Technical specifications

Oxygen sensors

Hamilton Medical offers the following oxygen sensors for use with Hamilton Medical ventilators:

Technical specifications

Oxygen sensor for HAMILTON-G5/S1, GALILEO, RAPHAEL
1/box

single use

Product specifications

Oxygen sensor model	**PN 396008**
Measuring range	0% to 100% O2
Signal output[1]	9 to 14 mV
Response time 90%	6 seconds
Accuracy full scale[2,3]	± 1%
Accuracy over operating range[4]	± 5%
Drift % signal/month[2]	< 1%
Linearity[2]	± 1%
Temperature coefficient	Compensated
Operating range	0°C to 45°C
Humidity noncondensing	0% to 99% relative humidity
Expected life[1]	60 months
Storage temperature[5]	0°C to 40°C
Warranty period[6]	15 months from date of manufacture

[1] In air (20.9% O2) at 25°C and 1 atm.
[2] At a constant temperature, pressure, and humidity < 1% volume O2 when calibrated at 100%.
[3] For optimal performance at higher oxygen levels, calibrate with 100% oxygen.
[4] Once the sensor has reached equilibrium (in approximately 1 hour), this value is calculated from the signal output value, above, following any step change of ≥ 15°C.
[5] Sensors may be stored at up to 55°C on a temporary basis only (up to 1 week); for example, during transport.
[6] For more information, see the '*Company statement Oxygen sensors warranty*' on: https://www.hamilton-medical.com/Partner-net/.

Technical specifications

Oxygen sensor for HAMILTON-G5/S1, GALILEO, RAPHAEL
1/box

single use

Product specifications

Oxygen sensor model	**PN 396009**
Measurement range	0% to 100% O2
Response time	< 6 seconds to 90% of final value
Accuracy	±1% full scale at constant temperature and pressure
Operating humidity	0% to 99% relative humidity (noncondensing)
Temperature compensation error	5% of reading over the operating temperature range
Expected lifetime	36 months in air at 25°C, 50% relative humidity, ambient pressure
Warranty period[7]	12 months from date of manufacture

[7] For more information, see the '*Company statement Oxygen sensors warranty*' on: https://www.hamilton-medical.com/Partner-net/.

Technical specifications

Oxygen sensor for HAMILTON-G5/S1
1/box

single use

Product specifications

Oxygen sensor model	**PN 10110239**
Measuring range	0% to 100% O2
Signal output[8]	9 to 13 mV
Response time 90%	< 7 seconds
Drift % signal[8]	< 0.1% / month of sensor output signal
Linearity[9]	< 3%
Temperature coefficient	Compensated
Operating range	0°C to 40°C; intermittent 40°C to 50°C
Humidity noncondensing	Up to 100% relative humidity
Expected operating life[8]	4 years
Storage temperature[10]	−20°C to 40°C (5°C to 25°C recommended)
Warranty period[11]	24 months from date of manufacture

All specifications apply to standard conditions: 1013 hPa; 25°C; 50% RH, and gas flow ≥ 2.5 l/min.

[8] In dry, ambient air.
[9] At 100% volume O2 applied for 5 minutes.
[10] Sensors may be stored at up to 50°C on a temporary basis only (up to 1 week); for example, during transport.
[11] For more information, see the '*Company statement Oxygen sensors warranty*' on: https://www.hamilton-medical.com/Partner-net/.

Technical specifications

Paramagnetic O2-sensor - Upgrade kit (PN 159715) for HAMILTON-G5/S1 ventilators with SN 10291 or higher
1/box

Product specifications

Oxygen sensor model	PN 396315
Operating range	0% to 100% O2 with over range capability −15% O2 to +200% O2
Intrinsic error	< ± 0.2% O2
Linearity[12]	< ± 0.2% O2
Repeatability[12]	< ± 0.2% O2
Signal noise (peak to peak)[12]	< 0.2% O2
Zero stability (permanent drift from calibration value)[12]	< ± 0.4% O2 for the first 24 hours < ± 0.2% O2 for the subsequent week (additional) < ± 0.2% O2 per month thereafter (additional)
Temperature coefficient	Zero: < ± 0.5% O2 / 10°C Span: < ± 0.5% of O2 reading / 10°C
Pressure range	± 33 kPag (±5 psig), operating ± 66 kPag (±10 psig), proof ± 100 kPag (±15 psig), failure
Tilt	< ± 0.5% O2 equivalent for 15° change in orientation from the calibration point
Time to valid reading	Time to valid output (from startup when within environmental specifications): < 8 seconds Time to status output (from startup when outside of environmental specifications): < 8 seconds
Operating temperature	5°C to 50°C (41°F to 122°F)
Storage temperature (noncondensing conditions)	−30°C to +70°C (−22°F to 158°F)
Storage pressure	10 kPa to 200 kPa (1.5 psi to 30 psi)
Thermal time constant	Time required for O2-signal to reach 66% of final reading after a 20°C step change in ambient temperature: 15 minutes
Ambient humidity	0% to 95% relative humidity
Altitude range (operating)	−500 m to +5,000 m (−1540 ft to +15,400 ft)
Product life span	8 years

[12] Testing has been conducted in accordance with the requirements of IEC 61207-1 1994.

Technical specifications

Oxygen sensor for
HAMILTON-C3/C2/C1/T1/MR1
1/box

single use

Product specifications

Oxygen sensor model	**PN 396200**
Measurement range	0% to 100% O2
Accuracy and repeatability	< 1% volume O2 when calibrated at 100% oxygen
Linearity error	< 3% relative
Response time	< 12 seconds to 90% of final value
Cross-interference	Meets ISO 80601-2-55 requirements
Effect of humidity	−0.03% relative per %RH at 25°C
Effect of mechanical shock	< 1% relative after a fall from a height of 1 meter
Temperature compensation	Built-in NTC compensation
Operating humidity	0% to 99% relative humidity, noncondensing
Long-term output drift	< 1% volume oxygen per month Typically < −15% relative over lifetime
Storage temperature	−20°C to +50°C
Prolonged lifetime	Maximum lifetime when stored between +5°C and +15°C
Warm-up time	< 30 minutes after replacement of sensor
Nominal sensor lifetime	≥ 1,000,000 of % volume oxygen hours
Warranty period[13]	15 months from date of manufacture

All specifications apply to standard conditions: 1013 hPa; 25°C dry, ambient air.

[13] For more information, see the '*Company statement Oxygen sensors warranty*' on: https://www.hamilton-medical.com/Partner-net/.

Technical specifications

Oxygen sensor for
HAMILTON- C6/C3/C1/T1/MR1
1/box

single use

Product specifications

Oxygen sensor model	**PN 10110473**
Measuring range	0% to 100% O2
Signal output[14]	6.5 to 12 mV
Response time 90%	< 7 seconds
Drift % signal[15]	< 0.1% / month of sensor output signal
Linearity[16]	< 3%
Temperature coefficient	Compensated
Operating range	0°C to 40°C; intermittent 40°C to 50°C
Humidity noncondensing	Up to 100% relative humidity
Expected operating life[14]	4 years
Storage temperature[17]	−20°C to 40°C (15°C to 25°C recommended)
Warranty period[18]	24 months from date of manufacture

All specifications apply to standard conditions: 1013 hPa; 25°C; 50% RH; gas flow ≥ 2.5 l/min, and 22 kOhm parallel load resistor.

[14] In dry, ambient air (measured with 22 kOhm parallel load resistor).
[15] In dry, ambient air.
[16] At 100% volume O2 applied for 5 minutes.
[17] Sensors may be stored at up to 50°C on a temporary basis only (up to 1 week); for example, during transport.
[18] For more information, see the '*Company statement Oxygen sensors warranty*' on: https://www.hamilton-medical.com/Partner-net/.

Technical specifications

Paramagnetic oxygen sensor for HAMILTON- C6
1/box

single use

Product specifications

Oxygen sensor model	**PN 160169**
Operating range	0% to 100% O2 with over range capability −15% O2 to +200% O2
Intrinsic error	< ± 0.2% O2
Linearity[19]	< ± 0.2% O2
Repeatability[19]	< ± 0.2% O2
Signal noise (peak to peak)[19]	< 0.2% O2
Zero stability (permanent drift from calibration value)[19]	< ± 0.4% O2 for the first 24 hours < ± 0.2% O2 for the subsequent week (additional) < ± 0.2% O2 per month thereafter (additional)
Temperature coefficient	Zero: < ± 0.5% O2 / 10°C Span: < ± 0.5% of O2 reading / 10°C
Pressure range	± 33 kPag (±5 psig), operating ± 66 kPag (±10 psig), proof ± 100 kPag (±15 psig), failure
Tilt	< ± 0.5% O2 equivalent for 15° change in orientation from the calibration point
Time to valid reading	Time to valid output (from startup when within environmental specifications): < 8 seconds Time to status output (from startup when outside of environmental specifications): Depends on environmental conditions
Operating temperature	5°C to 50°C (41°F to 122°F)
Storage temperature (noncondensing conditions)	−30°C to +70°C (−22°F to 158°F)
Storage pressure	10 kPa to 200 kPa (1.5 psi to 30 psi)
Thermal time constant	Time required for O2-signal to reach 66% of final reading after a 20°C step change in ambient temperature: 15 minutes
Ambient humidity	0% to 95% relative humidity
Altitude range (operating)	−500 m to +5,000 m (−1540 ft to +15,400 ft)
Product life span	8 years

[19] Testing has been conducted in accordance with the requirements of IEC 61207-1 1994.