Ford Econoline E350 E450 vent switch stuck on defrost

Our air conditioner sent cold air to the defroster vents instead of the dash vents. This is a common failure on the E350/E450 vans. The problem is that a 3-inch piece of rubber vacuum hose between the check valve and the vacuum reservoir dry rots and causes a vacuum leak defaulting the airflow to the defroster. The system must have vacuum to open the dash vents.

If you take it to a Ford dealer, the repair cost might approach $1000. The book says to remove the air conditioner components and make the repair from the engine bay. There are several easier repair methods on YouTube and other forums. Some suggest cutting vacuum lines, removing a bolt and passing a vacuum line through a bolt hole where the bolt is not replaced.

There are many ways to do this job but the approach below does not cut lines or use bolt holes for vacuum lines. After a brief inspection under the hood to check the vacuum source, all of the work is done just above the passenger side floorboard. It likely takes longer to research the repair than to do the repair. If you experience this failure, talk to your mechanic about options for the repair work.

Steps:
Under the hood, confirm a good vacuum source while the engine is running. Put your thumb over the vacuum source hose to make sure that it is drawing air:

A: **Gasoline Engine**--vacuum hose runs along the top of the firewall and should be found in the wire harness clips above the engine just under the hood seal, or;

B: **Diesel Engine**--from the mechanical pump run by fan belt, look for black rubber hose near the oil fill cap. (There is a chance that some diesel engines will have an electric vacuum pump.)

Inside the cab, find the grommet with the vacuum line entering the just above the carpet in the passenger side floorboard. Sit on the running board to look in and see this area.

Our vacuum line into the cab has a red sleeve that expands the installed grommet. Gently pull the vacuum line out of the grommet enough to clear the sleeve. Then with fingers or a screwdriver pry the grommet out of the plastic box toward the interior side of the van. You can then gently pull on the line bringing the check valve into view on the other side of the hole. If the vacuum line drags easily to the grommet hole, the hose connection to the vacuum reservoir has failed (this is the reason for the repair). After looking it over, push the check valve back into the hole.

Make a bigger hole, roughly the size of a quarter, where the grommet was located. The hole needs to be big enough to extract the check valve through the hole. Remove the dead vacuum line but keep the other 2 lines attached. Hold or tie the vacuum line off to the side and be careful not to nick the existing vacuum line when enlarging the hole. I used drill bits on an extension shaft to ream out the plastic flat area surrounding the grommet hole. Use the side of a drill bit to ream/melt away the thin plastic. I put blue masking tape on the end of the drill bits to keep it from damaging anything inside the heater box. A Dremel might work for this step but I found drill bits with an extension shaft allowed more room to work. I started with a 3/16 bit and finished with a 1/4 bit.

A: **Gasoline engines** require a vacuum reservoir to hold the dash vents opened during periods of low manifold vacuum (full throttle). For gasoline engines, a new vacuum reservoir will replace the abandoned original vacuum reservoir buried in the engine compartment. Buy a new vacuum reservoir and zip-tie it under the passenger side dash. Install a vacuum line from the new vacuum reservoir and connect it to the check valve where the rotten hose was attached.

Sweep up the plastic chips, start the engine and test the vents. If everything works like it should, tuck the check valve back into the hole. For gas engines, there will be 2 vacuum lines entering the cab through the hole--one to the system control switch and the other to the new vacuum reservoir. You could use a vacuum line with a 90-degree adapter head to attach to the check valve--this would allow both lines to enter the passenger compartment parallel through the hole. Clean the top and sides of the plastic air box and use foil furnace tape to seal the big hole. I used lots of 1/2-inch wide strips of foil tape to seal the hole.

B: **Diesel engines** with mechanical vacuum pumps powered by the fan belt have no need to replace the vacuum reservoir. The mechanical vacuum pump when the engine is running operates the dash vents just fine. Plug the open port on the check valve with a rubber cap.

Sweep up the plastic chips, start the engine and test the vents. If everything works like it should, tuck the check valve back into the hole. Clean the top and sides of the plastic air box and use foil furnace tape to seal the big hole. I used lots of 1/2-inch wide strips of foil tape to seal the hole.

Notes:

1. Don't break something by testing the system components with compressed air or an external powered vacuum pump. The vacuum system parts are fairly delicate. If you want to test, use a length of vacuum hose and connect it to the vehicles' vacuum source under the hood.
2. The big hole in the air box is under very minor vacuum pressure generated by the heater/AC fan. Foil furnace tape seems to have plenty of rigidity to seal the hole. I found no reason to seal the hole with anything better than foil furnace tape.

Parts:

Gasoline Model Parts:

Vacuum line: Amazon or auto parts store.

Ford Vacuum Reservoir $24:

https://www.amazon.com/Ford-YC2Z19A566AA-YC2Z-19A566-AA-RESERVOIR-VACUUM/dp/B000NUD7ES

Amazon.com: Ford Reservoir - VAC: Automotive

Fixed the inevitable vacuum leak on my Ford AC/heating system. I was able to place this reservoir behind the dashboard above and to the right of the engine cover (once I removed it), and attached it to a wire loom mounting screw that was right there.

www.amazon.com

Diesel Model Parts:

Rubber Vacuum Caps $4:

https://www.autozone.com/fittings-and-hose-line-connectors/vacuum-connector-and-tubing/p/dorman-autograde-assorted-black-rubber-vacuum-cap-8-piece/375436_0_0?cmpid=LIA:US:EN:AD:NL:1000000:FLT:71700000060668086&gclid=EAIaIQobChMIoYryo-mk8gIVQfvICh0yxgOJEAQYAiABEgKKN_D_BwE&gclsrc=aw.ds

Dorman- AutoGrade Assorted Black Rubber Vacuum Cap 8 Piece

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Photos--

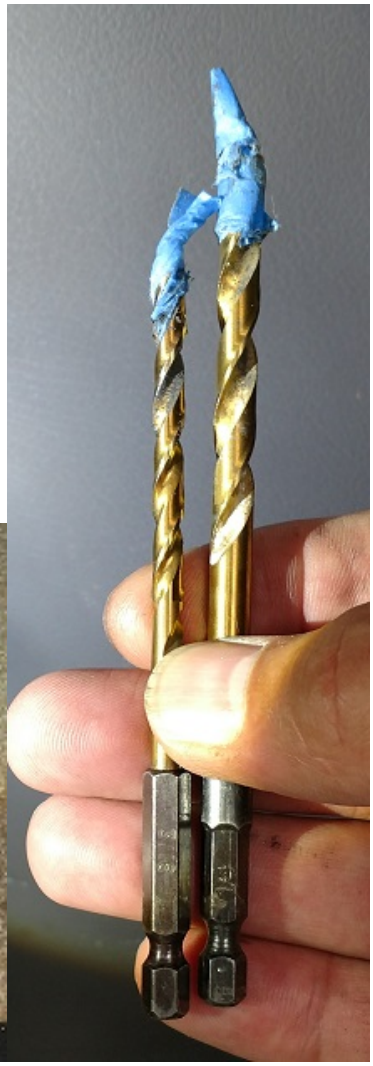
Failed 3-inch vacuum line located between check valve and vacuum reservoir buried in the air box behind the air conditioner components on the engine-side of the firewall.

This shows the vacuum line pulled into the cab with the end of the control line attached to the check valve on the other side of the plastic air box. Inspect, but don’t disconnect this line.

This shows the vacuum line entering the cab with the grommet and red expansion sleeve hanging out of the enlarged hole in the air box. The view is from the passenger side floorboard.

This shows the check valve with rubber cap attached to replace the line that used to attach to the vacuum reservoir on a diesel. The line heading upward comes inside the cab and goes to the HVAC control switch. For a gasoline model, a new vacuum line leading to a new vacuum reservoir installed under the passenger side dash would be installed instead of the rubber cap shone in the photo. If you want both vacuum lines to enter the cab parallel through the big hole, a 90-degree adapter could be used. Otherwise, a 270-degree loop on the new vacuum line could be use inside the air box to have both lines enter the cab parallel through the big hole. There appears to be plenty of room inside the air box to accommodate the loop of hose.

This shows the foil furnace tape covering the big hole. (This is on a diesel, so there is only one vacuum line coming into the cab.) I used a wet paper towel to clean the surfaces for the best tape adhesion. I probably used 8 small strips of foil tape to cover the hole. While it's not shown, the tape wraps and sticks to the top ledge above the hole.



Drill with extension and drill bits I used to ream out the hole. If you run the drill in the forward direction, the shavings come inside the cab, which is desirable to keep them out of the air box. It's easy to sweep up the plastic chips in the cab. ☺

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Additional reading and YouTube videos:
Google Search: econoline e450 e350 ford vent switch stuck on defrost
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