

CLAIMS

What is claimed is:

1. A breath sensor apparatus, comprising:
a sampling unit having a housing configured to receive a sample breath from a user;
5 a sensor positioned within the housing and in fluid communication with the sample
breath when received within the housing;
a processor in electrical communication with the sensor,
wherein the processor is configured to determine a dissipation time when the sensor is
exposed to a near-constant concentration level of CO detected from the breath sample down
10 to an ambient level of CO detected,
wherein the processor is further configured to calculate a time constant based on the
dissipation time and a reduction from the near-constant concentration level to the ambient
level; and
wherein the processor is further configured to apply the time constant to a transient
15 response of the sensor to account for drift in calibrating the sensor.
2. The apparatus of claim 1 wherein the processor is further configured to apply an
aging factor to the sensor prior to calculating the time constant to account for sensor
degradation over time.
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3. The apparatus of claim 2 wherein the aging factor is dependent upon an exposure
of the sensor to temperature and humidity over a period of time.
4. The apparatus of claim 3 wherein the aging factor ranges from 2% to 5% per year.
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5. The apparatus of claim 1 wherein the processor is configured to calibrate the sensor
to account for drift in the transient response and in a steady state response.
6. The apparatus of claim 1 wherein the processor is further configured to provide
30 instructions to the user to hold their breath for a predetermined period of time prior to
exhaling the breath sample.

7. The method of claim 6 wherein the processor is further configured to provide instructions to the user to dissipate the breath sample from the sensor.

5 8. A method for calibrating a sensor, comprising:
 receiving a breath sample from a user until the sensor detects a near-constant concentration level of CO from the breath sample;
 determining a length of time for the near-constant concentration level of CO to dissipate to an ambient level of CO;
10 calculating a time constant based on the length of time and a reduction from the near-constant concentration level to the ambient level; and
 calibrating the sensor to account for drift by applying the time constant to a transient response of the sensor.

15 9. The method of claim 8 further comprising applying an aging factor to the sensor prior to calculating the time constant to account for sensor degradation over time.

 10. The method of claim 9 wherein the aging factor is dependent upon an exposure of the sensor to temperature and humidity over a period of time.

20 11. The method of claim 10 wherein the aging factor ranges from 2% to 5% per year.

 12. The method of claim 8 further comprising calibrating the sensor to account for drift for a steady state response.

25 13. The method of claim 8 wherein receiving the breath comprises receiving the breath into a sampling unit in which the sensor is positioned.

 14. The method of claim 8 wherein receiving the breath further comprises instructing
30 the user to hold their breath for a predetermined period of time prior to exhaling the breath sample.

15. The method of claim 14 further comprising instructing the user to dissipate the breath sample from the sensor.

- 5 16. A breath sensor apparatus, comprising:
a sampling unit having a housing configured to receive a sample breath from a user;
a sensor positioned within the housing and in fluid communication with the sample
breath when received within the housing;
a processor in electrical communication with the sensor such that the processor is
10 configured to receive a measurement from the sensor corresponding to a biological parameter
sensed in the sample breath,
wherein the processor is configured to apply an aging factor to the measurement based
upon a length of time passing from an initial calibration of the sensor to account for a
degradation rate of the sensor over the length of time, and
15 wherein the processor is further configured to modify the aging factor based upon one
or more environmental factors to which the sensor is exposed over the length of time.

17. The apparatus of claim 16 wherein the processor is configured to apply the aging
factor of 3% to the measurement for each length of time of a year.

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18. The apparatus of claim 16 wherein the processor is configured to modify the
aging factor based upon a temperature level and a humidity level to which the sensor is
exposed over the length of time.

25 19. The apparatus of claim 18 wherein a relatively lower storage temperature
corresponds to a relatively lower degradation rate.

20. The apparatus of claim 18 wherein a relatively higher storage temperature
corresponds to a relatively higher degradation rate.

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21. The apparatus of claim 18 wherein a relatively lower relative humidity corresponds to a relatively higher degradation rate.

22. The apparatus of claim 18 wherein a relatively higher relative humidity
5 corresponds to a relatively lower degradation rate.