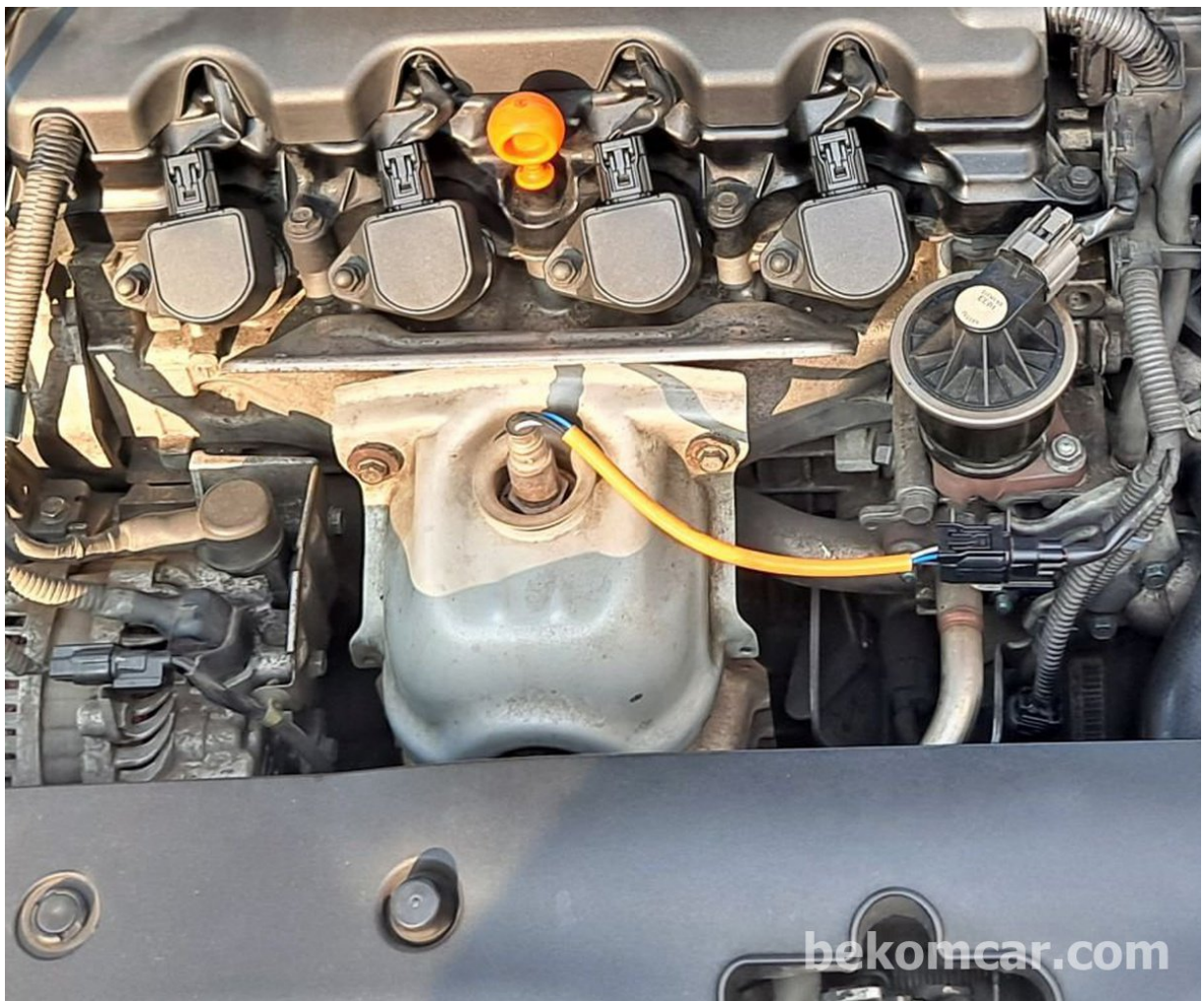


[Common, Software & diagnosis]

What O2 sensors and how many are there?

<https://bekomcar.com/en/tutorial/pdf/66/>

Generally, 4 cylinder engine has two sensors, one each before and after the catalytic converter. For V6 and V8 engines with dual exhaust systems have a total of 4 oxygen sensors. Normally, upstream or sensor 1 is before the catalytic converter and downstream or sensor 2 is located after the catalytic converter.



What are oxygen sensors called?

Before the catalytic converter has a few names, upstream sensor, pre catalytic sensor, sensor 1 or S1. After the catalytic converters are called downstream sensor, post catalytic sensor, sensor 2 or S2.

Where are they located?

Four cylinder engine has only one bank, Bank1. So, there are two, one each before and after the Bank 1 catalytic converter. For V6 or V8, there are two banks, Bank1 and Bank2. Each bank has upstream and downstream O2 sensors located before and after the catalytic converter. Yes, each Bank has two O2 sensors.

What are the roles of oxygen sensors?

1) Upstream sensor (S1)

S1 is different from downstream sensors. The main job of upstream sensor is to monitor the left over oxygen in the exhaust gas and report the result to engine control module (ECM). ECM uses such data to control the amount of fuel into the cylinder for combustion. ECM does this by controlling the injector open time.

2) Downstream sensor (S2)

In the meantime, down stream O2 sensor (S2) monitors if the catalytic converter is working properly. Should the catalytic converter is not working properly, the post catalytic converter O2 sensor reports such problem to the ECM.

What are some examples?

When OBD2 scanner reads, depending upon engine type there could be B1S1, B1S2, B2S1 and B2S2. B1S1 means upstream O2 sensor of Bank1, B1S2 means downstream O2 sensor of Bank2. By the same interpretation, B2S2 means downstream O2 sensor of Bank2.

How do sensors communicate to ECM?

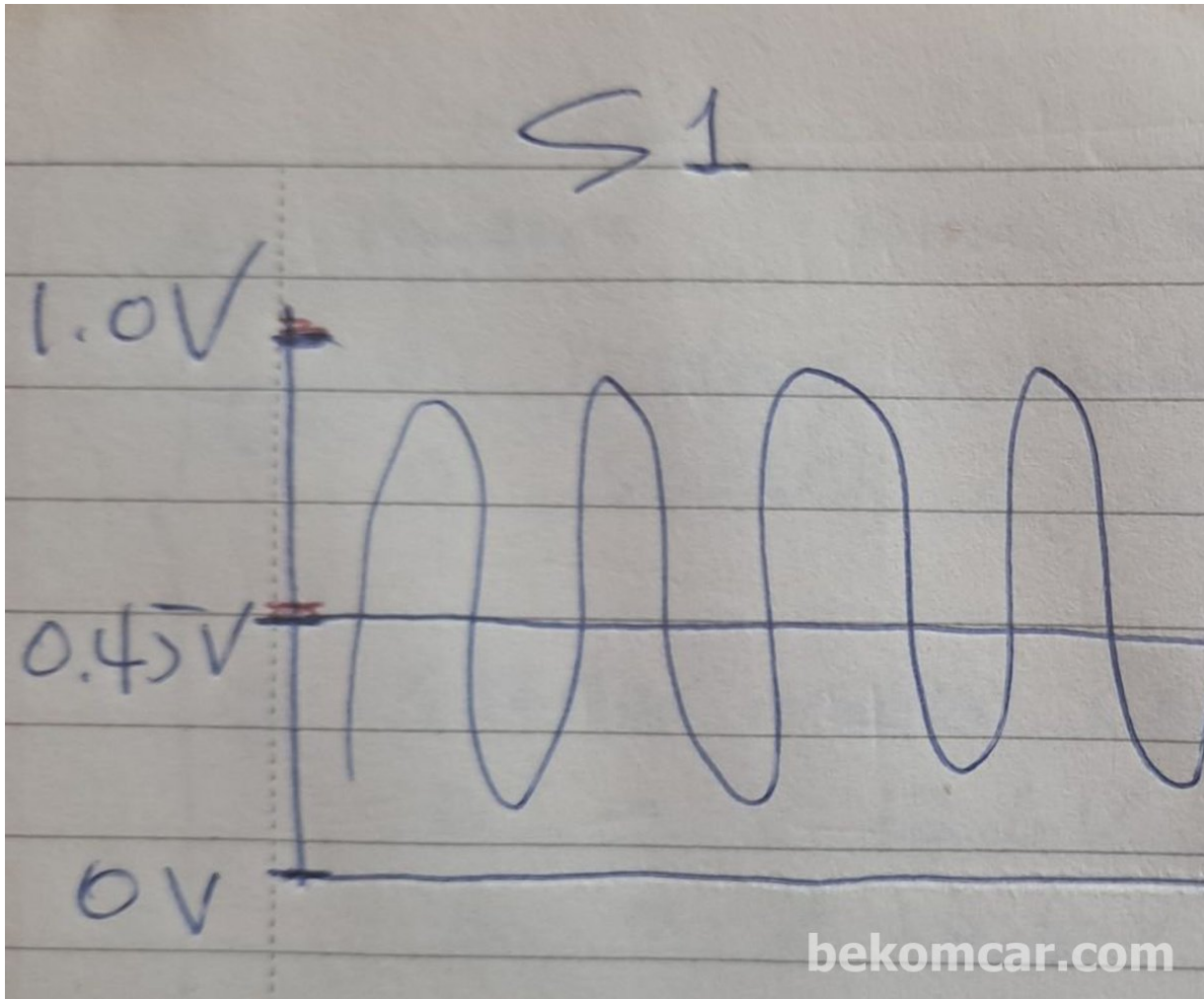
Normally, S1 and S2 send voltage data to the ECM. Of course, then such voltage is converted into the format ECM understands. These voltage sent by S1 is normally between 0.1V~0.9V. For S2, voltage is normally 0.6V~0.9V.

What are wide band O2 sensors?

Recently sold vehicles may have what they call 'wide band' oxygen sensor which differs from existing 'narrow band' O2 sensor. Narrow band O2 sensor typically tells the ECM whether the engine is running rich or lean. It is either rich or lean condition. Narrow band O2 sensors can not

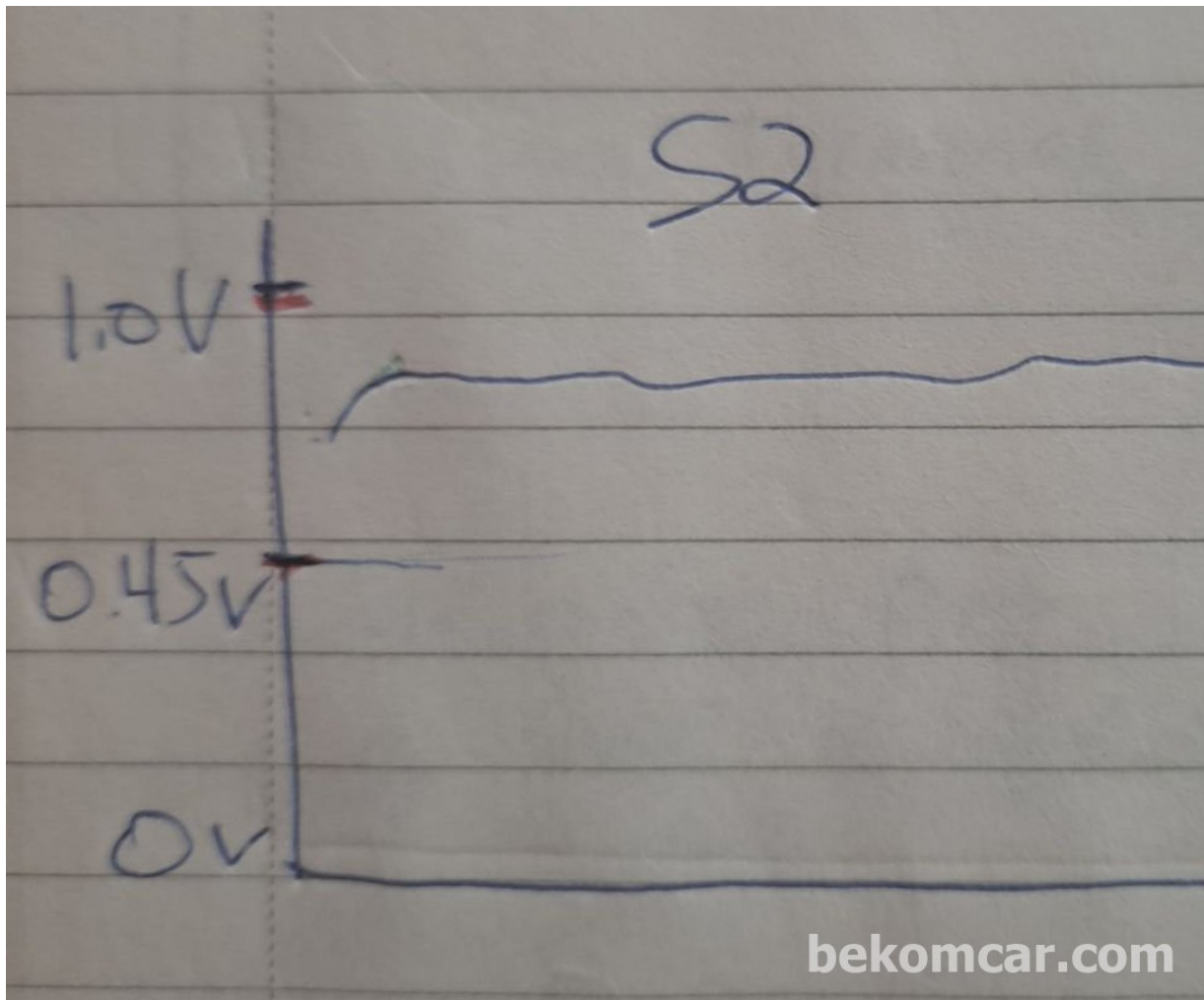
tell how rich or how lean the engine is running. Wide band O2 sensor addresses such issues much better with much wider band monitoring capability.

(1) Upstream O2 sensor frequency

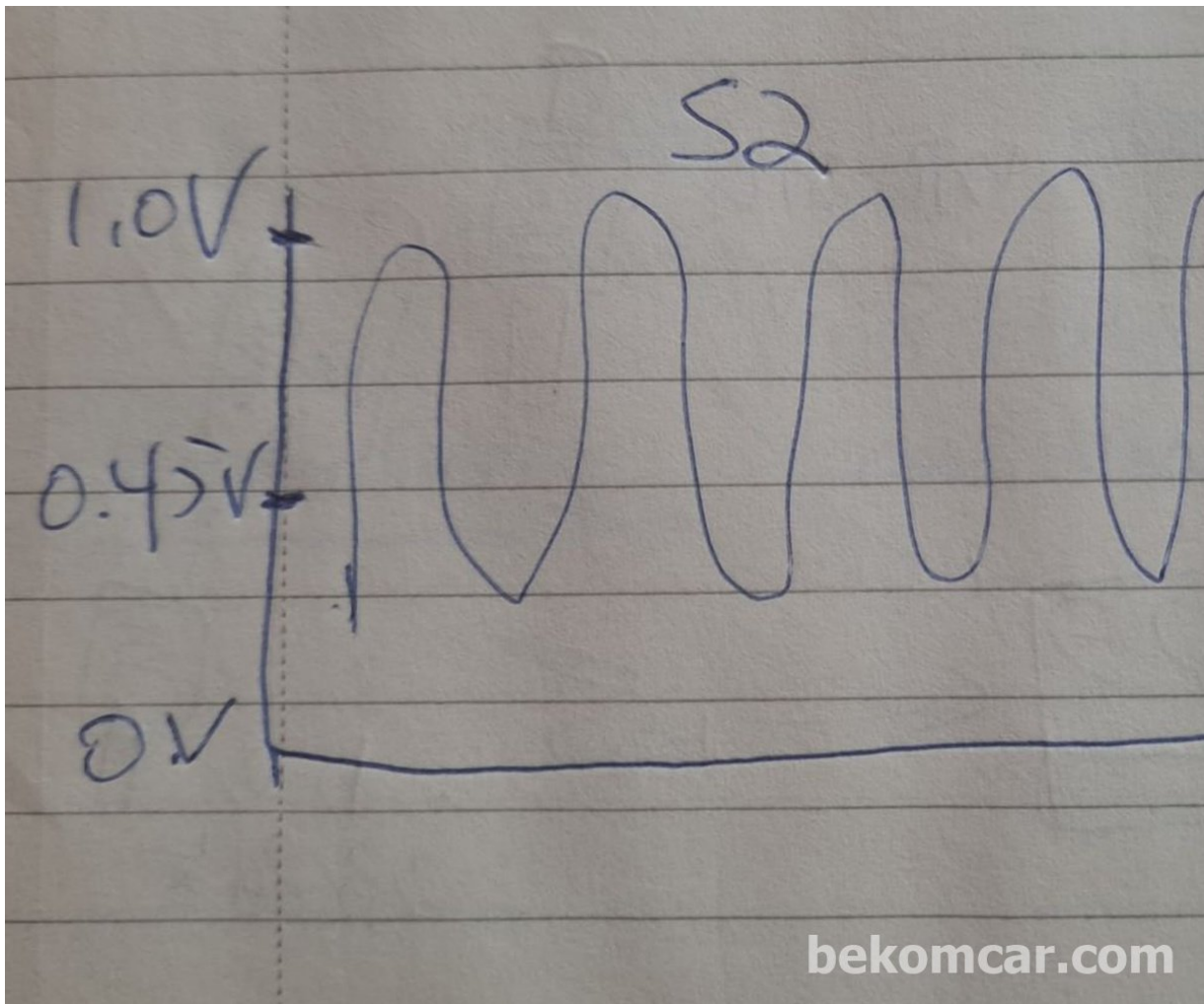


The sine wave format of O2 sensor is normal and working in good condition.-

(2) Downstream O2 sensor comparions



Properly working S2 frequency. This means the catalytic converter is in good condition.-



Frequency with some issues. This means the catalytic converter is NOT in good condition or O2 sensor is malfunctioning.-

References

1. <https://www.aa1car.com/library/wraf.htm>
2. <https://www.fixdapp.com/blog/oxygen-sensor/>
3. <https://www.taloredge.com/reference/Science/oxygensensor3.pdf>
4. <https://www.haltech.com/oxygen-sensors-and-wideband-controllers-explained/>
5. <https://www.techtips.ie/Blue-Print/diagnosing-wide-band-o2-sensors.pdf>

Related contents & Comments

1.  Vehicle diagnostics, OBD2, DTC basics - 101
2.  Check engine light (CEL) on your dashboard
3.  Bank1 sensor 1 oxgen sensor health status
4.  P0171, Bank1 system lean diagnostic trouble code (DTC)
5.  Understanding the basics of storage devices used in automobiles
6.  STFT (단기연료보정값) 과 LTFT(장기연료보정값) 기본 이해하기
7.  산소센서 전체적인 배우기
8.  Global OBDII, Pete Meier & Jerry Truglia
9.  차량떨림 과 간헐적인 경고등 발생
10.  P06A6 Sensor Reference Voltage A Circuit// 5V Reference circuit

8세대 시빅 산소센서 토크는 45Nm 이다. 아마도 대부분 혼다 차량은 비슷한 토크값일것이라 판단된다. 항상 작업하는 차량의 메뉴얼을 참조한다. .

Feb. 24, 2022, 2:43 p.m., #C438, (@sunjoo.moon)

리저라인, 오딧세이 등도 44~45Nm 로 한다. 메뉴얼에는 44Nm이나, 오래된 센서를 풀었다가 다시 조이기때문에 1Nm정도 더 조여준다. 그리고 볼트나 바디도 다 Iron 이기에 1Nm정도는 아무런 문제가 없다.

Feb. 24, 2022, 2:43 p.m., #C438, (@sunjoo.moon)

 SunJoo Moon , Edit Date: Nov. 18, 2021, 4 p.m.

❗Disclaimer ! All cars are different, so please read the service manual for your vehicle before any repair work. bekomcar assumes no liability for property damage and/or injury incurred directly and/or indirectly as a result of any of the information contained in the website. Use this information at your own risk.