

HOWTO: Diagnose the Dynamic Oil Pressure Warning System

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Do any of these symptoms sound familiar???

“My oil light has started to come on when my car is hot”

“The oil buzzer goes on after I’ve driven on the highway for a while; if I rev the engine the buzzer goes off”

“My oil light came on but my oil level is fine”

“My oil buzzer comes on when the engine slows to around 2000 RPM;. It’s fine at 3000 RPM or at idle.”

Any of the above are telling you it's time to check out your oil pressure. Note I said "pressure" not "level"; the warning system does not detect low oil level (unless the level is so low the oil pump sucks in air of course). The warning lights and buzzers may be the sign of broken wires or sensors OR you may actually have an oil pressure problem. If this is the case you are shaving months off your engine's life every minute you keep driving.

Low oil pressure problems are typical of high-mileage VWs with worn bearings and oil that is hot and therefore thin. The combination of thin oil and worn bearings means that the oil pressure is marginal at lower RPMs where the oil pump is not spinning as fast as it does on the highway.

In order to understand why this happens we need to understand VW's interesting warning system.

Volkswagen's "Dynamic Oil Pressure Warning System";

VW uses an oil pressure warning system that has two sensors.

(1)
A conventional low-pressure sensor, usually on the driver's side of the head.

It is normally closed and opens at 0.25 bar. The car always pays attention to this sensor and when this sensor trips the low pressure light comes on. This is the sensor that turns on the low oil pressure light when you turn the key to "on"; without starting the car. This sensor is not connected to the oil pressure warning buzzer. It's

typically blue in colour and is connected to the wiring harness with a blue/black wire.

Note that on 16V and V6 gassers this sensor is usually located on the oil filter flange.

(2)

A hi-pressure sensor located on the oil filter flange.

It is normally open and closes at a fairly high pressure depending on engine type (1.8 bar for gassers, 1.4 bar for normal diesels and some turbo diesels, 0.9 bar for MK3 turbo diesels). The car only watches this sensor when the engine is over 2000RPM and when this sensor goes off the oil buzzer will sound and the oil pressure light to flash. It's typically white, grey, or black in colour and is connected to the wiring harness with a yellow wire.

Why the complexity? The idea is that oil pressure that's OK when the engine is idling is not the same pressure that's OK when you're roaring down the highway. At idle a pretty low pressure is fine, but that pressure would be a big problem at highway speeds. Hence, a warning system that knows the difference:

Schematically, the system looks like this:

Troubleshooting:

Now that we understand the dual-sensor of the oil warning system troubleshooting is pretty straight forward:

- a flashing light, by itself, is the function of the low pressure sensor on the head

- a flashing light and buzzer are a function of the high-pressure sensor on the filter flange.

- the car only looks at the high pressure sensor when the car is over 2000 RPM.

Troubleshooting steps:

1)

Warm the engine up to full operating temperature (rad fan has cycled at least once) and then shut the engine off.

2)

Turn the key to "on"; the oil pressure warning light should come on thanks to the lo-pressure sender on the head. If the light doesn't come on there's a problem with the lo-pressure sender, the wiring to that sender, or the dash cluster. A test light between the sensor and the positive battery post should light when the car is off and go out when the car is idling, if the sensor is ok.

3)

Start the engine; the oil pressure warning light should go out. This tells you the engine has oil pressure appropriate for idle. If the light does not go out you have low-pressure sensor problems or oil pressure problems: STOP and figure it out before driving away !

4)

Slowly rev the engine up to 2500 RPM; the light should stay out and the buzzer should be quiet. If the buzzer sounds you need to troubleshoot the hi-pressure system:

a.

Disconnect the wire to the hi pressure sensor on the filter flange and let it dangle. The oil buzzer should now come on above 2000 RPM

b.

Now ground the yellow wire and rev the engine past 2000 RPM; the buzzer should not sound.

c.

If you fail either of these tests you have sensor issues, wiring, or cluster issues.

d.

A test light between the sensor and the positive battery terminal should be off at warm idle and come on as you rev the engine, if the sensor on the flange is working properly. If the buzzer still sounds with the wire to the sensor grounded the problem is most likely the wiring to the cluster or the cluster itself.

If you have a diesel:

As you now know the cluster needs to know engine RPM in order to tell which sensors to monitor. If you have a diesel the cluster reads RPM from the W terminal on the alternator. If that signal is missing or erratic, your tach will be doing funny things and so will your oil pressure warning system. Often oil pressure buzzer issues show up at the same time as a tach issue. In particular, if your tach reads too high it may trick the cluster into expecting the oil pressure to be high as well, and the buzzer will go off.

I seem to have low oil pressure; what can I do ??

The first thing to do is to confirm you really have an oil pressure problem. A cheap oil pressure gauge (Napa, Autozone, Canadian Tire, etc) connected to the oil filter flange will let you measure the one specification VW gives:

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2000 RPM

- oil at normal operating temperature (rad fan has cycled once)

- 2 bar (29 psi) minimum

<picture of cheepo gauge>

Note that the test spec is given with the engine hot… get out there for a spirited drive and bring your engine all the way up to full operating temperature before taking an official reading.

If your oil pressure is almost OK (ie gets dodgy around 2000 RPM) there are a few things you can try to buy yourself a little time:

- switch to a thicker oil… something like a good 20W50 for summer driving (if you live in a reasonable warm climate) or a wide range synthetic... something like a 5W40 or 5W50

- ensure you are running a quality OEM (Bosch, Mann, etc) filter … the cheap ones (particularly the one in the orange can) are known to not flow as well as stock

- check to see if your engine is overheating and therefore overthinning the oil

If these bandaids don't do the trick it's time to break out the wrenches:

- pull the oil pan and check to see if the oil inlet

screen is clogged with crud

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remove the oil pump and check for wear… the Bentley manual shows the procedure which uses feeler gauges to measure a couple of key wear points. In truth they very rarely wear out… they are a robust design and are the best-lubricated part of the engine, but it’s only two bolts to confirm. I personally don’t recommend arbitrarily replacing the oil pump at the first sign of oil pressure trouble… as I say they very rarely fail.

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Tear down the engine and replace the main and rod bearings. Although not recommended, this can be done with the engine in the car after pulling the oil pan.

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If you have a diesel the intermediate shaft bearings are a common wear area due to people overtightening the timing belt, and they can cost a lot of oil pressure when they start to flake. For all intents and purposes the engine has to come out to replace the intermediate shaft and bearings if you have a transverse-mounted engine (Rabbit, Golf, Jetta). Folks with Quantums and Foxes can evidently get to it without pulling the engine, as per the comment below.

Summary Table:

function
location
wire colour
sensor colour
pressure
P/N

low pressure
sensor
head
black/blue
blue
0.25 bar
028 919 081 D

high pressure
oil filter flange
yellow
white
1.8 bar
056 919 081 E

black
1.4 bar
068 919 081

grey
0.9 bar
068 919 081 A

<end of HOW-TO>