Installation of the Vanistan Fresh Air/Recirc Control Kit

This kit installs a control door in the Vanagon cabin fresh air inlet scoop, to control the amount of outside air that can enter the cabin ventilation system, especially at higher road speeds when ram effect causes an annoying pressurization of the venting system. In winter, the cabin heater will be more effective and quieter using low fan speeds when you can reduce outside frigid air mixing with the warmed air inside the cabin. In summer you will be able to stop hot air from diluting the cooling effect of the van's air conditioning system, if so equipped. The kit includes a secondary one-way flapper valve to be installed in one end of the air distribution box, supplying air to the fan when the fresh air inlet door is closed. A steel mesh screen covers the air inlet aperture to keep vermin out.

The inlet door is controlled one of two ways, depending on the option you chose at purchase:

Integrated control: a cable is operated by the existing rear overhead vent control lever, the lowest of the four factory heat and ventilation control levers in the dash panel. The control mechanism is constructed to open the inlet door fully within the first half of the control lever movement, when the rear overhead vents' control door below the air distribution box is still half-closed, so you can have more ram air vent pressure at the dash vents. The lever can continue to be swung all the way to the left and the inlet door will remain fully open but more fresh air will be allowed to flow to the rear overhead vents, lessening the pressure at the heater and dash vents.

Independent control: a separate pull cable with knob is installed in the dashboard near the existing vent control levers. This operates the inlet door independently of the existing controls. It is somewhat easier to install and adjust, and operates more smoothly because it isn't also controlling another function.

Parts included in all kits:
fresh air inlet door
inlet door foam/aluminum support insert left
inlet door foam/aluminum support insert right
steel screen panel left
steel screen panel right
poly tube 16"
recirculating air flapper valve

Additional parts included in kits with integrated control:
bellcrank assembly with spring and cable nut installed
cable housing 33"
cable wire with eye 37"
In hardware packet:
aluminum inside cable bracket
cable housing mounting clip
clip-nut
2" pc. black vinyl edge trim
(3) #10 x ½" hex-head sheet metal screws
(4) #6 x 1/2" hex-head sheet metal screws
#6 x ½" sheet metal screw
(3) #6 flat washers

Additional parts included in kits with independent control:
bellcrank assembly with cable nut and M4 wire clamping bolt installed, no spring
cable housing 33" with integrated mounting ferrule and jam nuts
cable wire 35" with integrated pull-knob
In hardware packet:
cable housing mounting clip
clip-nut
2" pc. black vinyl edge trim
#10 x 1/2" hex-head sheet metal screw
(4) #6 x 1/2" hex-head sheet metal screws
(2) #6 flat washer

Tools:
Medium flat screwdriver
#1 or 2 and #3 Phillips screwdrivers
1/4" and 5/16" nutdrivers
Needle nose visegrips or pliers
Wirecutter
Putty knife or small flat prybar
Electric drill
7/64" and 3/8" drill bits
2 1/8" hole saw
center punch
tape
7, 8, and 14mm open-end/box wrenches

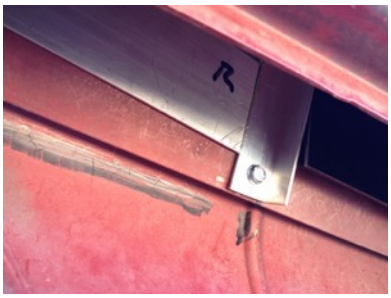
Note: All directions are from the driver's point of view; front is always toward the front of the vehicle, left is always toward the driver's left, etc. Outboard is away from the longitudinal centerline of the vehicle.

Install Inlet Door: Remove the front upper grille and the plastic mesh air inlet screen. The plastic mesh air inlet screen will no longer be used. Remove the 4 plastic expanding inserts from the lower edge of the inlet air scoop if they remained behind and are not still on the screen.

Test fit the left and right foam/aluminum inlet door support inserts in the inlet aperture that is up within the scoop, to familiarise yourself with how they fit. Push each support up against the ceiling of the inlet scoop, then push firmly against the wide aluminum strip to pop the foam insert into the aperture. The wide aluminum strip and the aluminum angle should lay dead flat against the rolled over bottom lip of the aperture. The inserts should be pushed outboard until the inboard edge of the aluminum angle is vertically aligned with the outboard edge of the raised rib in the bottom area of the scoop, as shown in the picture above right, the vertical marker line denotes the outboard edge of the raised rib.

Once you have test-fitted the supports in the required positions, remove them both, and loosely assemble the air inlet door and both supports as shown (picture above left). First put one of the small #6 flat washers over each of the pivot pins that project from the upper edge of the inlet door, then insert each pivot pin into the small hole near the top corner of each support's aluminum angle piece. The side of the inlet door with the bent rod should face you. Gripping each support, and holding all three parts together as an assembly, manipulate either support up loosely into position, then maneuver the other support along with the inlet door up into its position. Push on the wide aluminum strips to seat both supports as they were in your test-fitting. Make sure the foam tab that projects inboard of the angle piece is pushed in so it is also flush and aligned with the face of the rolled-over lower lip of the inlet aperture.

Check the swing of the inlet door, when pressed closed the beaded weatherstrip along the top will make it want to spring partly open, but apart from that it must swing freely without binding. If there is any interference with the aluminum angle pieces, reach behind the open inlet door and push the support inserts further outboard. Always make sure the aluminum flat bar and angle lay dead flat against the rolled-over lower lip of the inlet aperture.



Once the supports are seated in so they tightly fit the outboard ends of the inlet aperture, and the door swings without binding, fit your drill with a 7/64" bit, and using the holes in the bottom ends of the aluminum angles as a guide, drill thru the bottom lip of the inlet aperture. Drill right on thru the second layer of the rolled-over lip as well. Then install a #6 x 1/2" hex head sheet metal screw in each and tighten just snug to hold the assembly in place, both screws will be removed again later to secure the screen panels, after which they can be final tightened.

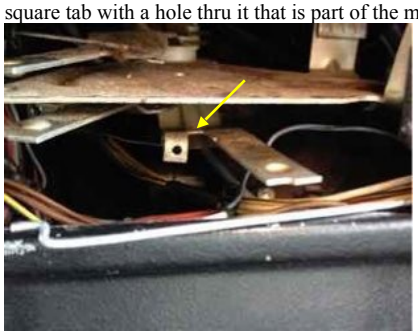
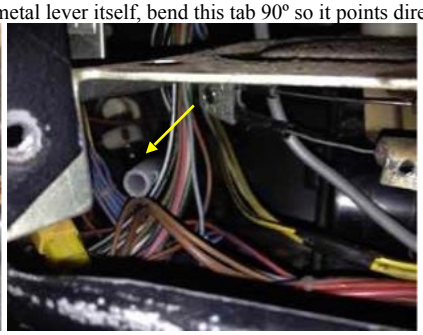
Install Integrated Control Cable: (for independent control cable installation, jump to ***Install Independent Control Cable*** on p.5)
Inside the van, remove the main fresh-air fan rotary switch knob by pulling straight off. The other fan switch knob for the rear heater fan can be left in place.

Remove the 4 vent and heater control lever knobs. Do not pull the knob itself, they break off easily. Instead, move each lever in turn to the center of its swing to expose as much of the knob's plastic shank as possible, then grip the shank tightly behind the knob with needle-nose visegrip or strong pliers, then pull steadily and inline with the lever until it pops off (picture below left). Note that in each of the two slots, the upper knob points up and the other points down, so you will put them back correctly later.


Remove the vent and heater control levers' slotted fascia plate by carefully working a putty knife or small thin prybar in behind it from the bottom and gently pry it away from the dashboard. There are small plastic pins integral to the fascia that wedge into openings in the dash, one pin is bottom left and the other upper right, concentrate your prying efforts as directly under these pins as possible and alternate between one pin location and the other to ease the fascia off bit by bit. Be very careful as it is really easy to break the fascia (picture above right).

Remove the large #3 Phillips screw that anchors the left side of the vent control levers assembly to the frame of the vent levers opening.

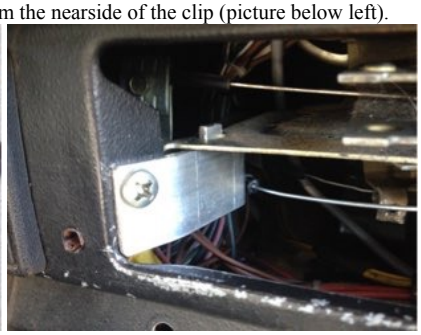
Swing the upper 3 levers all the way to the right to make more room to work, then move the lowest lever to the middle of its range. There is a small square tab with a hole thru it that is part of the metal lever itself, bend this tab 90º so it points directly downward (picture below left).


Behind the front grille to the left of the radiator is a 1/2" blind rubber grommet blocking a hole in the van firewall. Remove this grommet to expose the hole in the bodywork there that the control cable will go thru (shown above right with poly tube and cable).

Separate the poly tube, cable housing and cable wire. You can wrap the tube with several wraps of tape 3" from one end to act as a stop for the tube. Then working from the outside of the van, you will insert the poly tube into the hole you removed the blind grommet from. You need to maneuver the tube thru the space under the dash until the tube end emerges near the vent lever assembly, visible thru the vent lever opening (picture above middle). Slide the tube in until your tape stop is up against the firewall (picture above right).

Mount one end of the cable housing to the aluminum cable bracket with the cable housing clip and one #10 x 1/2" hex head sheet metal screw. Leave not more than 1/16" of the housing exposed from the nearside of the clip (picture below left).


From inside the van, insert the free end of the cable housing into the end of the poly tube, and slide it in, letting the tube guide the cable housing on thru the hole in the firewall, until the aluminum bracket is entering the vent lever assembly opening. If the poly tube is moving away, you can reach up

under the dash with your left hand to keep it in place while sliding the cable housing in, or have a helper hold the tube from the outside. Next insert the straight end of the cable wire into the cable housing and slide it on thru until the loop on the end is positioned roughly 2” from the end of the cable housing. Position the aluminum bracket as shown above middle, with the raised tab on top inserted into the hole in the lever assembly frame, and reinstall and tighten the large Phillips screw to hold it in place.

Position the cable wire end loop so that it is roughly centered in the vent control opening. Put a #6 flat washer on one of the #6 sheet metal screws, hold the screw and washer on the end of your small Philips screwdriver with one finger as you guide it into the wire loop, and then into the small hole in the bent lever tab. The screw should self-thread into the tab, screw it in until it is almost gripping the wire loop, but stop when there is still a little free play and the washer can be turned with your finger (picture above right).

Work the lever back and forth to be sure the cable moves freely without binding. The existing cable remains attached so the bottom control lever works both the existing rear overhead venting control and the new fresh air inlet flap.

The poly tube will remain in place because it helps assure that the cable housing bends smoothly near the lever assembly. If you want to seal the cable entry point thru the firewall you can use tape or caulk, but wait until the installation is otherwise complete.

Tip: When finished, the new inlet control door mechanism’s spring will exert a slight pull on the control lever when the door is closed, and after many years these levers tend to be a little loose, so the pull may be enough that the lever creeps leftward from the closed position. So leave the lever knobs and fascia off until you have the cable and flap operating satisfactorily, then adjust the lever tension if needed by reaching up under the dash with a 14mm open-end wrench (a stubby wrench is best; also on some vans this nut is a 13mm hex) and tighten the nut on the bottom of the vent levers assembly a bit to increase the drag on the levers’ movement. The nut will be just visible thru the vent lever assembly opening.

Install Bellcrank Assembly: The bellcrank converts the up-down movement of the cable to the forward-backward movement required to control the inlet door, and the spring acting on the bellcrank is what pulls the door open when the cable is relaxed. The cable wire end will be secured to the bellcrank bracket and does not move; the cable housing tube is the active element, when the control lever in the cab is moved rightward, the cable wire is pulled shorter and that displaces the cable housing tube upward to push against the bellcrank lever, which transfers that force to the inlet door to close it. The reverse happens when the control lever is moved leftward, the upward pressure of the cable housing is relaxed so that the inlet door is allowed to be pulled fully open by the spring by the time the control lever has reached the midpoint of its swing. From the control lever's midpoint leftward, the cable housing lowers further away from the bellcrank lever, so that as the control lever is moved all the way leftward it fully opens the rear overhead vent control flap in the base of the heater box.

Slide the clipnut onto the lower rim of the inlet air scoop, positioning over the small rectangular hole that is just to the left of the center grille mounting tab. Install the black plastic edge trim piece over the upper metal edge of the grille opening, centered directly above the clipnut. Pre-install a #10 x 1/2” hex head sheet metal screw into the hole in the small tab on the bellcrank frame on the side opposite the spring, just screw it about half-way in for now.

In your right hand, hold the bellcrank assembly while pushing the bellcrank lever upward against the spring tension with your thumb. With your left hand, reach in and pull the inlet door forward, to where it’s about half open. Tilting the bellcrank assembly, maneuver it up into the inlet scoop while engaging the 90º bend on the other end of the bellcrank into the slot created by the bent rod that is attached to the front of the inlet door. Once engaged, maneuver the bellcrank assembly upward so the slot between the tabs on its top slips over the piece of plastic edge trim, and so the hole in the very bottom of the bellcrank assembly is over the clipnut. The picture below left shows the bellcrank assembly in its installed position, with the cable also installed and the inlet door closed; observe the way the bellcrank lever engages the inlet door. Install the remaining #10 x 1/2" hex head sheet metal screw to hold the bellcrank assembly in place. Work the bellcrank by hand to be sure the inlet door closes fully when you push up on the cable attachment end of the crank, and that the spring is able to pop the door open freely when released.

Set Cable Position: Inside the cabin, slide the bottom vent control lever all the way right, this will be the inlet door closed position. Back outside, take the free end of the cable wire, slide it thru the hole in the swivel barrel that is attached to the bellcrank. Grip the cable housing and push it upward against the bellcrank to hold the door tightly closed, slide the free end of the cable wire under the #10 x ½” sheet metal hex screw and tighten the screw to hold the cable wire firmly (do not overtighten!).

Back inside, test operation with the control lever, when moved all the way right the door should be fully closed, and should open to where its bottom edge is about ½ - ¾” from the forward wall of the inlet scoop cavity by the time the lever is moved halfway left. Most important is to achieve full closure, and let the opening position fall where it will.

Also be sure that the control lever stays in its full-right position and doesn’t creep leftward due to the spring tension the opening mechanism exerts on the cable when closed. If needed, tighten the vent control levers’ pivot nut a bit as described in the Tip earlier on this page. Put the knob back onto the lower control lever partway so you can more accurately feel the effort required to move it, and adjust the control levers’ pivot tension nut until you are comfortable with it.

Make adjustments to the cable and bellcrank assembly until you are satisfied with the lever/door operation. When you have the cable set where it works best, mark the cable wire right where it crosses the screw shank, then loosen the screw and remove the wire so you can bend it 90º right on the mark, and clip off the excess cable wire leaving 3/8" after the bend (do this without pulling it out of the swivel barrel or you won't be able to slide it thru the hole again). Then reinsert the bent cable end under the screw head, lifting the bellcrank end as before so the door is tightly closed, and tighten the screw enough to hold the cable wire in that position. The bend in the wire will keep it from slipping without the need to overtighten the sheet metal screw.

When you have the mechanism set up to your satisfaction, reinstall the lever fascia and knobs. Put all 4 levers in the middle of their ranges, and once the fascia panel is back on, you may need to go in thru the slots with a thin implement to gently pry each lever in line with the slot opening so you can slip the lever knobs back on.

Jump to ***Install Screen Panel*** on p.6.

Install Independent Control Cable:
With center punch, mark where you will drill a hole for the cable to mount in the lower dash below the ventilation control lever panel. Apply tape around the hole area beforehand to protect the dash finish later when tigtening the cable housing into place. Drill a 1/8" pilot hole, followed by the 3/8" drill.

Behind the front grille to the left of the radiator is a ½" blind rubber grommet blocking a hole in the van firewall. Remove this grommet to expose the hole in the bodywork there that the control cable will go thru (shown above right with poly tube and cable). Insert the poly tube into the hole you removed the blind grommet from. You need to maneuver the tube thru the space under the dash until the tube is aligned with the 3/8" hole you drilled.

Remove one jam nut and washer from the cable housing ferrule, and insert the wire end of the cable thru the 3/8" hole. Under the dash edge, slip the washer and jam nut onto the cable end, then guide the cable end and cable housing into the poly tube. Slide the cable on into the tube, and once the housing ferrule threads go thru the hole, slide the washer onto the ferrule and thread the nut on. It's very hard to get a wrench on the nut from under the dash, but by holding the nut by hand you can tighten the 2nd jam nut on the ferrule with a 14mm open-end wrench. The poly tube can remain in place.

Install Bellcrank Assembly: The bellcrank converts the up-down movement of the cable to the forward-backward movement required to control the inlet door. In the independent cable control installation, the cable housing is clamped in place and the cable wire is the active element.

Slide the clipnut onto the lower rim of the inlet air scoop, positioning over the small rectangular hole that is just to the left of the center grille mounting tab. Install the black plastic edge trim piece over the upper metal edge of the grille opening, centered directly above the clipnut.

In your right hand, hold the bellcrank assembly while pushing the bellcrank lever upward with your thumb. With your left hand, reach in and pull the inlet door forward, to where it's about half open. Tilting the bellcrank assembly, maneuver it up into the inlet scoop while engaging the 90º bend on the other end of the bellcrank into the slot created by the bent rod that is attached to the front of the inlet door (picture below left). Once engaged, maneuver the bellcrank assembly upward so the slot between the tabs on its top slips over the piece of plastic edge trim, and so the hole in the very bottom of the bellcrank assembly is over the clipnut. The picture below shows the bellcrank assembly in its installed position, with the cable also installed and the inlet door closed. Install the #10 x 1/2" hex head sheet metal screw to hold the bellcrank assembly in place. Work the bellcrank by hand to be sure the inlet door closes fully when you push up on the cable attachment end of the crank, and that it is able to open freely when released.

Set Cable Position: Inside the cabin, push the cable knob all the way in, this will be the inlet door closed position. Back outside, remove the #10 x 1/2" hex head sheet metal screw that is holding the bellcrank assembly in place, slip the cable housing mounting clip over the end of the cable first and pinch it closed but loose enough that it isn't yet gripping the cable housing. Then take the free end of the cable wire and slide it thru the hole in the swivel barrel nut that is attached to the bellcrank. Reinstall the sheet metal screw to hold the cable housing mounting clip and bellcrank assembly loosely in place. Adjust the cable housing position so 1/8" to 1/2" of it is exposed above the clip, and tighten the sheet metal screw.

Push upward against the bellcrank to hold the door tightly closed, and using an 8mm open end wrench to hold the swivel barrel, use a 7mm wrench to tighten the M4 setbolt until it just begins to grip the cable wire. Pull the cable wire upward to be sure the knob inside is all the way in, and holding that wire position make sure the bellcrank lever is pushed as far upward as it can go and the inlet door is pressed closed. Tighten the M4 setbolt to hold the cable wire firmly, as shown at left.

Work the knob inside to be sure the inlet door is pushed closed when the knob is pushed in, make adjustments to the cable until you are satisfied with the lever/door operation. Clip off any extra cable wire about 1/4" above the swivel barrel.

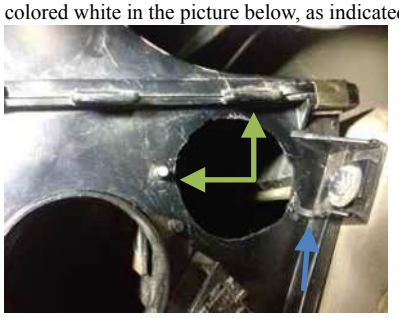
Install Screen Panels: Put the inlet door in fully open position, and remove the #6 hex-head sheet metal screw from the left support. Maneuver the left screen panel into the space above the bellcrank assembly as shown at left. The left screen panel has a slot cut into it that allows the bellcrank arm to swing fore and aft to work the inlet door. Bending the outboard upturned "wing" of the screen panel partly downward first will make the insertion easier. The bent rear edge of the screen panel is meant to slip under the rolled-over bottom lip of the aperture, while the forward bent edge will be outside the upper lip of the grille opening when the screen is in position. Bend the outboard "wing" upward into the scoop cavity so it rests against the aluminum angle piece of the left inlet door support. Once in position, make sure the bellcrank arm doesn't rub on the screen's slot, then reinstall the #6 screw to hold it in position. Bend or trim the screen to get sufficient clearance if necessary.

Do the same procedure with the right side screen panel, although you won't need to deal with the slot and bellcrank arm. When in position, the right screen panel's inboard end should overlap the left screen's by about 1/4" behind the middle grille mounting tab.

Test operation again before reinstalling the radiator grille.

Install Recirculating Air Flapper Valve: Remove the glovebox and the dashboard end vent flex hose. Disconnect the wiper motor wire connector and tuck it out of the way. You can disconnect the vent control cable crossing this area if you find it helpful, it makes the job easier but isn't strictly necessary, but take care when removing the clip, it can fly off and be lost, and the old plastic can easily break at the clip mounting. The cable is removed for clarity in these pictures.

Cut a piece of stiff paper or thin cardboard exactly 1 3/16" square as a pilot hole marking guide. Place the paper square flat onto the end face of the air distribution box, top edge butted up against the rim of the air box cover seam, and left side of the rectangle butted against the embossed pin which is colored white in the picture below, as indicated by the green arrows.



Positioned so, make a center punch mark at the bottom forward (lower-right as you are looking at it) corner of the square, then remove the square. Drill a 1/8” pilot hole at the punch mark, then cut out a circle with the 2 1/8” holesaw (your hole will probably look much better than the one in the picture, that hole was enlarged by hand after I cut it too small the first time!).

It's a little tight with the widshield wiper motor assembly nearby, so if you have a right-angle drill adapter you should use that so you can drill and hole-saw straight on. If not, opt for a small-body drill if you have the choice of one. Hole-sawing at an angle will create a slightly oval hole. If it can't be avoided, you may have to use a round or half-round file, Dremel tool, cutting burr, etc. to round out the hole to allow the flapper valve body to fit. File and trim and test the fit often until the valve just fits into the hole.

You will also need to cut out the lower gusset around the airbox securing bolt, as indicated by the blue arrow in the picture above, to allow the flapper valve body to seat flat; this can be done with a large diagonal wirecutter, a Dremel cutter or rotary file in a die grinder. Be sure to take the plastic down flat on the face within about 1/8" of the edge of the hole you sawed out.

The flapper valve assembly is sized to fit tightly in the sawn hole, with reasonable pressure applied the smaller diameter step of the valve tube should pop into the hole with a tight enough fit to remain in place by itself. When inserting the valve, flip the flap open and hook an upper corner of the flapper into the hole first, then the rest of it will slip thru easily. Make sure the hinge is at top and press the valve body into the hole.

Test that the flapper valve disc is able to swing inward freely until it is almost horizontal, and drops back down of its own weight when released. If it only swings in part way and jams, try rotating the valve body clockwise a bit so the hinge isn't exactly at the top, and test again. If the flapper still hangs up, it may be rubbing on a ridge feature that can be felt just inside the sawn hole toward the rear of the van. Remove the valve assembly and use a half-round file thru the hole to file away a bit of the ridge. The flapper is already relieved a bit on that rearward edge, so you can also trim off another 1/16" of the flapper disc with scissors if necessary. Reinstall and test until the valve disc swings freely.

If the hole is too large and the valve is too loose a fit to stay in place on its own, use two of the #6 x 1/2" hex-head sheet metal screws thru the wire ears to secure it. These might not be needed at all if the fit is tight enough, use your own judgment. The screws will self-drill if you use a power screwdriver, otherwise you can pilot drill with the 1/8” bit thru the wire ears. Tighten the screws very gently as the plastic will easily strip out.

You can test the flapper valve by turning the ignition on and running the fan with the inlet door closed; the flapper should swing freely inward, and close by gravity when the fan is switched off. When you open the inlet door and the van is moving, the flapper will be pushed closed by the ram air pressure.

Reconnect the vent control cable, if removed, the wiper motor connector, the dash vent duct hose, and reinstall the glovebox, and you’re finished.

Safety warning: When it is necessary to defrost or defog the windshield and front door glass, it is always advisable to allow in some outside air, because recirculating inside air will become more and more humid, while drier outside air will remove fogging and icing from glass much faster.

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