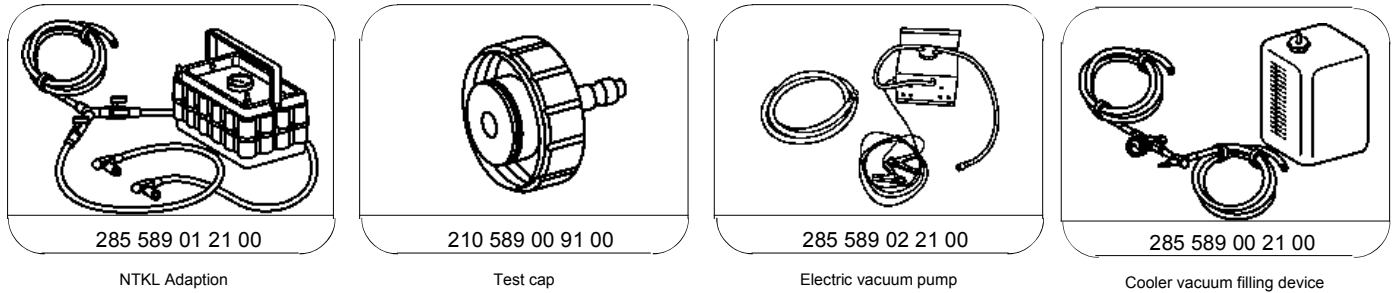


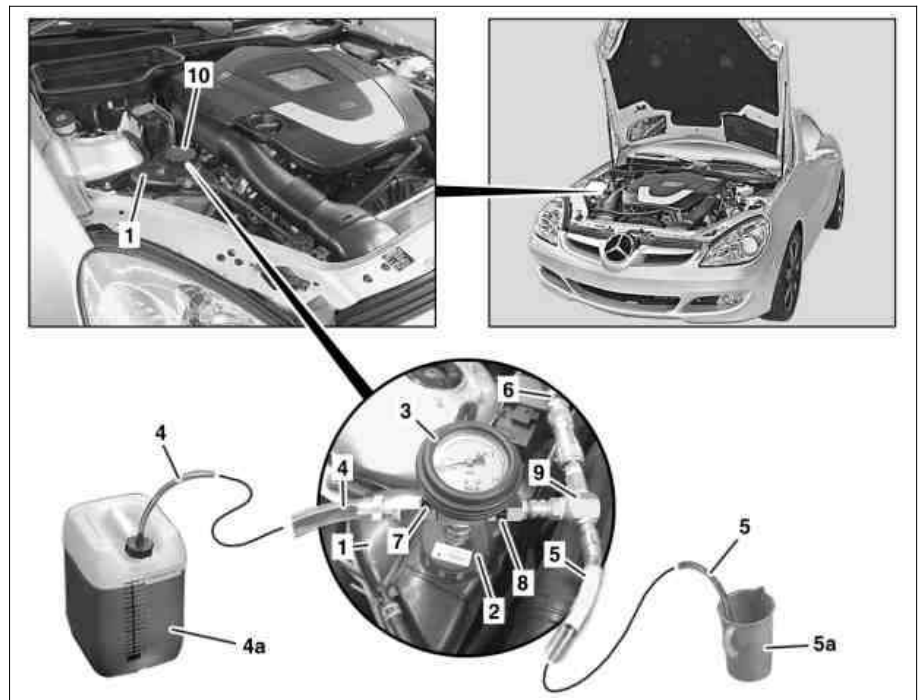
Engine 133, 152, 155, 156, 157, 159, 176, 177, 178, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279
 Engine 157, 176, 177, 279, 642
 Engine 607, 628, 629, 642, 651



i Engine 133, 157, 274, 276.8, 278, 279
 Engine 157, 176, 279
 Engine 176, 177, 178
 Engine 642 in model 164, 166, 204, 207, 211, 212, 213, 218, 222, 238, 251, 253, 292
 Engine 651
 Also repeat the ventilation process for the low-temperature circuit.
i Only ventilate the engine cooling system for a cold engine.

i **☞** The drainage container for NTKL adaptation (13) should be emptied after beginning work.

Shown on engine cooling system main circuit in model 171




P20.00-2250-06

- 1 Bring coolant reservoir (4a) of the **☞** vacuum-type cooling system filler to the same height as the coolant expansion reservoir (1).
- 2 **☞** Unscrew cooling system closure cap (10) and screw on tester cap (2) at coolant expansion reservoir (1).

- 8 Connect compressed-air hose(6) to Venturi nozzle(9) and apply pressure.


i The overpressure in the compressed air supply must be at least about 8 bar so that sufficient vacuum can be generated through the Venturi nozzle (9).

3 Attach the control unit (3) to the  tester cap (2) .

4 Attach Venturi nozzle(9) to control unit(3).


5 Close drain valve (8) and feed valve (7).

6 Place feed hose (4) of the coolant on the coolant reservoir (4).

 In order to avoid suctioning up of air in coolant reservoir (4a) and for completeness of the filling capacity of the engine cooling system in the vehicle, always completely fill up the coolant reservoir (4a).

7 Guide waste air hose (5) into an empty container (5a).

9 Open the drain valve (8).

 A vacuum is created in the engine cooling system.

10 Open feed valve (7) until feed hose (4) has filled with coolant and subsequently close feed valve (7) again.

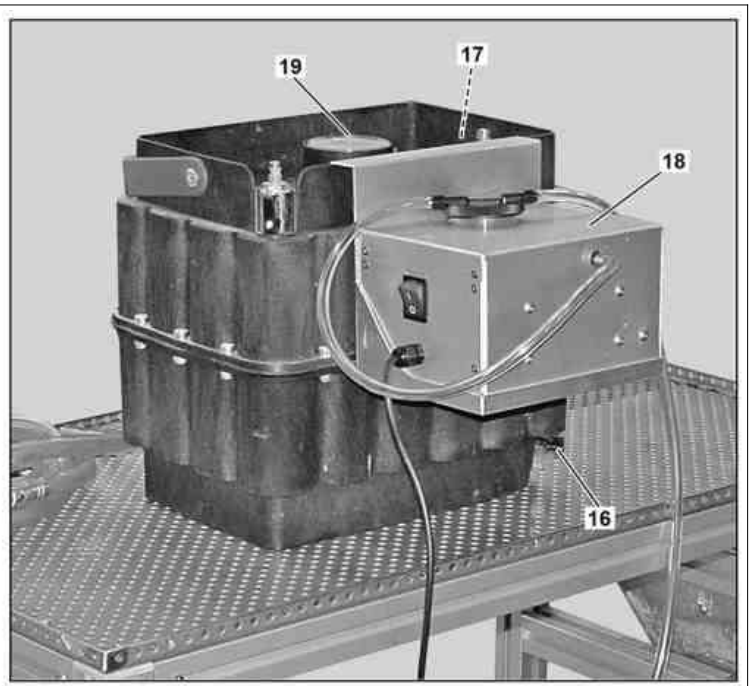
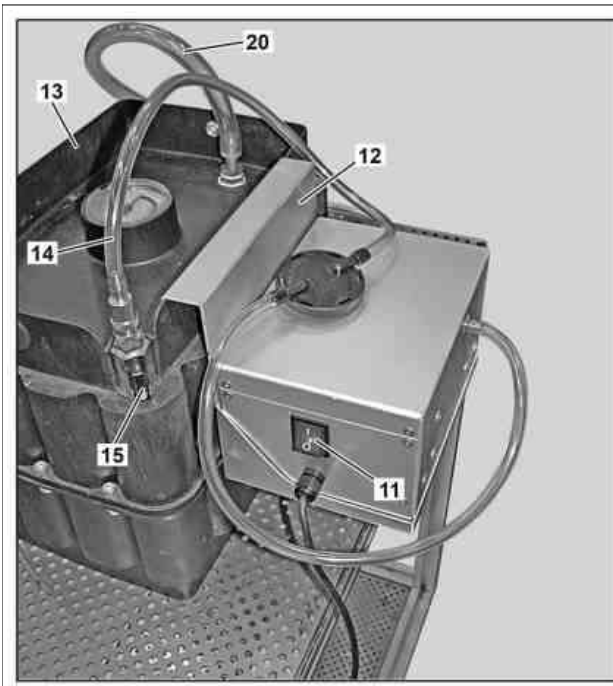
11 Close drain valve (8) if display of the control unit (3) is in the green area.

12 Remove compressed air hose (6) from the Venturi nozzle (9) and monitor whether the vacuum remains stable for 30 seconds.


If this is not the case.


Check hoses and connections for damage, repair if necessary and again create a vacuum.


13 Close feed valve (7) and drain valve (8).








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14 Bring switch (11) of the  electrical vacuum pump (18) in position 0.

 The vacuum indicator (19) must indicate at least -0.9 bar.

15 Connect positive and negative terminal of  electric vacuum pump (18) to a suitable 12 V voltage source.


22 Open the drain valve (8).


- i** Observe polarity of the positive and negative terminal of the  electrical vacuum pump (18).
- 16 Hook bracket (12) into the  NTKL adaptation (13).
- 17 Connect hose (14) to the  NTKL adaptation (13).
- 18 Close off shutoff valves (15, 16, 17).
- 19 Attach hose (20) to the  NTKL adaptation (13).
- 20 Decouple venturi nozzle (9) and replace by a hose (20).
- 21  Switch in electrical vacuum pump (18) and open stopcock (15).


i The feed valve (7) must remain closed.

i Evacuate the whole engine cooling system for 5 minutes. The indicator for the vacuum indicator (19) must be above the -0.9 bar marking.

23 Close drain valve (8).

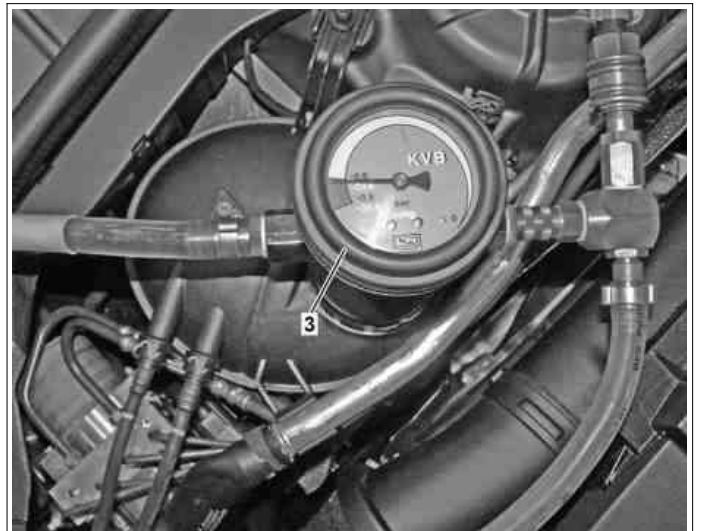
24  Switch off electrical vacuum pump (18).

i Bring switch (11) of the  electrical vacuum pump (18) in position 0.

25 Remove hose (14) and reduce vacuum in  NTKL adaptation (13) until vacuum display (19) shows 0.0 bar.

26 Check the whole engine cooling system by means of a visual inspection for 30 s for leaktightness.

Shown on engine cooling system main circuit in model 231




P20.00-2498-11

27 Open feed valve (7).

i The engine cooling system is filled.

i The filling process is over once the control unit (3) shows 0.0 bar.

28 Open drain valve (8) if coolant is no longer suctioned.

29 Remove control unit (3) with all connections and  tester cap (2).

30 Correct coolant level in coolant expansion reservoir (1).

31 Screw cooling system cap (10) onto coolant expansion reservoir (1).