Failure of secondary air system (fault analysis guide)

E34, E36, E38, E39, E46, E52, E53, E31 / M60/1, M62 LEV, M73, M73LEV, S50, S52, S54, S62, M54, M52TU, M52, M44, M43TU

Complaint:  
- Failure of secondary air system  
- Entry in DME fault code memory "Throughput of secondary air system too low"  
- "Check engine" lamp illuminated on US vehicles

Cause:  
Past experience has shown that the failure of the secondary air system is not attributed to a component fault in the secondary air pump but rather to the secondary air check valve not closing/opening or the actuating relay sticking.  
- Secondary air check valve does not close:  
The secondary air valve is located between the secondary air injection channel (either integrated in the cylinder head or on the exhaust manifolds) and the secondary air pump.  
The electric valve switches through the vacuum from the intake system for the purpose of opening the secondary air check valve.  
Due to soiling, the electric valve can no longer close mechanically. Consequently, the secondary air check valve is also no longer closed. Hot exhaust gas constantly flows through the secondary air check valve thus damaging it and possibly also the secondary air pump.  
- Secondary air check valve does not open:  
The secondary air check valve will not open in the event of the diaphragm leaking or sticking. Consequently secondary air injection does not take place although pressure is applied by the secondary air pump.  
- Actuating relay stuck (sticking of relay make contacts):  
After starting the engine, the actuation time of the secondary air pump is from 2.5 to 105 seconds depending on the engine temperature and engine speed.  
The relay make contacts sticking or sporadically sticking result in continuous power supply or impermissibly long power supply to the secondary air pump.  
The secondary air pump is not designed for permanent power supply and is operated up to its destruction.

Affected vehicles:  
E31 / M73  
E34 / M60 B30  
E36 (incl. Z3) / M43TU, M44, M52, M52TU, M54, S50, S52, S54  
E38 / M52TU, M60 B30, M62LEV, M73, M73LEV  
E39 / M52, M52TU, M54, M62LEV, S62  
E46 / M43TU, M52TU, M54, S54  
E52 / S62  
E53 / M54, M62LEV  
Production period: from introduction of the secondary air system

Procedure:  
Proceed as follows in the case of customer complaint:  
- Actuation of secondary air pump via the DIS tester:
- **Secondary air pump is not operative:**

  Check whether voltage is applied at the secondary air pump.

  If not:
  Check electrical lines and plug connections of the secondary air system and replace the actuating relay if necessary.
  If so:
  Replace secondary air pump and actuating relay.

  Check whether the secondary air check valve is closed on conclusion of secondary air injection.
  For this purpose:
  Visually check the secondary air check valve for dirt/soiling at the pressure hose connection to the secondary air pump:

  No soiling:
  No further action necessary.

  Soiling (black particles/combustion residue) found:
  Replace secondary air check valve and electric valve (= solenoid valve that switches the vacuum from the intake system through to the secondary air check valve).

- **Secondary air pump operative:**

  Check the vacuum hoses from the intake system to the secondary air check valve as well as the pressure hoses and pressure lines from the secondary air pump to the engine for leaks and correct installation:

  If necessary, replace or correctly install leaking lines, leaking or bent hoses.

  No fault found in lines or hoses:
  In this case, the secondary air valve is stuck or its diaphragm leaking and therefore does not open.
  Replace secondary air check valve.