



John Lamb &lt;viamed.john.lamb@gmail.com&gt;

---

## Sensor Problem please read!!!

1 message

---

**Valeriy Gorbunov** <vgorbuno@yahoo.com>

Sun, Oct 6, 2013 at 6:22 PM

Reply-To: Valeriy Gorbunov <vgorbuno@yahoo.com>

To: Jerry Whatley <info@customrebreathers.com>

Cc: John Lamb <john.lamb@vandagraph.co.uk>

initial mV for all sensors are added on John's request, I have all mV logs from pressure pot test, let me know if you need it.

Jerry,

My name is Valeriy Gorbunov, I am a Megalodon rebreather diver, rig #1197.

Recently I purchased an oxygen sensor replacement from Nanaimo Dive Outfitters (Shirley), it is SC-I22D model, S/N ISC102892, manufactured May, 2013, label at the back 8010012, in bar-code ID652039.

Because of unexpected problem I tried second sensor S/N 102884 and the problem was the same.

Problem description.

When a dive starts, on descend and staying at depth 20-30m the new sensor shows 10% less PO2 readings above 1ATA PO2.

Example (the sensor in the problem is #3):

Calibration at 100% O2 on the surface:

#1: 1.00

#2: 1.00

#3: 1.00

10m

#1: 0.70

#2: 0.70

#3: 0.70

20m

#1: 1.43

#2: 1.42

#3: 1.30 ?!

On ascend it equalizes:

12m

#1: 1.11

#2: 1.10

#3: 1.09

and all 3 sensors are staying in sync.

If in the same dive I descent again all 3 sensors are showing about the same readings:

16m

#1: 1.32

#2: 1.31

#3: 1.28

After the sensor is stored on air (till next day, or over weekend) the problem reappears on next dive descend underwater again.

It looks like ambient pressure change (pressurizing and/or maybe something else, e.g. moisture) is affecting the sensor's output.

The measurements condition.

new sensors, just unpacked and installed (from a history log file):

#1: 9.9 mV

#2: 9.8 mV

#3: 10.1 mV

Air mV before dive:

#1: 9.8 mV  
#2: 9.3 mV  
#3: 10.3 mV

Air mV after dive:

#1: 9.8 mV  
#2: 9.8 mV  
#3: 10.6 mV

Everything is measured by 2 independent dive computers ISC APEX and Shearwater Predator, all 3 sensors are calibrated at 100% oxygen (1ATA PO<sub>2</sub>) at 13C temperature (working temperature under water) to eliminate possible influence of temperature-compensation, and all readings are identical on both computers.

2 other sensors are from the same manufacturer #1: ISC101421 and #2: ISC101423, manufactured in Jul, 2012, opened and put in use in Jan, 2013.

Theoretically, old sensors #1 and #2 can be identically in error showing 10% over the real PO<sub>2</sub> (they are from the same lot and S/N are close), but odds are 2:1 that the new sensor #3 is failing.

Very big problem is when all those measurements are repeated in a test pressure chamber filled with 100% oxygen and pressurized to 1 Bar (2ATA PO<sub>2</sub>) the sensor behaves normally and I can't pressurize it more than 1 Bar to reproduce the error.

Please let me know your thoughts.

With all my respect,

Valeriy Gorbunov

Victoria BC  
Canada

p.s. Next dive I'll try to rotate the sensors to eliminate possible computer circuits influence.