

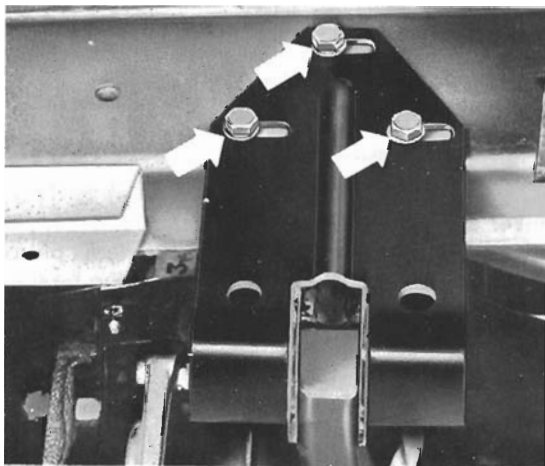
10 ENGINE AND CLUTCH

- Working under the vehicle, pull the accelerator cable out of its guide tube. Then disconnect the fuel lines from the pressure regulator of fuel injection engines or from the fuel pump of dual-carburetor engines. Quickly plug the line(s). (The fuel line connections mentioned are at the front, right-hand side of the engine.)

WARNING —

Do not smoke or work near heaters or other fire hazards. Have a fire extinguisher handy.

- Remove the two lower engine-to-transmission mounting bolts.
- Place a floor jack with an engine adaptor beneath the engine. Raise the jack until the adaptor just supports the engine.
- Remove the bolts that hold the engine bearer brackets on the frame (Fig. 3-9).



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Fig. 3-9. Bolts (arrows) that hold engine bearer to frame. There is a similar bracket at the opposite side of the vehicle.

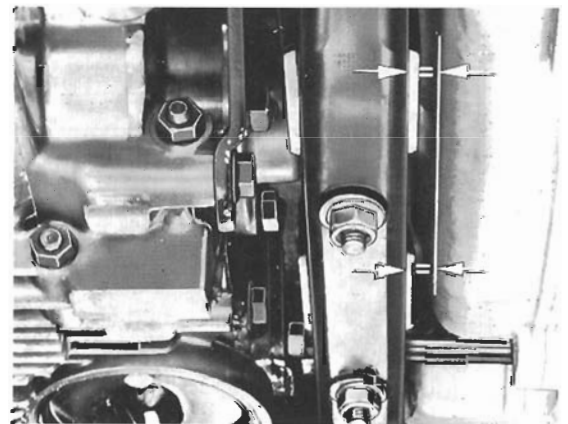
- Using the floor jack, pull the engine slightly to the rear until the transmission rear driveshaft is completely disengaged from the clutch or—on vehicles with automatic transmissions—the drive plate is freed from the torque converter.
- Carefully lower the engine to floor level, making sure that none of the disconnected wires and hoses are caught on the engine.
- On vehicles with automatic transmissions, install a retaining strap or stiff wire across the mouth of the transmission bellhousing in order to prevent the torque converter from falling off its support tube while the engine is out of the car.

CAUTION —

If you intend to disassemble the engine, thoroughly clean its exterior following removal. Otherwise, dirt may accidentally enter the working parts during repair.

Although installation is the reverse of removal, pay special attention to the following additional steps:

- Check the clutch release bearing for wear. (See **15.4 Replacing Clutch Release Bearing.**) On both new and used release bearings, roughen the plastic facing with emery cloth. Then rub in molybdenum grease.
- Wipe off the mating surfaces of the engine and transmission. Lightly lubricate the transmission rear driveshaft splines with molybdenum disulfide powder. Lubricate the starter drive bushing in the transmission case with multipurpose grease (Bosch starter only).
- When installing the engine, be careful not to damage the transmission rear driveshaft or the clutch driven plate. Put the transmission in gear, set the parking brake, then hand-turn the crankshaft until the splines mesh.
- Press the engine into firm contact with the transmission flange, then install the engine-to-transmission mounting bolts. After you have loosely installed the bolts that hold the engine bearer brackets, torque all four engine-to-transmission mounting bolts to 3.0 mkg (22 ft. lb.).
- Remove the transmission support bar. Shift the engine bearer brackets on their elongated bolt holes until the bearer is vertical and parallel to the engine fan housing as indicated in Fig. 3-10. Then torque the bearer bracket bolts to 2.0 mkg (14 ft. lb.).

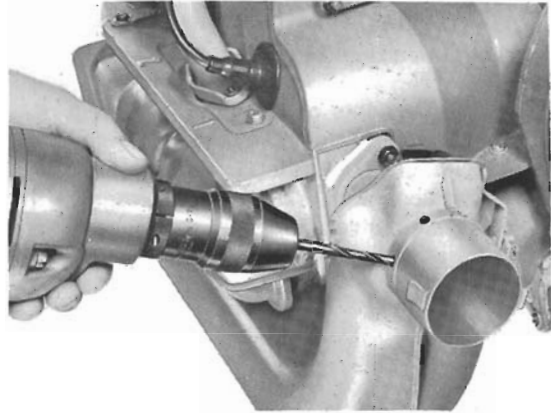


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Fig. 3-10. Engine bearer alignment. The gap indicated by the arrows must be uniform along its entire length.

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6. Make sure that the rubber seal between the engine cover plates and the body is correctly positioned.
7. On vehicles with automatic transmissions, torque the three bolts that hold the torque converter to the drive plate to 2.0 mkg (14 ft. lb.).
8. Make certain that the crankcase is filled with oil. Adjust the clutch pedal freeplay as described in **15.5 Adjusting Clutch Pedal Freeplay**; adjust the accelerator cable as described in conjunction with carburetor installation in **FUEL SYSTEM**; adjust ignition timing as described in **19.2 Distributor**; adjust the carburetor as described in **FUEL SYSTEM** or adjust the idle as described in **FUEL INJECTION**.



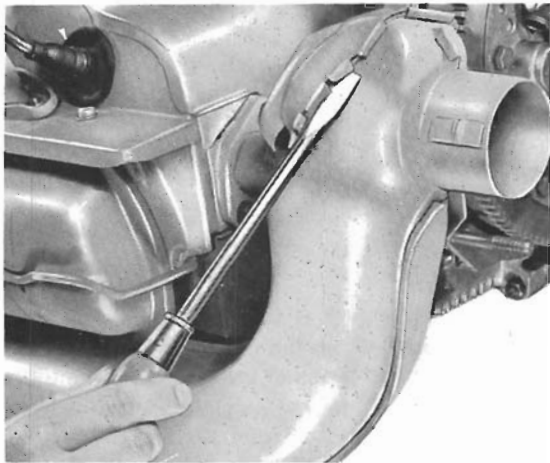
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Fig. 4-2. Spot welds being drilled out. Centerpunch the welds first.

4. REPLACING OUTLET PIPES AND HEATER CONTROL FLAPS

(single-carburetor engine)

If necessary, you can pry up the cover plate tabs for access to the heater control flaps (Fig. 4-1).



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Fig. 4-1. Screwdriver being used to pry cover loose.

Check the heater flaps for free movement. Replace them if they are badly stuck or corroded. Install the cover plate, then crimp the tabs to hold it in place.

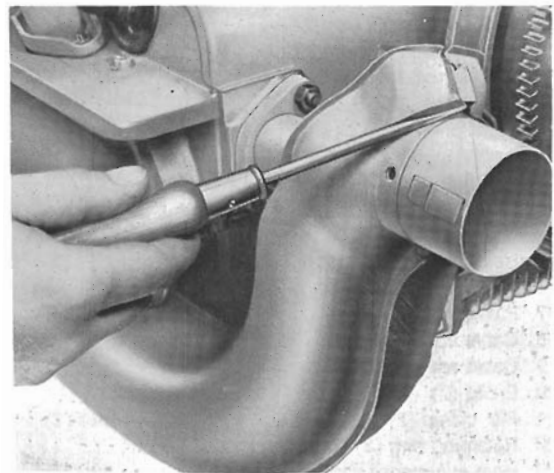
To replace the outlet pipes, use a 6-mm (1/4-in.) drill to drill out the spot welds as shown in Fig. 4-2.

CAUTION —

If you lack welding skills and equipment for installing the new outlet pipes, we suggest that you leave such repairs to an Authorized VW Dealer or other qualified shop.

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After drilling, pry up the lip that holds the heat exchanger casing together (Fig. 4-3). Then bend the casing slightly apart and remove the outlet pipe.



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Fig. 4-3. Heat exchanger casing halves being separated.

After removing the old outlet pipe, inspect the metal in the heat exchanger casing to make sure that it is sound. Keeping the heater flaps open, tack-weld the new outlet pipe to the heat exchanger. Then coat the pipe with cold zinc paint or a heat-resistant equivalent.

5. EXHAUST SYSTEM

If you intend to disassemble the engine following its removal, the exhaust system is the first thing you take off. However, you can also remove and install the muffler and the heat exchangers with the engine still in the car.

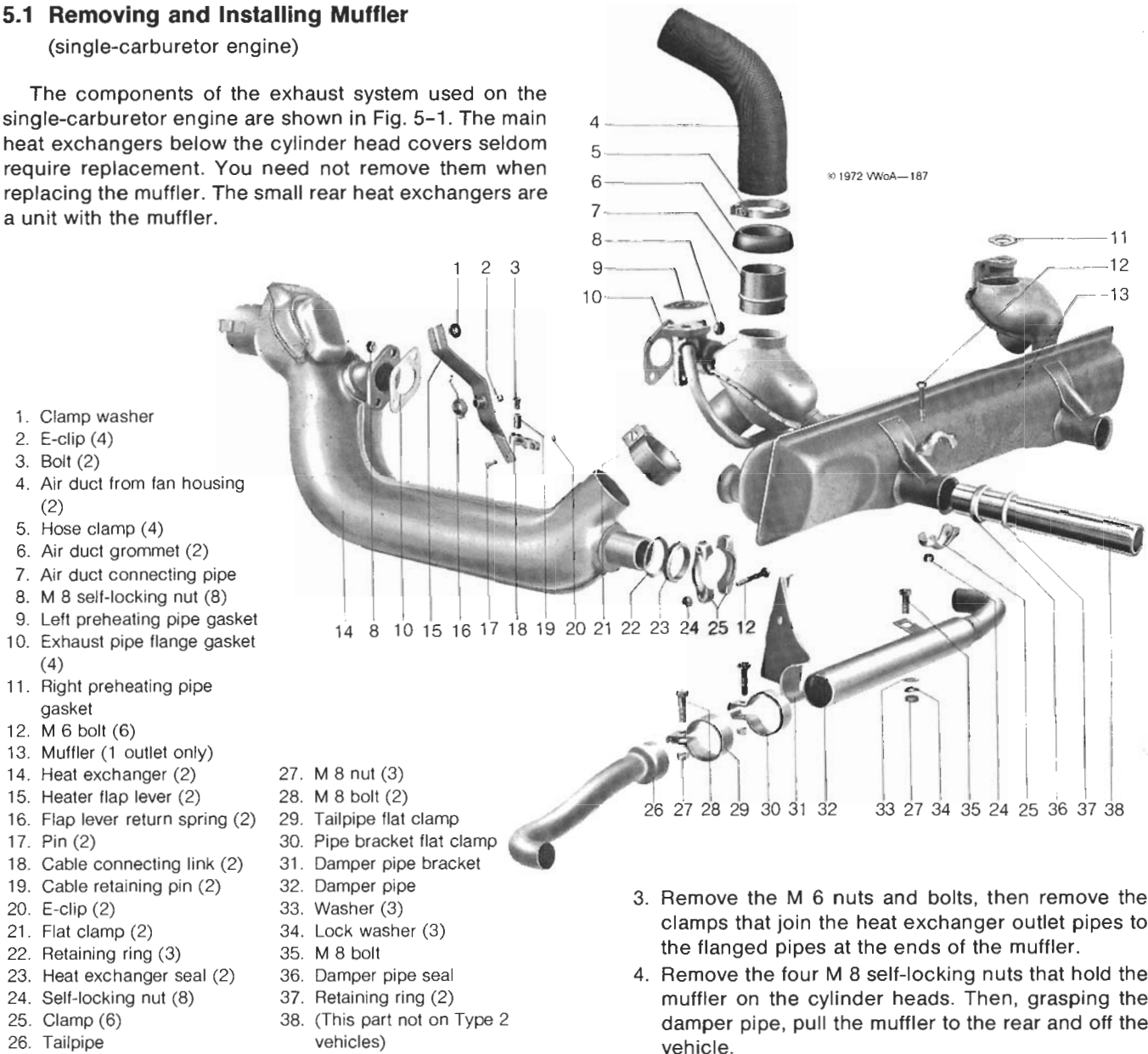


12 ENGINE AND CLUTCH

5.1 Removing and Installing Muffler

(single-carburetor engine)

The components of the exhaust system used on the single-carburetor engine are shown in Fig. 5-1. The main heat exchangers below the cylinder head covers seldom require replacement. You need not remove them when replacing the muffler. The small rear heat exchangers are a unit with the muffler.



- 1. Clamp washer
- 2. E-clip (4)
- 3. Bolt (2)
- 4. Air duct from fan housing (2)
- 5. Hose clamp (4)
- 6. Air duct grommet (2)
- 7. Air duct connecting pipe
- 8. M 8 self-locking nut (8)
- 9. Left preheating pipe gasket
- 10. Exhaust pipe flange gasket (4)
- 11. Right preheating pipe gasket
- 12. M 6 bolt (6)
- 13. Muffler (1 outlet only)
- 14. Heat exchanger (2)
- 15. Heater flap lever (2)
- 16. Flap lever return spring (2)
- 17. Pin (2)
- 18. Cable connecting link (2)
- 19. Cable retaining pin (2)
- 20. E-clip (2)
- 21. Flat clamp (2)
- 22. Retaining ring (3)
- 23. Heat exchanger seal (2)
- 24. Self-locking nut (8)
- 25. Clamp (6)
- 26. Tailpipe
- 27. M 8 nut (3)
- 28. M 8 bolt (2)
- 29. Tailpipe flat clamp
- 30. Pipe bracket flat clamp
- 31. Damper pipe bracket
- 32. Damper pipe
- 33. Washer (3)
- 34. Lock washer (3)
- 35. M 8 bolt
- 36. Damper pipe seal
- 37. Retaining ring (2)
- 38. (This part not on Type 2 vehicles)

3. Remove the M 6 nuts and bolts, then remove the clamps that join the heat exchanger outlet pipes to the flanged pipes at the ends of the muffler.
4. Remove the four M 8 self-locking nuts that hold the muffler on the cylinder heads. Then, grasping the damper pipe, pull the muffler to the rear and off the vehicle.

Fig. 5-1. Components of the exhaust system (1968 through 1971 models).

To remove muffler:

1. If the engine is in the car, loosen the two hose clamps. Then remove the air ducts and the air duct grommets. Remove the cover plates over the intake manifold preheater pipe connections, and unbolt the preheater pipes from the muffler. Then remove the crankshaft pulley cover plate, the rear cover plate, and the air duct connecting pipes.
2. Remove the screws and nuts from the flat clamps on the heat exchanger connections.

Installation is the reverse of removal. Inspect the muffler for leaks and damage and make sure that the exhaust pipe flanges that bolt to the cylinder heads are not warped. If you install a new muffler, also install a new tailpipe and damper pipe. Use new gaskets at all points. Torque the M 8 self-locking nuts to 2.0 mkg (14 ft. lb.) and the M 6 nuts and bolts to 1.0 mkg (7 ft. lb.).

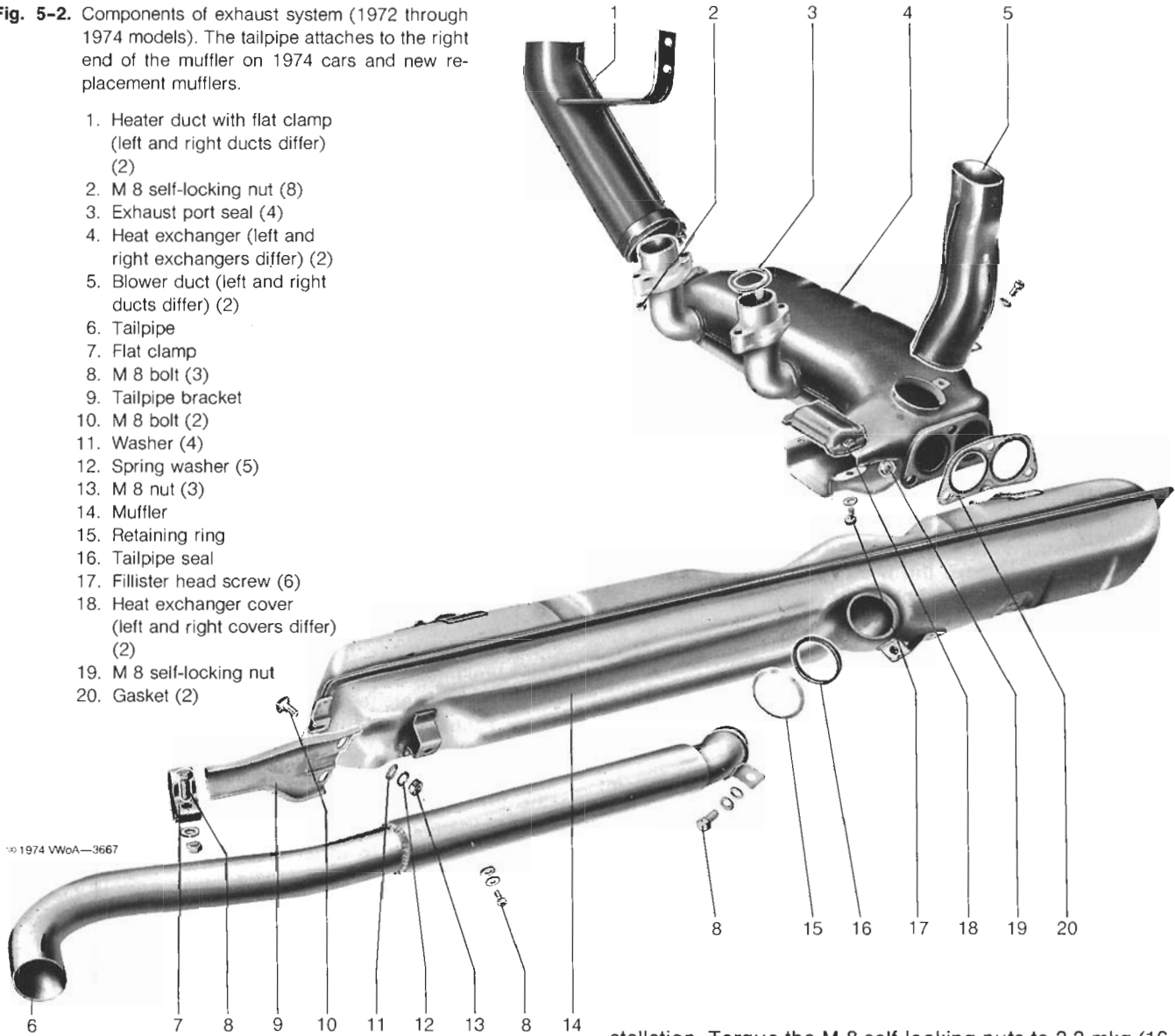
5.2 Removing and Installing Muffler

(dual-carburetor engine)

The components of the exhaust system used on the dual-carburetor engine are shown in Fig. 5-2. The main heat exchangers below the cylinder head covers seldom require replacement. You need not remove them when replacing the muffler.

Fig. 5-2. Components of exhaust system (1972 through 1974 models). The tailpipe attaches to the right end of the muffler on 1974 cars and new replacement mufflers.

1. Heater duct with flat clamp (left and right ducts differ) (2)
2. M 8 self-locking nut (8)
3. Exhaust port seal (4)
4. Heat exchanger (left and right exchangers differ) (2)
5. Blower duct (left and right ducts differ) (2)
6. Tailpipe
7. Flat clamp
8. M 8 bolt (3)
9. Tailpipe bracket
10. M 8 bolt (2)
11. Washer (4)
12. Spring washer (5)
13. M 8 nut (3)
14. Muffler
15. Retaining ring
16. Tailpipe seal
17. Fillister head screw (6)
18. Heat exchanger cover (left and right covers differ) (2)
19. M 8 self-locking nut
20. Gasket (2)



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Installation. Torque the M 8 self-locking nuts to 2.2 mkg (16 ft. lb.).

To remove the muffler, remove the 6 self-locking nuts from the studs that hold the muffler on the two heat exchangers. On 1973 and later vehicles, remove the union nut and disconnect the exhaust gas recirculation system pipe from the left front side of the muffler. Then grasp the muffler and tail pipe and pull them as a unit to the rear and off of the heat exchangers. If only the tailpipe is faulty, you can remove it separately without taking off the muffler. However, if the muffler must be removed, it is best to remove it together with the tailpipe, then separate the two parts following removal.

Installation is the reverse of removal. If you install a new muffler, also install a new tailpipe. Replace the heat exchanger flange gaskets and the tailpipe seal during in-

5.3 Removing and Installing Heat Exchanger (single-carburetor engine)

The heat exchangers are located just below the cylinder heads on either side of the engine. You must remove the muffler before you can remove the heat exchangers.

To remove:

1. Remove the two fillister head screws that hold the heat exchanger casing to the lower warm air duct plate under the cylinders.
2. Disconnect the heater control cable from the heater flap lever.