

April 13, 2021

Maxell Holdings, Ltd.

Maxell develops lead-free galvanic cell-type oxygen sensors suitable for medical use, enabling measurement at high oxygen concentration

Compliant with RoHS directive^{*1} while achieving 20% longer^{*2} life



Lead-free galvanic cell-type oxygen sensor KE-25F3LFM

Maxell, Ltd. (President and Representative Director: Keiji Nakamura, hereinafter “Maxell”) announced that it started sample shipment of lead-free galvanic cell-type oxygen sensors (hereinafter “lead-free oxygen sensor”) using weak acid electrolyte solution which are capable of measuring over a range of 0-100% oxygen. These sensors are compliant with RoHS directive^{*1} and are not influenced by CO₂. Therefore, they are suitable in medical devices such as artificial ventilator, anesthesia apparatus and infant incubator which require high oxygen concentration measurement, as well as in fields such as combustion gas monitoring, biotechnology equipment, food storage, and education.

Main Features of Maxell’s Lead-Free Galvanic Cell-type Oxygen Sensor

1. Expanded measuring range of 0-100% O₂
2. 20% longer^{*2} life expectancy than conventional products (6 years)
3. Compliant with RoHS directive^{*1}
4. Virtually no influence from CO₂, H₂S, SO₂

Due to the limited measuring range of 0-30% O₂, conventional lead-free oxygen sensors were not able to be used in medical applications and fields where measurement of high oxygen concentration is required. Maxell succeeded in stable measurement of high oxygen concentration, which causes a load increase on oxygen sensors, by changing components of newly developed lead-free oxygen sensor. This made it possible to measure over a range of 0-100% O₂ and to extend the life expectancy 20% longer^{*2} than conventional products.

Additionally, newly developed lead-free oxygen sensor is not influenced by CO₂ using originally developed weak acid electrolyte solution, as with all other Maxell’s conventional products. In medical fields, the oxygen sensors which are unaffected by CO₂ are required

because the gas exhaled from human contains approximately 4% CO₂. Newly developed lead-free oxygen sensor KE-25F3LFM is compliant with RoHS directive^{*1} as with Maxell's other lead-free oxygen sensors, and can be used in medical fields.

Maxell has been contributing to the reduction of the environmental load through commercializing lead-free oxygen sensors compliant with RoHS directive^{*1} since 2019. Due to a high degree of technical difficulty to achieve lead-free oxygen sensors, conventional oxygen sensors which contain lead are exempted from RoHS directive^{*1}. However, the exemption will eventually be expired for oxygen sensors used in applications, such as medical devices and monitoring and control instruments in the future.

Maxell will contribute to solutions for societal problems, such as SDGs, through the development of environmentally friendly products by enhanced technologies in response to domestic and overseas market demands.

*1 RoHS directive: Refer to the description shown in 2011/65/EU and EU2015/863.

*2 20% longer: In comparison with KE-25F3LF

Product details

Galvanic Cell-type Oxygen Sensor

https://biz.maxell.com/en/tokki/oxygen_sensors.html

About SDGs

Maxell will contribute to reducing a risk of soil or ocean pollution or harmful impacts on the human body, through the development of lead-free galvanic cell-type oxygen sensors.



Contacts

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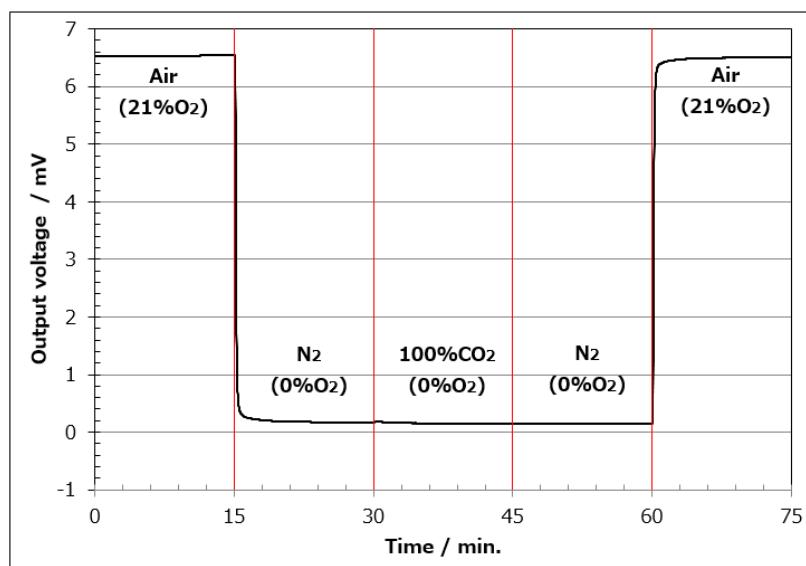
E-mail: contact-maxellbattery@maxell.co.jp

Inquiries: https://www.maxell.co.jp/inquiry/maxell/en/form.jsp?f=biz&q=tokki_en_biz

Appendix

Influence of CO₂ on lead-free galvanic cell-type oxygen sensor KE-25F3LFM

Newly developed lead-free oxygen sensor KE-25F3LFM is not influenced by CO₂ because it uses originally developed weak acid electrolyte solution. The graph below shows the influence of CO₂ on KE-25F3LFM. When normal air (21% O₂), N₂ (0% O₂), 100% CO₂ (0% O₂), N₂ (0% O₂), normal air (21% O₂) are flowed into the oxygen sensor in order, the output voltage is not affected from N₂, 100% CO₂, N₂, and the initial and final sensor output voltage in normal air are stable and equivalent. Therefore, it is concluded that KE-25F3LFM is unaffected by 100% CO₂ and the accurate oxygen concentration can be measured even in the coexistence of CO₂.



Influence of CO₂ on lead-free galvanic cell-type oxygen sensor KE-25F3LFM

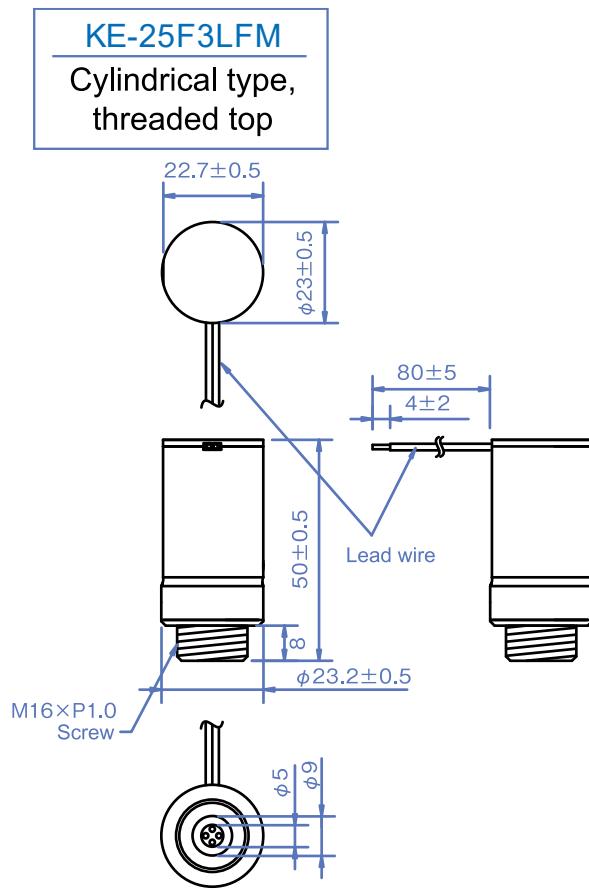
Specifications

Model No.	KE-25F3LFM
Measurement range	0 ~ 100% O ₂
Linearity accuracy	±1 % Full Scale
Operating pressure range	811 ~ 1216 hPa
Operating temperature range	5 ~ 40°C
Response time (90%)	approx. 15sec.
Life expectancy ^{*1}	approx. 108×10^4 %h approx. 6 years at 20°C
Appearance	Cylindrical, Threaded top

*1 Life expectancy: when the product is used at 20°C with a humidity of 60%RH and atmospheric pressure of 1013hPa, represented as a value of (Oxygen Concentration %) × (Time h)

* Specifications of the sample products are subject to change without notice.

Dimensions



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