



SECONDARY DIAPHRAGM SPRING KIT P/N 20-13

For models 4150 & 4160 Vacuum Activated Secondary Carburetors INSTALLATION & TUNING INSTRUCTIONS 199R8219-3

INTRODUCTION:

This kit contains a variety of secondary diaphragm springs to tailor the secondary opening characteristics to a particular engine and vehicle configuration.

Many people are of the opinion that opening the secondary throttles sooner will provide increased performance and quicker dragstrip times. This is true, as long as there is sufficient airflow when the secondaries open to pull fuel from the discharge nozzles. Those who feel a “kick in the pants” when the secondaries kick in are actually feeling a flat spot during initial acceleration. This happens because the secondaries have already begun to open and have weakened the fuel delivery signal to the primary boosters. The engine struggles to increase speed and what they actually feel are the secondary nozzles “crashing in” as the engine finally reaches the speed where it pulls enough airflow to provide the proper fuel delivery signal to the primary and secondary venturii. Chances are that they will find the car faster from the start to the “kick in” point, if they disconnect the secondaries.

Before starting modifications, it is a very good idea to obtain a stopwatch. Small gains in acceleration cannot be felt by the seat of the pants and the roar of the engine can deceive even an experienced tuner.

INSTALLATION:

1. Remove the choke cap by removing the 3 retaining screws.
2. Remove the choke housing by removing the 3 screws holding the housing to the main body.
3. With the choke housing swung out of the way, remove the 3 screws holding the secondary throttle diaphragm assembly. Remove the “C” clip at the throttle lever.
4. Remove the secondary diaphragm cover screws. Tap the top of the housing lightly with a mallet to ease removal.
5. Install the alternate secondary diaphragm spring.



6. Make sure the cork gasket in the secondary diaphragm housing seals properly with vacuum passages in the main body.
7. When reassembling the secondary diaphragm parts, exercise care to properly align vacuum passage in the casting with the “cut out” in the rubber diaphragm. Likewise, do not pinch or tear the rubber diaphragm.
8. Check to be sure that all parts removed in steps 1, 2, and 3. Be sure that the “C” clip is in place.
9. Check the choke assembly for freeness and proper function.

CAUTION! After the modification and before starting the engine, check the secondary throttle and also the primary throttle for freeness of operation. Be certain that there is no manner of interference when the throttle lever is operated between idle and the wide-open position. Any binding or interference could cause the throttle to stick during operation and could possibly result in a loss of carburetor throttle control (uncontrolled engine speed).

SECONDARY THROTTLE OPENING RANGES

COLOR	RELATIVE LOAD	350 CID ENGINE OPENING RPM		402 CID ENGINE OPENING RPM	
		Initial	Full	Initial	Full
White	Lightest	---	---	---	---
Orange	Lighter	1620	5680	1410	4960
Yellow	Light	1635	5750	1420	5020
Purple	Med. Light	1915	6950	1680	6050
Plain	Medium	2240	8160	1960	7130
Brown	Med. Heavy	2710	8750	2380	7650
Black	Heavy	2720	Not Fully Open	2390	Not Fully Open

NOTE: All data was taken without the air cleaner. An air cleaner would cause an earlier opening in all cases. Values are subject to change due to cleaner restrictions.

TUNING:

First, make some notes about carburetor performance as it is in stock condition. Does the engine falter or stumble at wide-open throttle, anywhere in the rpm range? Can the secondary opening point be distinctly felt?

If there are no flat spots or stumbles, a lighter secondary spring should be installed. Try the accelerations again and if there are still no flat spots, try a lighter spring yet. When a flat spot is felt, go back up to the next stiffer spring. If the carburetor bogs, out of the box, note when it bogs. If it is an instantaneous off idle bog, the accelerator pump may be the real problem. A secondary bog will usually occur in the 2000 to 3000 rpm range. If this is the case, install a heavier diaphragm spring.

The first thing many people do when they first disassemble the diaphragm assembly is throw out the small metal ball that is contained in the vacuum passage in the lower housing, without really knowing why it is there. At first glance, it looks as if it would block the flow of air, but a close inspection will reveal a small groove in the seat under the ball. This groove acts as a restriction, so that the secondaries open in a slow controlled manner.

Removal of the ball will allow the secondaries to more or less flop open and may cause a bog, so unless your driving is restricted to the track, leave the ball in place.

Some of the newer carburetors replace the ball and seat with a pressed-in brass restriction. Drilling out this restriction will have the same effect as removing the ball.

In general, heavy cars require stiffer secondary diaphragm springs than light cars. Air cleaner configuration and restriction plays an important part in spring selection, so be sure to use your air cleaner when evaluating your vehicle's performance after each change. An installation with an open element air cleaner will require a weaker spring than one with a restrictive snorkel-type air cleaner.

Vacuum secondaries are designed to open when the engine is under load. "Winging" the throttle with the transmission in neutral should result in no secondary movement. If they do open in neutral, the engine will almost surely bog under load. Do not clip a spring in an effort to make a spring weaker, so the secondaries will open sooner. Strange as it seems, clipping springs actually increases spring rate. While the spring load as installed will be lower, the spring's resistance to change in height will be greater, which means that the secondaries will start to open sooner, but will reach wide-open position later. Regardless of what you hear do **NOT** leave the diaphragm spring completely out. Although the link on the left side of the carburetor will force the secondaries to close, the diaphragm spring ensures complete return to idle giving the engine a consistent idle speed.

If the lightest spring is installed and the secondaries still do not open when all parts are functioning properly, the carburetor is most likely too big for the engine and forcing the secondaries open by mechanical means will probably slow the car down.

199R8219-3

Revision Date: 1-5-16