

Installation of the Vanistan 1.9 Wbx Oil Cooler Kit

Parts included in the kit:

- (1) Mocal thermostatic sandwich adapter with BSP-8/JIC-8 male/male adapter fittings installed
- (1) 3/4"-16 female/male nipple extension fitting to secure sandwich adapter
- (1) Trucool 24-plate oil cooler with 90deg. 1/2"MPT/JIC-8 fittings installed
- (2) 18mm banjo to JIC-8 male adapter fittings
- (2) 18mm banjo bolts
- (4) 18mm copper crush washers
- (2) oil hoses with straight JIC-8 spin-on fittings. One hose is longer than the other
- (1) forward cooler support plate with clipnuts installed
- (1) rear cooler support plate with clipnuts installed
- (1) ABS air duct elbow
- (1) pc. bulbed weatherseal
- (2) rear support plate retaining tabs
- (1) large snap ring
- (1) 2.5" flexible duct hose
- (2) hose clamps for duct hose.
- (7) #10 x 1/2" hexhead sheet metal screws
- (2) #6 x 1/2" hexhead sheet metal screws
- (1) tandem hose bracket with two black plastic saddle clamps, cover, and bolt
- (2) M8 x 25mm hexbolts
- (2) M8 flat washers

Tools needed:

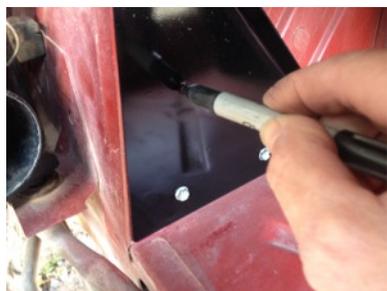
- 1" deep socket wrench for sandwich adapter retainer/nipple extension
- 24mm box end or socket wrench for banjo bolts
- Two 22mm or 7/8" open-end wrenches for hose end fittings
- Oil filter remover
- Phillips screwdriver
- 1/4" and 5/16" nutdrivers (a long wobble extension is helpful here)
- 6mm Allen wrench or driver
- 13mm socket wrench
- Drill
- 1/8" drill bit
- center punch
- marker
- snap ring pliers

Note: If your 1.9 wbx is using the stock exhaust pipes, you will need to use a shorter oil filter. The filter to fit any year Saab 900 or 9000 will fit and has the correct specs for the wbx. The Mann part number is W712/80. Switching to the stock 2.1 exhaust or my stainless tuned WBXaustSS allows use of the normal wbx filter size.

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.

First remove the right rear taillight assembly's 4 Phillips-head screws. Disconnect the electrical plug and set the taillight aside. Some of the installation will be performed by working thru the taillight opening.

Remove the air filter housing. Then remove the fiber blockoff plate that covers the cavity at the base of the right rear D-pillar by prying off the small retainer clips. Discard.



Assemble and Mount the Oil Cooler Assembly: The cooler will be mounted at an angle within the D-pillar cavity, with both its fittings to the rear of the van.

The forward cooler support plate is the simple triangular plate with one bent edge. Position it flat against the forward wall of the cavity as shown far left, lower edge flat against the cavity floor and with the left edge of the plate aligned with the corner of the cavity wall where it joins the main engine compartment.

Mark the center of the three screw holes, then remove the plate. Center punch on your marks and drill three 1/8" holes.



Attach the forward cooler support plate to the cooler with two of the #10x1/2" hexhead sheet-metal screws as in the photo far left. Snug the screws and then loosen them slightly to allow some movement to aid in positioning the cooler.



If not already installed, apply the piece of bulbed weatherseal to the bent edge of the rear cooler support plate as shown at far left.

Install the grooved end of the air duct elbow through the hole in the rear support plate and put the large snap-ring in the groove.



Position the rear support plate within the cavity box by leaning it forward as at far left, and tilting it upright so that the square notch in the top of the plate goes under the box beam on the roof of the cavity. In final position it should be vertical and backed up against the body gusset visible thru the taillight opening as shown at left.



With the two #6x1/2" hexhead sheet metal screws, attach the rear support plate retaining tabs to the rivets in the plate, the screws will self-tap into the rivets. Position the tabs over the body gusset as shown in the picture far left, and tighten the screws just enough to hold the support plate loosely in place.

Now insert the cooler and forward plate assembly back into the cavity to where the three screw holes for the forward support plate line up. Install the three screws loosely to hold the assembly in place.

Run the remaining two #10 screws thru the cooler's rear mounting tab into the clipnuts on the rear support plate. Now the cooler and supports are all in place, go around and gently tighten all the screws.



Install the Hose Bracket: *(bracket supplied is not the same as shown in pictures)*

Bolt the hose bracket to the water outlet flange on the forward side of the left cylinder head. On your 1.9 wbx, this flange will be closed off with a flat steel cover. Remove the two 6mm Allen head bolts but leave the cover in place without breaking the seal, and secure the hose bracket over the cover using the longer hex-head bolts and flat washers provided.

When installed the main body of the bracket will be positioned as in the picture at left, with the bracket saddle hanging towards the rear of the van. The bolts should be torqued to 18-20ft.lb. Remove the bracket's bolt, top cover, and upper plastic saddle piece and set aside.

(note: new bracket will be oriented as the one in picture at left, so the upper part of it points to the rear of van and sloping to the left.)

Fit the Hoses to the Sandwich Adapter: Fit one of the copper crush washers to each of the banjo bolts, slip one banjo bolt thru each of the banjo adapter fittings' eye, and slip a second bonded sealing washer over the threaded end of the banjo bolt. Loosely thread the banjo bolts into the sandwich adapter outlet ports. Hold the sandwich adapter as shown in the picture below left. The rubber seal is facing you (towards bottom of picture). I recommend you hold the sandwich adapter in a wooden-jawed vise, or clamped to a tabletop using blocks of wood, a rag, or some other material that won't mar the rubber seal or the machined aluminum filter sealing surface. Tighten the banjo bolts so that the fittings are leaving the sandwich adapter at the angle shown, about ten degrees from perpendicular (*hoses are shown rather than adapters, but the angle must be the same*). The banjo bolts will torque down firmly and won't turn much further once the fittings are snugged down, so don't apply too much torque, about 20ft.lb. is enough (*remember, the bolts are hollow, so they can be broken!*).



Remove the engine oil filter and wipe the filter mounting flange clean. Make sure the pipe nipple in the crankcase has not unscrewed, screw it into the case as far as you can by hand, there should be only about 7/8" to 1" exposed. Coat the rubber sealing surface of the sandwich adapter lightly with clean oil, and install the adapter to the engine block's oil filter flange. Tighten the nipple extension screw with the 1" deep socket to about 30-35 ft.lb. The adapter may try to turn as you tighten the extension, if

so, loosen and swivel it against the direction of tightening a bit to compensate so that when tight the fittings are in the position shown above right, and are not touching any part of the engine nearby (*once again, hoses are shown but the adapter fittings must be in the same position and angle*).

Route the Oil Hoses: One oil hose is longer than the other, the longer hose will connect to the lower fitting of the oil cooler. Make sure the fittings are clean, and use no sealant or tape on them; they thread up dry. Thread the female swivel end fitting to the elbow fittings on the cooler. Don't tighten the fittings yet, leave them loose enough that the hoses can swivel at the fittings.



Now run the free ends of both hoses across the engine bay at an angle toward the support bracket as shown at far left, and lay both hoses in the bracket saddles. Lay the upper bracket saddle piece over both hoses, fit the top cover and bolt, and run the bolt down just enough to hold it all together. Then route the free ends of the hoses in a curve around the left end of the engine and thread them onto the banjo adapter fittings. It doesn't matter which hose goes where on the sandwich adapter.

The hoses should curve smoothly without actually touching the valve cover, cylinder head, or the side of the engine bay, and should lie naturally in the hose bracket saddles and across the engine bay. Adjust the hose positions to get clearance. Once the curve of the hoses is set you can tighten the swivel fittings at both ends. On the cooler fittings, use two 22mm (7/8") open-end wrenches. *Always hold another wrench on the stationary fitting in order not to stress the hex bosses of cooler itself; they can be broken off easily!* The spin-on fittings don't need to be very tight; this type of fitting makes a good seal dry with only moderate torque., about 15-20 ft.lb. Overtightening can crack the fitting seats and cause leaks! Tighten down the saddle clamp bolt. Plastic wire ties can be added later if desired to secure the hoses against movement.



Fit Intake Air Duct Hose: The air filter housing's inlet horn has to be cut off partly to fit the intake air flex hose to it. Saw off the curved end of the inlet horn just after the start of the curve. The altered air horn will look like the picture at far left.

Refit the air filter box to the vehicle. Fit the flex hose and one of the two clamps provided to the plastic pipe elbow on the rear cooler mounting plate, and fit the other end of the flex hose to the altered air inlet horn. Secure with the second hose

clamp. Just like the stock arrangement, this duct lets the engine draw cooler and cleaner air from the D-pillar vent instead of hot dusty air from the engine compartment.

Priming, Starting, Leak-Checking:

Pre-fill your oil filter with clean oil and reinstall hand tight. The filter seals swell in use so the filter will become tighter, so it's important not to overtighten when installing. Overtightening the filter may result in the sandwich adapter moving or the spigot extension fitting loosening when you try to remove the filter. If this ever occurs, recheck the sandwich adapter position and tightness of the spigot extension fitting before installing the filter again, and use less torque on the filter next time.

Start the engine and shut down after the oil pressure warning light goes out. The oil cooler will self-prime in a few seconds when the engine runs, and doesn't need any air bleeding, nor does it need to be specially drained during a routine oil change. It adds about 1 pint (~500ml) to the engine oil capacity. After getting oil pressure, let the oil settle for several minutes and check the level, you will probably need to add about a pint of oil to bring the level back up after the cooler circuit is filled.

As always with waterboxer engines, the oil level should not be filled to the top notch on the dipstick, but instead kept between the notches, closer to the lower notch is generally a better level to keep the oil at. The cooler will not effect where you keep the oil level once it has been primed.

I like to leave the taillight assembly out until the engine has been run warm, so I can more easily check that all the oil cooler fittings are leak-free. Once you have verified that, reconnect and remount the taillight assembly.

The cooler takes advantage of ram-air flow down the D-pillar when the van is moving, which at speeds above 30mph is quite adequate to keep the oil at less than 230F even in hot weather. At lower speeds, rpms are generally lower and the oil doesn't heat up much under those operating conditions.

The thermostatic valve in the sandwich adapter allows for quick warmup and prevents overcooling because it allows oil to bypass the cooler until the oil temp has reached 180F (82C), but even while the bypass is open it creates a slow flow of oil thru the cooler circuit so the cooler is not holding a slug of cold oil when full flow is diverted to it.

Notes on oil hoses: Handle the oil hoses gently, avoid kinking or sharp bends. Take care when using any sharp tool near hoses. When installing, avoid forcing hoses to bend within 2" of the end fitting.

Hoses should be inspected regularly for physical damage, loose fittings, or developing leaks. Hoses can be kept clean by wiping down with a clean rag sprayed with WD40.

The two oil hoses can be bundled together at intervals with plastic zip-ties if desired. Additional protection such as sleeve wraps can be applied as you see fit. One place that I think it is wise to cover them with something fairly tough is where they cross the plane of the engine drive belts above the alternator, so they aren't lacerated if a belt gets thrown. Some heavy polyethylene plastic cut from a container, or some aluminum flashing sheet can be used to make a sleeve around both hoses there, held in place by zip-ties. Be careful that anything used to cover hoses does not have sharp edges that could lacerate them.

All hoses have a limited service life, these can be expected to provide good service for about 6-8 years, regardless of mileage. I can supply replacements on request for a reasonable cost.

Enjoy your Vanistan engine oil cooler!

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