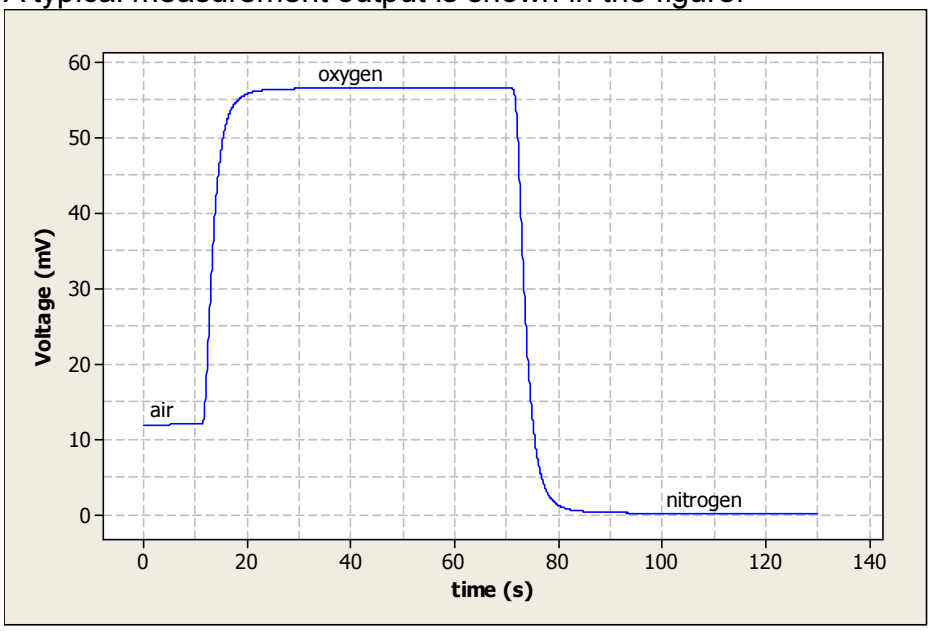
Vandagraph
Sensor Technologies

Summary of production final stage testing of 801xxxx Series Oxygen Sensors

Oxygen sensors undergo the following production final stage testing to verify that each sensor meets the published specifications in terms of: output in ambient air, output in oxygen, zero offset voltage, linearity error and response time.

Each sensor is exposed to a flow of dry ambient air for 10 seconds, followed by a flow of dry oxygen for 60 seconds and then to flow of dry nitrogen for a further 60 seconds. The flow rate is 3 L/min.

A typical measurement output is shown in the figure.



Sensor parameters are derived as follows:

- **Output in ambient air.**

  During the last few seconds of the test, the sensor response is averaged and taken as the sensor output (mV). Actual real time barometric pressure is monitored and used to calculate the pressure compensated sensor output (mV) in ambient air at the standard pressure of 1013 hPa.

Vandagraph Sensor Technologies Limited
15 Station Road, Cross Hills, Keighley, West Yorkshire BD20 7DT, United Kingdom
Tel +44 (0) 1535 634900 Fax +44 (0) 1535 635582 e-mail: info@vandagraphst.com
www.vandagrapst.com

Company registered in England, No. 03116432

- **Output in oxygen.**

  Again, during the last few seconds of the test, the sensor response is averaged and pressure compensated as described above, so as to provide the sensor output (mV) in 100% oxygen.

- **Zero offset voltage.**

  The sensor response between 59.8 and 60 seconds in dry nitrogen is averaged and taken as the zero offset voltage.

- **Linearity error.**

  The linearity error is calculated according to the following equation:

$$\text{linearity error} = \left| \frac{\text{sensor response in 100\% oxygen} \cdot 0.2095}{\text{output in ambient air}} \cdot 100 - 100 \right|$$

- **T90 response time.**

  From the output in ambient air and the sensor response in 100% oxygen the response change is calculated. The time required to reach 10% and 91% of the response change respectively is taken to calculate the T90 time according to the following equation:

$$\text{T90 time} = t(\text{91\% response change}) - t(\text{10\% response change})$$

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