



John Lamb <viamed.john.lamb@gmail.com>

Sensor Problem please read!!!

1 message

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To: Jerry Whatley <info@custombreathers.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 PO2) 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 PO2 (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 PO2) 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

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Canada

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