

MB107 Center Vent / Defroster Relationship

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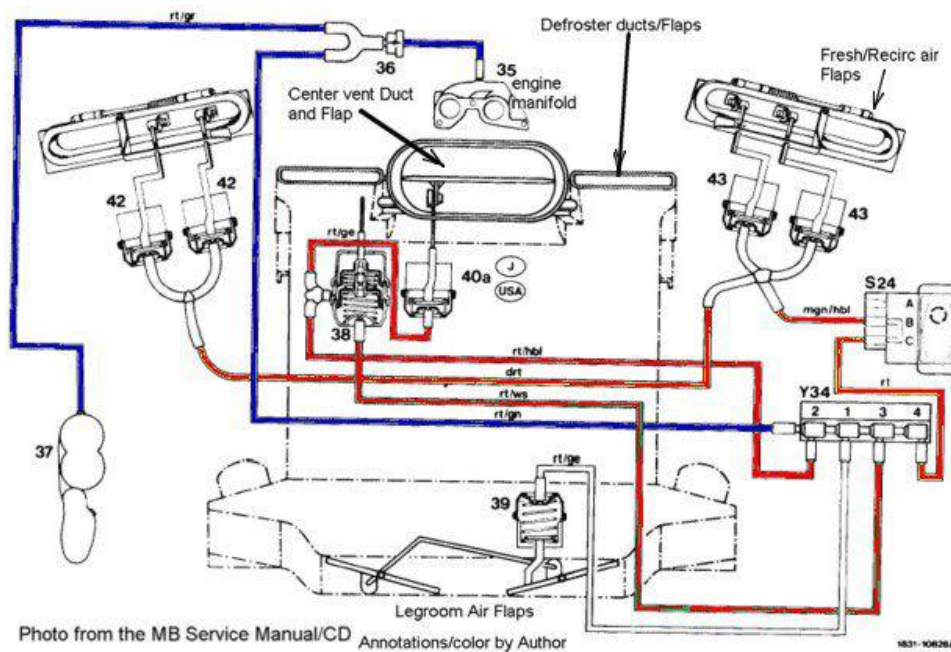
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Reviewing Center Vent/Defroster Relationship on a 1988 560SL (R107)

If you own a late-model 107 that uses vacuum actuators to operate the air distribution flaps, then you have probably experienced loss of function of the center vents (among other air distribution problems). Reports have been shared of fixes ranging from "propping open the center vent" to plugging vacuum lines to allow air circulation from the vents. While the most common cause for loss of function may be degraded and failed vacuum pod diaphragms, other causes do exist and can be more onerous. The following pages and pictures are offered to shed some illumination on the subject of "why do my center vents not open/stay open?"

- Heat, AC & Climate Control Manual
 - Heat - AC - Automatic Climate Control Service Manuals

Function Diagram



The above drawing illustrates the climate control system in cooling mode, selection "c" . The Blue signifies vacuum from the engine, and the red is vacuum applied to the actuators. In this mode, vacuum is applied to the pods for fresh air entrance to the cabin (42 and 43 open), vacuum is applied to the bottom (long throw) of the defroster pod (38 closed), and vacuum is applied to both the short throw defroster pod (38 closed) and the

center vent pod (40a open). It is important to recognize that pod 38, the defroster pod, is a dual-function actuator. For the defroster vents to be completely closed, vacuum must be applied to both lines (switchover valves 2 and 3). Also important is to understand what the "relaxed state" of each actuator means in terms of airflow. If vacuum is removed from the Center vent pod, a spring will close the center vent flap. The defroster flaps will default to full open if vacuum is removed from the two ports (or partially open if vacuum removed from only one of the two ports). The fresh air pods will default to re-circulated air if vacuum is removed from them. Not mentioned here yet is the legroom pod, which in this mode is defaulted to closed (39 no vacuum applied).

Tests

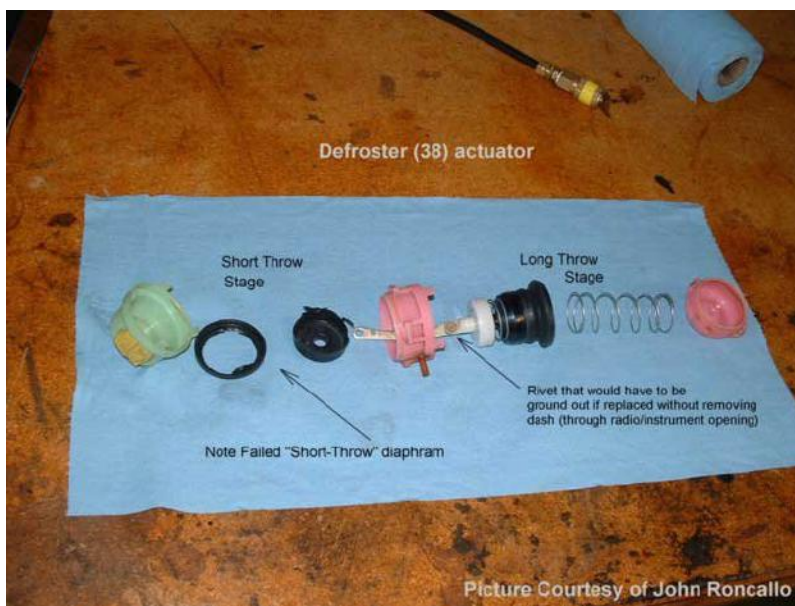
In this author's opinion, the best functional tests of the vacuum systems differs from the MB service manual/cd. Removal of the glove box provides access to the switchover valves. By removing the vacuum lines here, and applying approximately 200-300 millibars to each individual circuit, one can narrow down or pin-point vacuum leaks relatively quickly (although whether or not the leak is diaphragm/pod related or vacuum line-related will require a bit more exploration). Further exploration will be necessary to determine if a certain pod is responsible, in the case of the defroster/center vent valves, or the fresh-air valves. Any vacuum leak in any one circuit may also be enough loss to render any remaining "functional " pods unable to perform their designed function during attempted normal operation. Often reported is the "golf-tee" repair. A owner may choose to plug off a leaking circuit, thereby allowing other functions to return to normal. This is especially true with the center pod/short-throw defroster pod. Plugging the line from switchover valve 2 may allow the floor vents to regain function, and likewise for the re-circulating air flaps, etc.

Failure Modes of the Center Vent

Typical failure mode is for the actuator's rubber diaphragm to rupture or otherwise develop a leak, rendering the pod non-functional.

In the event of the center Flap, a ruptured diaphragm will result in the center vents remaining closed, regardless of the mode the climate control system is in. Another fault of the center vents is associated with the short-throw defroster function.

When this diaphragm leaks, vacuum will not actuate the center vent pod, thereby causing the center vents to remain closed as well as the defroster vents to remain partially open.



Picture Courtesy of John Roncallo

Of the two cases, failure of pod 38 is more desirable from a solution standpoint. It can be accessed from the radio/console opening and the instrument cluster opening. There have been reports of this pod being serviced from only one of the two, but access is very limited. In the case of pod 40a failure, the accepted solution is to remove the console and dash. Reportedly, this is the only way to access the center vent pod (and the legroom vent pod) as the heater box must be at least partially removed (these two pods reside INSIDE the heater box).



Unfortunately, there is another failure mode of the center vent actuator. If you find you can open the center vent by inserting a rod into the vent and gently forcing the vent open, and it stays open, then you have a broken heater box/pod mount.



What happens here is the pod breaks out a section of the heater box wall that it is mounted to, and no longer operates the flap. In this case, heater box removal is also necessary to remove the pod, fix the broken heater box, and repair pod function. If you want visual confirmation, remove the radio from the console. You will be looking straight at the heater box where the two rivets of the center pod mounts are located. If the heater box is broken, it will be obvious.

If you have a center vent that refuses to open, you probably have a function loss of pod 38 or 40a. You can somewhat determine this by selecting function c, and rotate the temp wheel to min (maximum cooling). Engage the fan on high and feel for air from the defroster. If air blows strong, you may only have a failure in the pod 38, short-throw port. This would mean for now, you do not have to worry with dash disassembly to repair the pod 40a (in other words, you could choose to plug off line to the short-throw port, restoring vacuum to the center vent pod). However, if air is barely or not blowing thru

the defroster vents, you have a failure in pod 40a necessitating dash disassembly. Regardless, it is worth mentioning that, if any one pod has a ruptured diaphragm, it is probably best to change out ALL diaphragms as failure of the rest is probably not to far behind.

Solutions

The following photos, courtesy of John Roncallo and used here with permission, represent one way of repairing the heater box in the event it has failed

Reportedly, parts for the heater box are no longer available; however, this author did not try and verify this claim. Obviously, the best plan of action would be to remove the dash and console, and replace all the diaphragms/pods to head off return failure in the near future. If you prefer, 5 of the seven pods CAN be accessed, albeit not necessarily easily, without removing the dash. In the case of the fresh air pods (43), removal of the glove box provides decent access to the two on the passenger (US left-drive) side of the car, while removal of the instrument cluster provides likewise for the driver's side (42). In the case of pod 38, the two-stage defroster valve, it can be accessed from the radio/console opening, and the instrument cluster opening. Removal is no piece of cake, and a judicious application of a dremel moto tool or similar will be needed to release the pod from the vent flap lever. replacement is somewhat easier, but some means of attaching the pod to the vent flap lever will have to be facilitated. Careful application will be needed to prevent binding and allow a full range of motion of the pod if this is attempted.

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