark on the choke lever gear. The upper photo shows the paint mark on the plastic pinion. The lower photo shows the index mark on the choke lever. Told you this wasn't your average choke assembly.



7 Remove the three screws on the unloader cover. Remove the cover and return spring between the cover and the diaphragm. The mechanism can be removed without removing the pivot arm, although it does require some twisting and wiggling to get it out. Twist the pivot arm in close to the unloader rod and pull it through the hole. With the assembly removed, flip it over and remove the pivot arm tension spring and the E-clip below it. Then separate the pivot arm from the unloader rod. We'll install the pivot arm on the new unloader.

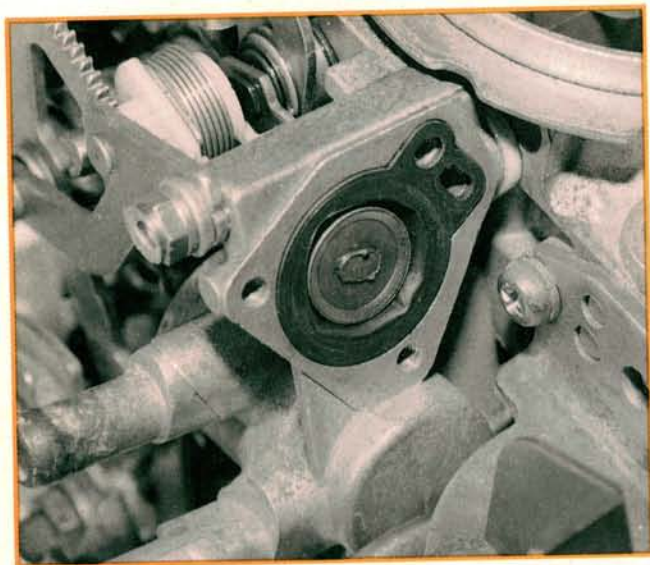


6 Inspect the wax element housing for signs of corrosion damage. On cars with badly neglected cooling systems, corrosion can eat away at the housings, and may cause leaks. At the other extreme, the passage through the element housing may get plugged so badly that coolant flow is restricted. Then the element doesn't heat and the choke doesn't open, or opens too slowly. A company called ACR Corporation in San Fernando, California (818-365-6363) has many repair parts for Mikunis, and even has rebuilt wax elements if yours has failed.

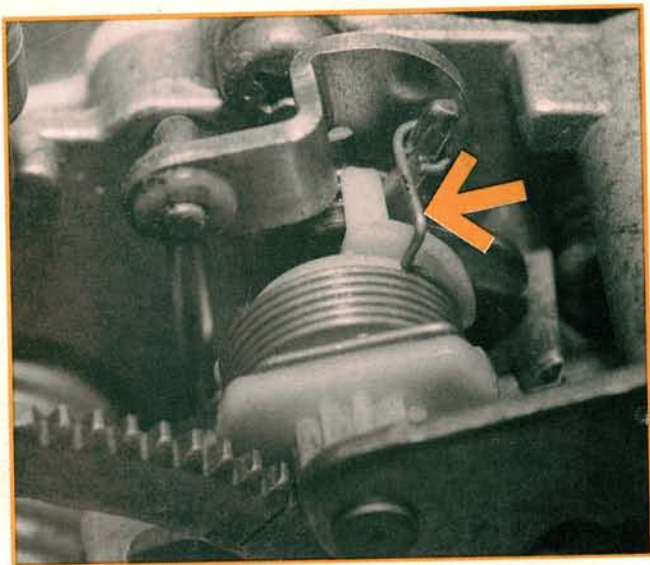


8 All three carbs torn down for this article had a rupture in the unloader diaphragm. The Vista's was the worst (arrow), and leaked so badly that it didn't even start to move when vacuum was applied to it. The lower photo shows the unloader rod and pivot arm assembly. Our photo shows the spring installed on the assembly. We removed the tiny E-clip which is normally installed before the spring, and laid it off to the side so you could see it better. Remember, when you reassemble the arm and rod, install the clip first, then the spring.

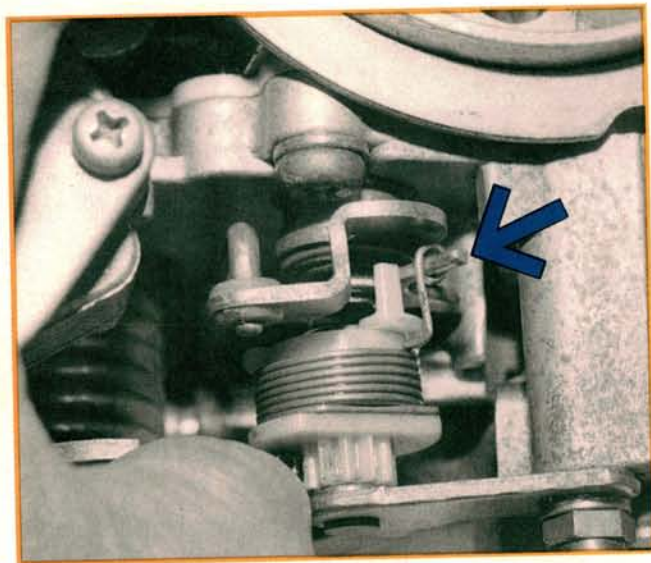
DRIVEABILITY CLINIC



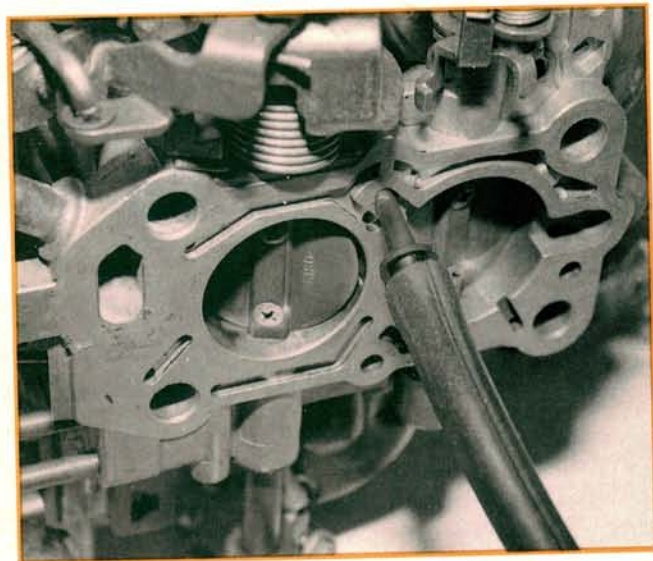
9 Before you reinstall the choke diaphragm, make sure the vacuum port which leads from the base of the carb to the diaphragm is open. It would be silly to install a new diaphragm if there's no vacuum source to operate it. Then slide the new diaphragm/pivot arm assembly through the hole in the carb. Don't forget to install the unloader diaphragm return spring between the cover and the head of the diaphragm. Now we can reinstall the choke pinion assembly, matching the paint mark on the pinion gear to the mark on the choke lever as we do.



10 We've mentioned the alignment of the painted tooth on the plastic pinion with the index mark on the choke lever. And we've mentioned the need to properly align the punch mark on the carb with the index mark on the pinion assembly bracket as we bolt it to the carb. But there's one more thing we need to do as we install the pinion assembly. The "strangler" spring (arrow) must be properly installed. The strangler spring adjusts the closing pressure on the choke blade, providing strong closing tension when the engine coolant is cold.

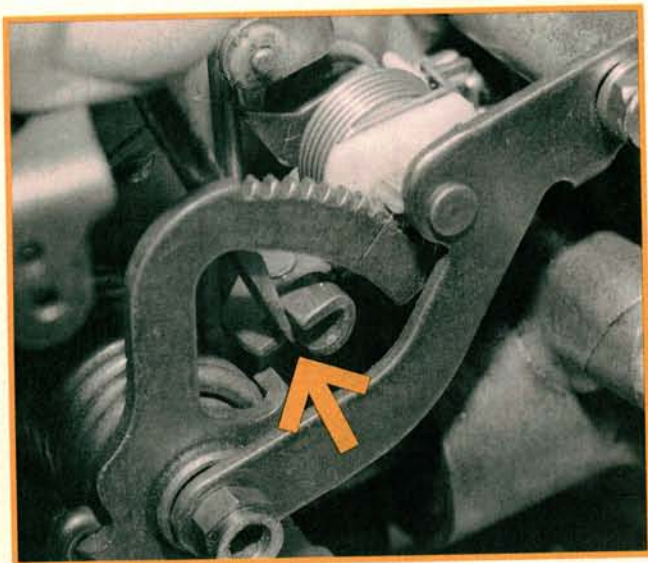


11 Here's another view of the pinion gear/strangler spring assembly. There's a thin metal finger (arrow) on the choke lever arm. (The finger is located on the same arm connected right to the end of the choke shaft.) The strangler spring pops over that thin finger. There is also a thin plastic finger on the plastic pinion gear that should be positioned as shown in our photo. As mentioned in the previous step, the strangler spring should exert more closing pressure on the choke mechanism when the engine is cold, and reduce tension on the arm as it opens.

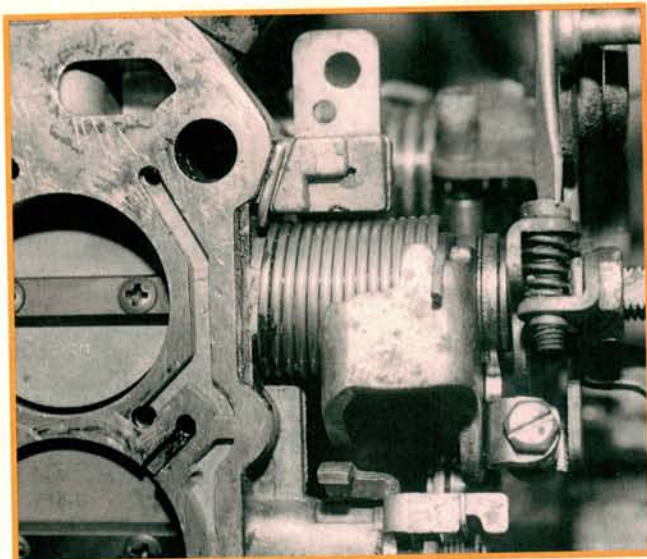


12 We had removed all of our carbs for complete overhauls, and in each case, we found it a lot simpler to check and adjust the amount of choke break provided by the new diaphragm before we installed the carb. We simply flipped the carb over and applied vacuum to the unloader supply port at the carb base. Then we checked the amount of "break" using a drill bit of the correct size. Doing this off the car gives us a good base setting, and doesn't allow any warm coolant to affect our cold readings. Use the opening spec for your vehicle and climate.

DRIVEABILITY CLINIC



13 One of our carbs needed a choke break adjustment. Bending this tab on the choke break pivot arm can be done on the car. If you're adjusting choke break with the carburetor still installed on the engine, leave the cover off, and use engine vacuum to check the choke opening. If necessary, you can "tweak" the adjustment to provide the best choke operation for your specific engine. We chose to replace our choke cover after final adjustments, since so much road salt finds its way under the hood in winter. Some techs in the sun belt said they toss the old covers.



14 Final checks. Make sure the strangler spring snaps the choke shut when it's cold. One of our carbs needed a thorough cleaning of the choke shaft and choke plate. It was sticking and sticking badly enough that the spring wouldn't close it. None of our cars was out of spec for fast idle speed when we finished, but this photo shows the location of the fast idle adjustment screw. The fast idle cam follower levers off the choke lever. See our illustration for a diagram of key components in the Mikuni choke system.

