Gmail **Steve Nixon <steve.nixon.viamed@googlemail.com>**

Fwd: FW: Plan B Cells

1 message

Steve Nixon <steve.nixon@vandagraphst.com> 15 January 2018 at 10:25
To: Mini Nambiar <m.nambiar@jfdglobal.com>

FYI

As discussed the sensors have an extended operating temperature range, the outputs are tightly grouped together, the output is very stable... In addition, in terms of performance evaluation, the sensors routinely pass EN 14143 standards testing.

Steve
---------- Forwarded message ----------
From: **Steve Nixon** <steve.nixon@vandagraphst.com>
Date: 12 January 2018 at 14:22
Subject: Re: FW: Plan B Cells
To: Graham McLachlan <g.mclachlan@jfdglobal.com>

Hi Graham

Thanks for the additional information and reply from Michael.

For production we need tests and specifications that can applied in accordance with production procedures.

I can understand what Michael says. However, it is not feasible to apply the two specifications at the same time. Linearity doesn't come into force as the pO2 is constant. Also, your own accuracy specification states **Accuracy at constant temperature, pressure and humidity**. The required load is also stated as 10K.

You can't mix the two tests into one. I believe that by testing the whole functionality of the sensor, you will find that the performance is good; whether it is under true performance conditions, simulated or when undergoing standards testing. I don't see how your existing sensor would pass the isolated temperature performance testing with such a tight specification.

I believe that your current sensor is based on the manufacturer's (complete sensor or just wet component/pcb) temperature compensation specification of:

+/-5% of full scale over the operating temperature range, worst case tacking error (within first hour after maximum temperature step) is +/-7.5% of full range (gas samples must be brought to ambient temperature). Percent readout is only within +/-1% at constant pressure.

In our specifications, we specify the following:

Temperature compensation error (steady state): 0°C to +50°C, 5% relative error

At a pO2 of 205 mbar an error of 10.25 mbar is within the tolerances. The results in your e-mail from 08.12.17 are therefore all within the specified tolerances.

Furthermore, we specify a warm up time of 30 min. That is the time the sensors need after a sudden change in temperature to reach a stable state (thermal equilibrium). The highest deviations in the graph are within that stabilization period.

Regarding Hysteresis, we specify the following:

Repeatability: < 1% volume oxygen at constant temperature and pressure.

In Air (20.95% O_2) a reading from 19.95% O2 to 21.95 % O2 is allowed. That again roughly equates to 10 mbar pO2 deviation at ambient pressure. So, the results are within in specification.

In the results with calibration board only a few points are outside the specification. It is very likely that the resistor on the calibration board interferes with our temperature compensation.

Regards

Steve

On 11 January 2018 at 15:01, Graham McLachlan <g.mclachlan@jfdglobal.com> wrote:

> Hi Steve,
>
> Got a response from Michael on the test results:
>
> What do you think?
>
> Thanks,
>
> Graham

Graham McLachlan Team Lead - R&D
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From: Michael Hossack
Sent: 11 January 2018 14:51
To: Graham McLachlan
Cc: Steven Coull; Scott Waddell; Mini Nambiar
Subject: RE: Plan B Cells

Where does the 5% come from? Temperature performance is stated as 0.05% / °C so 2% O2 over 0 to 40 °C (20 mbar in 100% O2 or 4.2 mbar in air). We added the linearity error (4 mbar) to that to get the total allowable error.

We're not using constant temperatures to monitor for temperature performance, we're varying temperature in steps and attempting best we can to keep everything else constant.

Michael

Michael Hossack Senior Electronics Engineer
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From: Graham McLachlan
Sent: 11 January 2018 14:00

To: Scott Waddell; Mini Nambiar; Michael Hossack
Cc: Steven Coull
Subject: Plan B Cells

Hi,

Spoke with Steve Nixon on the phone. From the conversation I had:

Pointed out that the specification of +/-8mbar is a much tighter spec than the +/-5% (relative) from the Teledyne datasheet. If you use the Teledyne datasheet all the results come in under the line. Has the accuracy limits for constant temperature and temperature performance been mixed around? We are using constant temperatures to monitor accuracy for temperature performance? Michael, could you spend a bit of time looking in to this for me?

Thanks,

Graham

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