CONVERTING FROM STROMBERGS TO SU CARBS

The Zenith Stromberg carburetors that came on the later Lotus twin cam engines are a source of frustration even greater than Lucas electrics for many Lotus owners. This has been recognized for many years. Articles on these infernal beasts in now-yellowed copies of *LOTUS reMARQUE* have put forth various modifications to correct lean carburetion and the attendant lack of throttle response, especially in the zero to one-quarter throttle opening range.

As a relatively recent Lotus Elan owner, I was also plagued by these problems, but I chose not to attempt to make a silk purse out of a sow's ear. Instead, I decided to look into an alternative carburetion system. From my experience with other British sports cars, I was familiar with SU carburetors and recognized their similarity to the Elan's Strombergs, except that they were adjustable for mixture ratio and were not encumbered with emissions modifications.

The SU $1^3/_4$-in.-type HS6 was the logical choice, because it has the same bore as the Stromberg. Additionally, it bolts directly onto the Lotus manifold with no modifications. Moreover, because HS6 carbs came on a large number of vehicles, from big Healeys to Volvos, they are relatively easy to find. I purchased a pair from a Volvo (SU AUD331) from Joe Curto Inc., (718) 465-4829, which also sells all the spares required to rebuild these units and make them Lotus-ready. (Curto also carries Stromberg spares.)

There are two types of HS6 carburetors. They are floating needle/fixed jet (in lateral movement only) and fixed needle/adjustable jet (for lateral movement). The jet in each model is vertically adjustable, so that the mixture strength can be altered. This conversion requires a fixed-needle model, but the ones I purchased had floating needles. They were easily converted to fixed needles by purchasing an inexpensive conversion kit for holding the needle and machining a small ridge off the top of the jet holder, so that it could be moved laterally in the carburetor body.

Since the space between the two carburetors is limited, I found it necessary to mount the SUs with the float bowls on the outside, rather than between the carburetors, as they had been mounted on the Volvo. This required switching their positions, putting the front carburetor on the rear of the engine and the rear carburetor on the front.

Although the switch went smoothly, it resulted in the actuating mechanism for the throttle butterflies being located on the outside, rather than between the carburetors (see photo). However, I found a very simple solution to this problem that allowed me to use the original Lotus throttle linkage and flexible couplings.

On each throttle shaft facing between the two carburetors is a partially hollow extender that positions the throttle return spring. This extender was removed and drilled completely through, producing a hole in the end facing the opposite carburetor. A short piece of $^5/_{16}$-in. brass rod, which is the appropriate diameter to fit the Lotus flexible couplings, was cut with a hack saw. Then a shoulder was cut onto the rod, so that it would fit into the hole drilled through the threaded extender. The rod was then pressed into place and subsequently soldered. (The extender is steel, and it should be tinned using acid flux and solder; the brass rod can then be pressed into place and soldered using rosin-core flux.)

The exact dimensions for the brass rod and the hole in the extender are not critical and can be made to fit the application. When I was done, the $^5/_{16}$-in. brass rod extended $^3/_8$" past the threaded extender, and the original Lotus linkage could be connected without modification. Since both extenders have right-hand threads, I made a special locking tab washer out of mild sheet steel to keep the extender on the front carburetor from loosening when the throttle was applied. (It should be noted that HS6 carburetors other than AUD331 may have slightly different throttle shaft fittings, and the throttle linkage for them may be easier or more difficult to develop.)

After mounting them, it was obvious that the float bowls, which were level in the Volvo, were not in the Lotus application. Fortunately, the float bowls are adjustable, based on an adaptor grommet that goes between the float bowl and the carburetor. Unfortunately, SU does not make a grommet that will hold the float bowl level when the carburetor is inclined 15 degrees from horizontal, as is the case on the Lotus twin cam. My carburetors had 30-degree grommets. To get each float bowl level at 15 degrees inclination, I cut $^1/_8$" off the edge of the slot in the grommet, which locates it in the carburetor body, and placed a $^1/_8$-in. aluminum shim on the opposite side. I then assembled the bowl to the body. When I mounted the works to the engine, it was level on the first try.

To attach the SU carburetor chokes to the original Lotus choke cable, I used a cable splitter from a motorcycle throttle cable. This is a small mechanical device that splits the single cable coming from the twist grip throttle of the motorcycle into two cables, one for each carburetor, and is part of a replacement throttle cable assembly. A local motorcycle shop may be able to provide one cheaply from a discontinued model or a junk bike. A modest amount of skill with a soldering iron is all that is required to make up a cable. (As an aside, bicycle brake cable is excellent for this and other applications on the Lotus where control cables are required, and it can be purchased at most bicycle shops.)

The original Lotus air box bolts directly to the SU carburetors using only four of the original six bolts. The unused holes in the air box, which supplied the vacuum chamber for the Stromberg carburetors, were plugged by making a new mating gasket for the SUs. Additionally, four new holes were drilled in the air box to accommodate the air passages to the suction chambers in the SUs.

At this time, I also plugged the hole for the crankcase ventilation tube, because the original tube no longer fit, due to interference from the rear float bowl. There are many ways to block this hole. I used a piece of phenolic and glued it in place over the hole with Shoe Goo.

The crankcase was vented directly to atmosphere by using a short piece of $^5/_8$-in. copper pipe and a $^5/_8$-in. copper 90-degree elbow. I soldered a piece of $^5/_8$-in. pipe into the elbow so that $^3/_4$" of pipe was protruding past the elbow. This piece of pipe was a tight fit into the rubber grommet in the twin cam head where the original vent pipe was located. I pushed it home until the elbow itself was flush with the grommet. I then clamped a length of $^3/_4$-in. heater hose to the other end of the elbow using a small hose clamp. This was routed between the frame and the starter motor and terminated just below the oil pan. No additional securing of this vent tube appears to be required.

With the new carburetors installed, the question of hood clearance needed to be addressed. A small ball of clay placed on top of each carburetor was used to indicate the amount of clearance available. The rear carburetor had plenty of clearance. The front carburetor was close. In my application, I found that the bonnet would close and, when the engine was running smoothly, there was no hood contact. However, when the engine was turned off, the front carburetor would tap the hood. To eliminate this, I filed a small amount off the plastic knob on top of the piston damper. Additionally, using a body grinder, I removed a small amount of fiberglass from the underside of the hood where evidence of contact was noted. This provided sufficient clearance for my car.

Because of the techniques used for body construction, some cars may need no adjustment for clearance, while others may require more than mine did. At worst case, a modest amount of bodywork on the front of the bulge in the hood may be required. Make sure that the front of the bonnet is adjusted so that it is flush with the body. If it is low, it will reduce carburetor clearance.

The SU HS6 carburetor's specifications for application to the Lotus twin cam engine are presented in Table 1. Used carburetors, rebuild kits, and carbs rebuilt to Lotus specification can all be purchased from Joe Curto Inc.

For those who wish to experiment, the needle profiles for two different needles are presented in Table 2. These specifications are for a stock twin cam engine with the crossover pipes and secondary butterflies removed and the various openings created by the removal sealed off. When it comes to selecting needles for a modified engine, the Haynes SU Carburetor manual is most useful. The manual (part no. 211-340) can be purchased from Moss Motors, (800) 235-6954. It has many pictures and exploded views that are helpful in rebuilding and tuning procedures.

Adjusting the carburetors is covered completely in the Haynes manual, but here is a brief description:

Before installation, the main jet must be centered in the carburetor body with respect to the needle. Start with the jet adjusted to be flush with the top of the jet holder. Loosen the jet locking nut so that the jet holder is free to move laterally. Place the piston with attached needle into the carburetor body and bolt down the suction chamber. With the piston resting and fully closing the ven-

SU HS6 CARB SPECS USED ON LOTUS ELAN

Jet	0.100"
Needle	0A8
Suction spring	Red
Float setting	Front carb — $^3/_8$" Rear carb — $^5/_{16}$"

NOTE: The different float settings for the front and rear carburetors are to compensate for the upward cant of the front of the engine. The fuel should be approximately level with the main jet when it is fully depressed by the choke mechanism.

TABLE 1