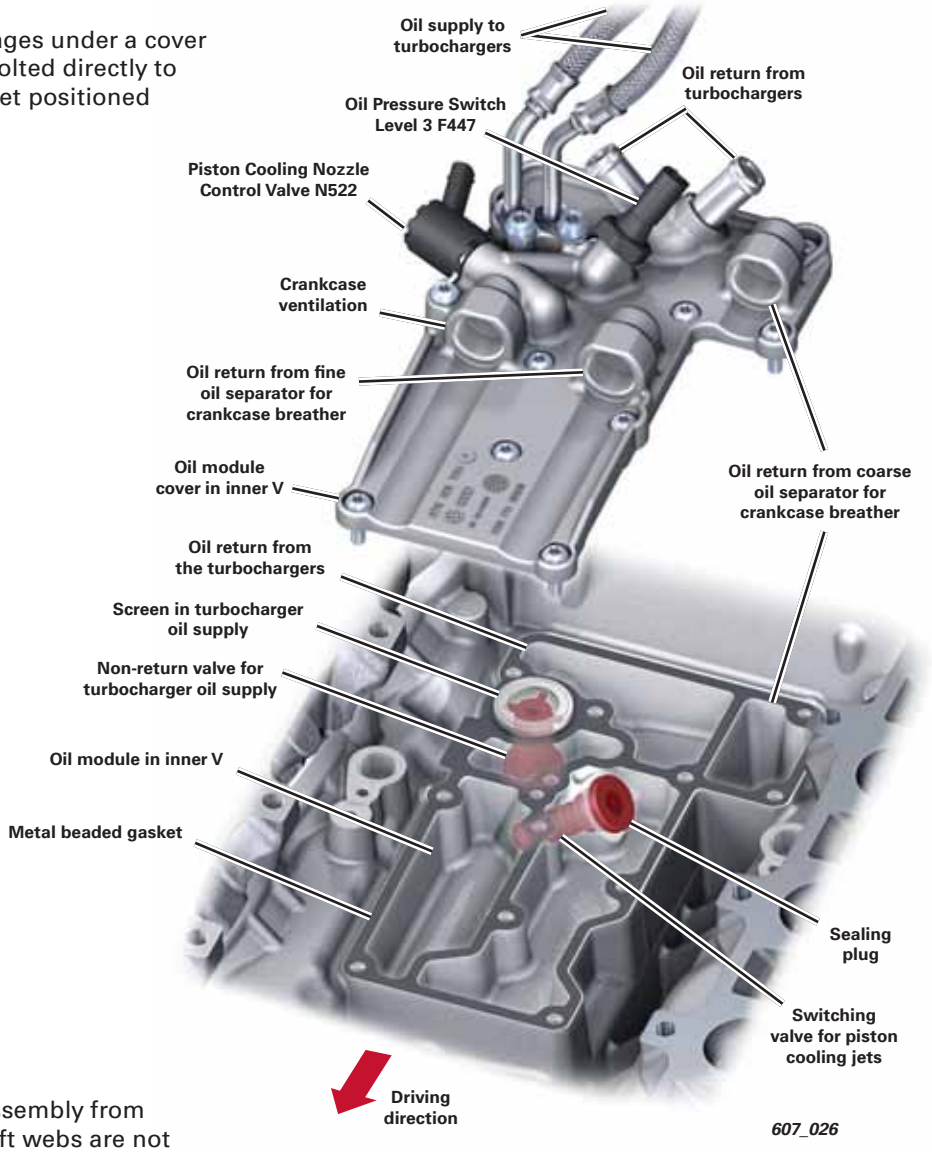
Oil Module in the Inner V

There are numerous oil supply passages under a cover in the V of the engine. The cover is bolted directly to the cylinder block, with a metal gasket positioned between them.



Windage Tray

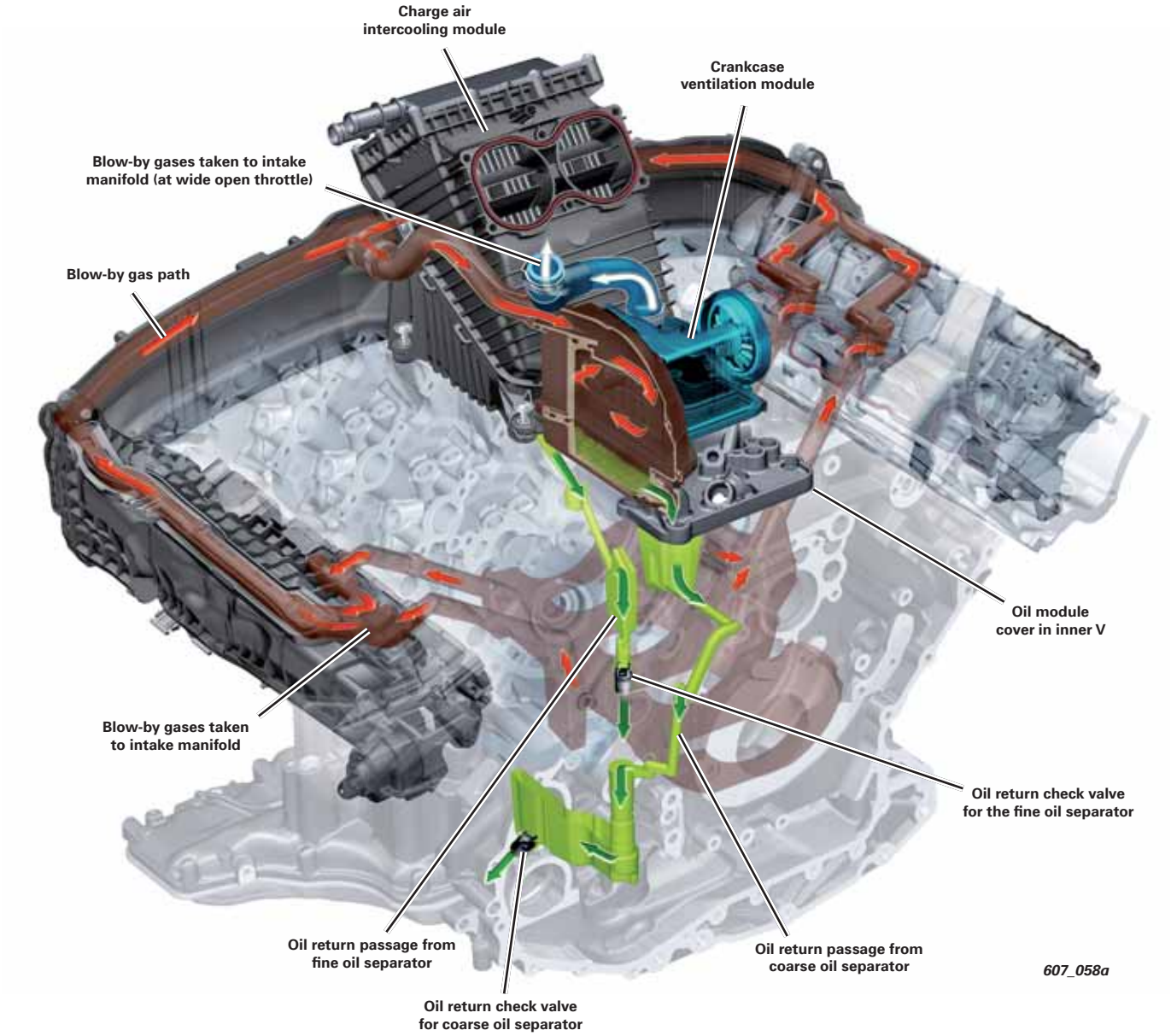
This tray separates the crankshaft assembly from the oil pan. As a result, the crankshaft webs are not immersed directly in the engine oil. This prevents foaming at high engine rpm. To reduce the weight of the engine, the windage tray is made of plastic.

Crankcase Breather and Ventilation

Crankcase ventilation takes place over both cylinder heads. The blow-by gases are taken into the crankcase breather module through separate ducts that lead into the intake manifolds and charge air module.

The crankcase breather module is placed in the inner V of the engine and performs several tasks:

- Coarse oil separation
- Fine oil separation
- Pressure regulation through the pressure control valve
- Positive crankcase ventilation (PCV)



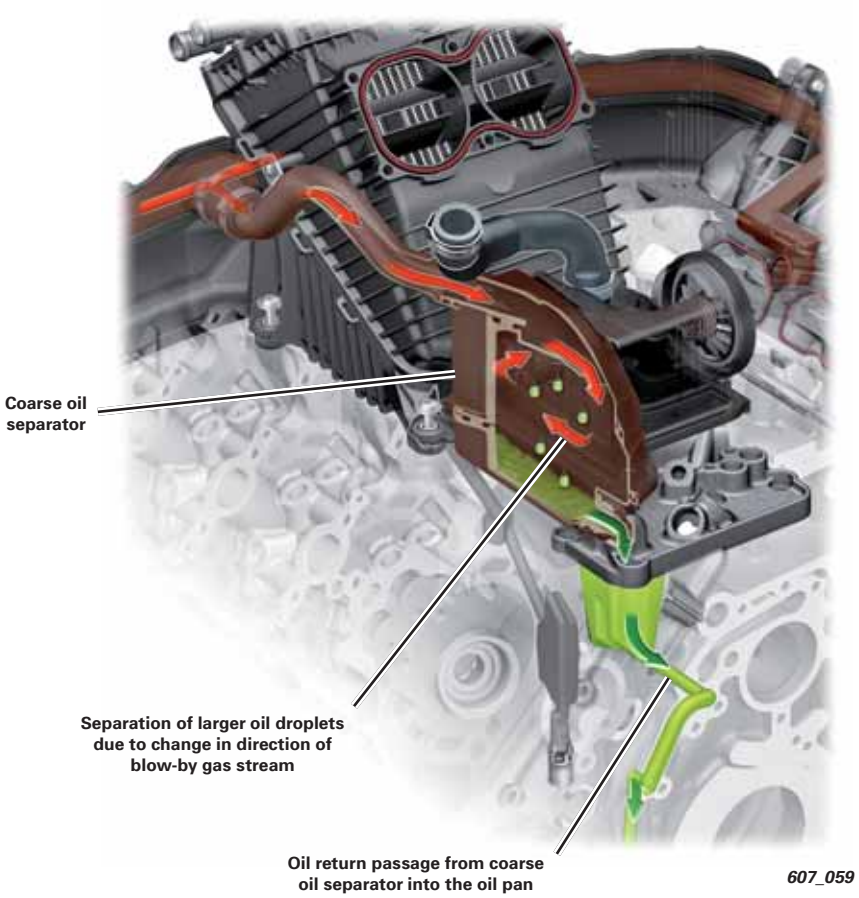
Note

Internal leaks in the oil return from the coarse oil separator can lead to increased engine oil consumption or blue smoke in the exhaust. The oil return check valves are integrated into the upper part of the oil pan. They cannot be replaced separately.

Coarse Oil Separation

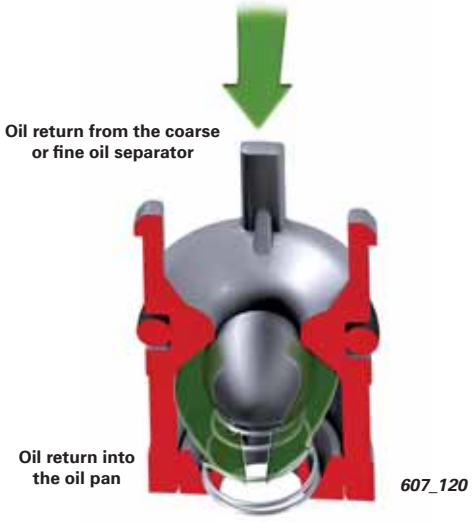
The blow-by gas stream makes a 180° change of direction in the first, large-volume chamber. Because the larger drops of oil have greater inertia, they bounce off the chamber wall and run into the collector on the floor of the heavy oil separator. A drain opening is located there. It is attached to the cover of the oil module in the inner V.

The draining oil runs through a return passage below the oil level of the oil pan. An oil return check valve closes automatically when the engine is running, triggered by pressure differences in the crankcase and oil mist separator. This prevents untreated blow-by gases from flowing past the fine oil mist separator.



Oil Return Check Valves

Two oil return check valves are located inside the oil return passages. They prevent untreated blow-by gases from being sucked out of the crankcase. The valves are spring-loaded ball valves clipped into the upper part of the oil pan.



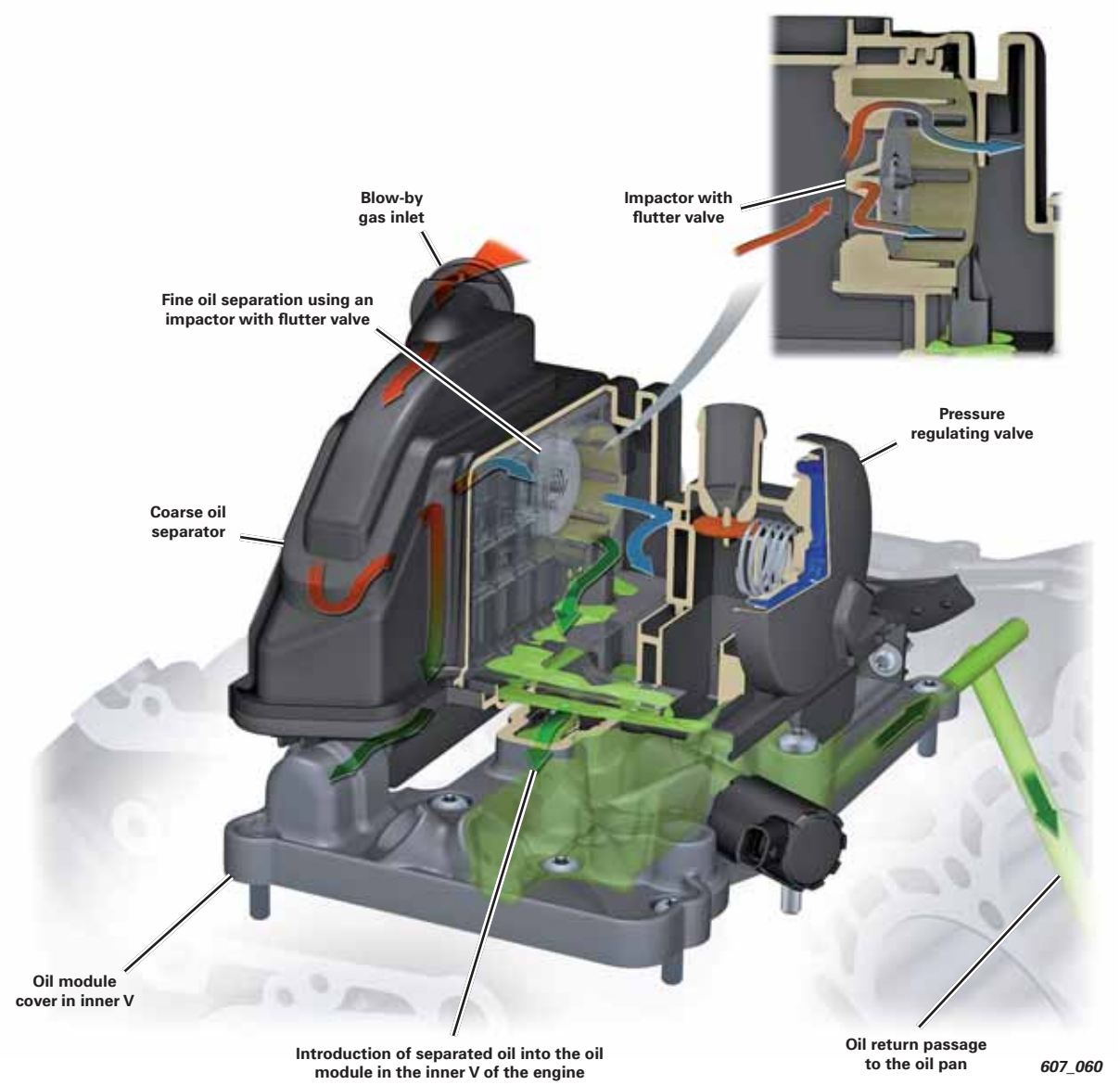
Fine Oil Separation

From the coarse oil separator, blow-by gases reach the second chamber through the fine oil separator. It contains the impactor, pressure regulator valve, blow-by valves, and the PCV valve.

The blow-by gases are cleaned first in the fine oil separator, which works on the principle of an impactor. It also works in conjunction with a pressure restriction valve that opens during increased blow-by volume flow. This limits pressure loss over the entire system.

The separated fine oil, like the coarse oil, is returned to the oil pan over a separate connection in the inner V of the engine. A non-return valve is also installed here.

Treated blow-by gases flow through the single-stage pressure regulator valve. Depending on the pressure ratio in the air supply, the blow-by gases are taken for combustion via the integrated blow-by valves in the charge air module or the crankcase ventilation module.



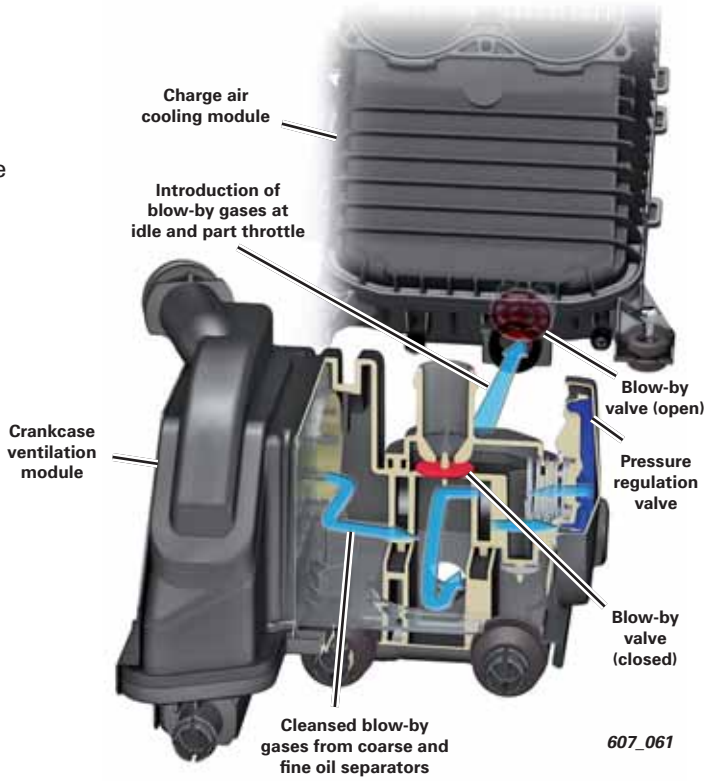
Reference

For further information about the construction and operation of an impactor, refer to Self-Study Program 920113, *The 6.3L W12 FSI Engine.*

Introduction of Cleaned Blow-By Gases

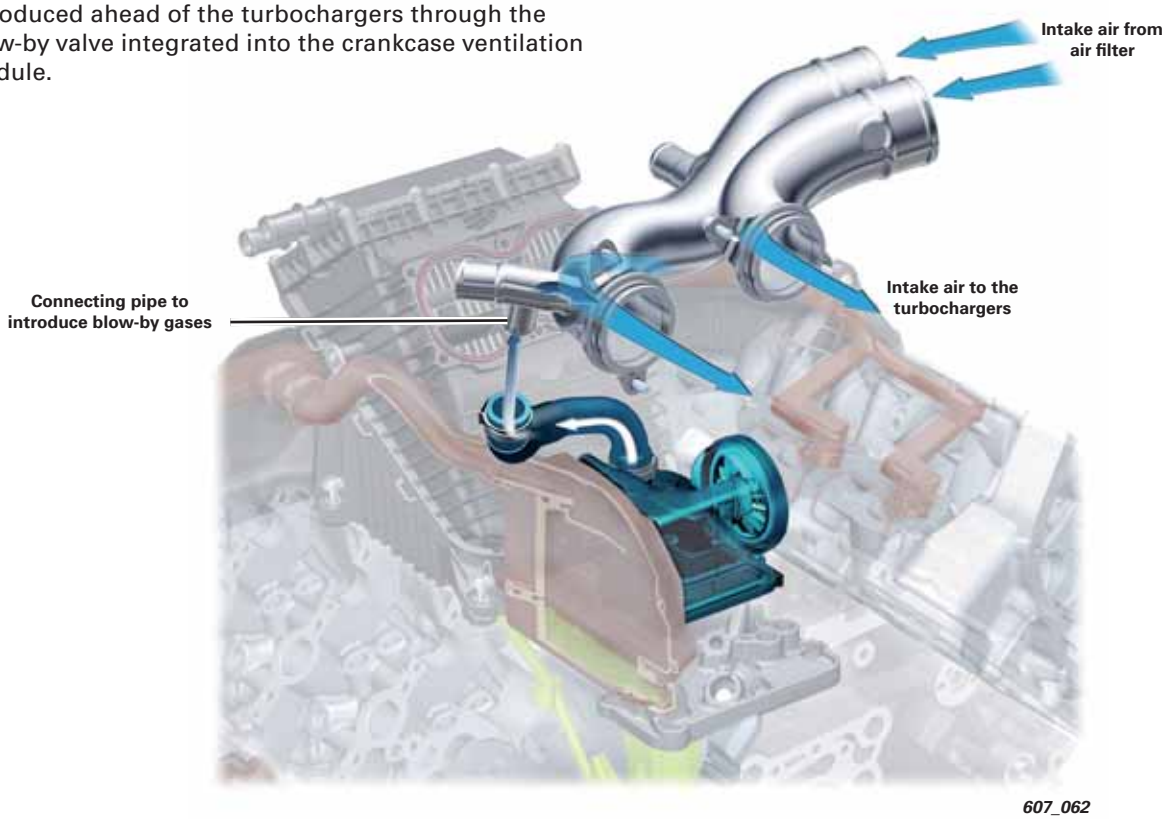
Idle and Part Throttle Operation

Vacuum is present in the air supply at idle and at partial load. The treated blow-by gases are admitted into the charge air cooling module. In the process, the blow-by valve for idle and partial load is opened by the suction effect.



Wide Open Throttle Operation

When there is positive pressure in the charge air module during turbocharged engine operation, the blow-by valve integrated into the charge air module closes. The cleansed blow-by gases are now introduced ahead of the turbochargers through the blow-by valve integrated into the crankcase ventilation module.



Crankcase Ventilation (PCV)

Fresh air is admitted into the crankcase via the positive crankcase ventilation module. The crankcase is ventilated at idle and at partial load only. The fresh air flows into the positive crankcase ventilation module through the “full throttle” blow-by connection.

A specified volume of fresh air is introduced over a plate valve and a drilling in the crankcase breather module through a connection in the cover of the inner V into the crankcase. If the engine is in turbocharged operation, the plate valve closes because of pressure differences.