D05R-LF

Preliminary Product Specification | Rev. 1

Lead-free oxygen sensor

Galvanic gas sensor with an extra water repellent head space.



NRC D05R-LF

PRODUCT OVERVIEW

Type	D05R-LF
Part number	TBD
Compliance	RoHS compliant and SVHC free

KEY FEATURES

Wide measurement range	0.01 ... 100 Vol.% O2
Long lifetime	Application-dependent operating life
High signal stability	Low long-term signal drift
Lead-free	RoHS compliant

DOCUMENT PURPOSE

The purpose of this document is to present the performance specification and key features of the sensor. This document should be used in conjunction with the Operating Manual of the instrument and the Product Safety Data Sheet of the sensor.

Technical specifications

Important Note: All characteristics are based on conditions at 25 °C, 50 %rH, 1013 hPa and a gas flow of > 2.5 LS/min. For sensor performance data under other conditions, contact NRC. While NRC may provide information or engineering support for its products through NRC personnel, literature and website, it is the customers sole responsibility to determine the suitability of the product(s) for the customer specific requirements and applications.

MEASUREMENT

Operating Principle	Partial pressure electrochemical cell
Measurement Range	0.01 ... 100 Vol.% O2
Initial Output Signal	8.0... 13.0 mV at dry ambient air
Response Time t90	< 8 s
Signal Drift (long-term)	≤ 0.1 % / month at ambient air
Linearity Error	≤ ± 3 % at 100 Vol.% O2 applied for 5 min
Zero Signal Offset	≤ 150 µV at 100 Vol.% N2 applied for 5 min
Influence of Gas Humidity	- 0.03 % of signal per %rH
Signal Temperature Compensation	NTC on sensor PCB
Cross-Sensitivity	none to He, H2 and CO

ELECTRICAL

Electrical Connector	3-Pin Molex
Recommended Load Resistor	≥ 1 MOhm

MECHANICAL

Weight	≤ 27 g
Material in Contact with Media	PVC, PPS, PTFE, ABS, NBR, Stainless Steel
Gas Connector	fits for M16x1 DIN 13 or 5/8-24 UNEF

ENVIRONMENTAL

Operating Temperature Range	0 ... 45 °C
Ambient Pressure Range	700 ... 1250 hPa
Ambient Humidity Range	up to 100 %rH non-condensing

LIFETIME INCLUDING SHELF LIFE

Expected Operating Life	1 ... 6 years at ambient air can vary significantly by application read Lifetime info box on next page
Nominal Sensor Life	1 200 000 Vol.%h O2 at ambient air, depending on application

Storage, lifetime and installation

STORAGE IN UNOPENED ORIGINAL PACKAGE

Ambient temperature	15 ... 25 °C recommended; -20 ... 40 °C maximum one week
Ambient pressure	600 ... 1250 hPa
Ambient humidity	50 ... 100 %rH recommended, non-condensing; 0 ... 30 %rH maximum one week

LIFETIME AND SHELF LIFE

Temperature and humidity are two of the most essential environmental factors. Electrochemical gas sensors contain a liquid electrolyte that may evaporate over time. This process speeds up in hot, dry conditions and with increased gas flow. On the other side, low temperatures can slow down a sensor's reaction or lead to inaccurate zero readings.

Humidity presents another challenge. When moisture condenses at the gas inlet, it can impact measurement precision or potentially lead to corrosion. Abrupt changes in temperature or being in humid settings, such as coastal or marine applications, increase the risk of signal drift and malfunction.

Dusty air, vapors from cleaning agents, emissions from batteries, industrial pollutants, etc. can affect sensor performance over time. These pollutants might not cause immediate malfunction but can gradually reduce sensor performance.

Sensors keep aging even when the devices are switched off. When a device is kept in uncontrolled ambient conditions, like inside a hot truck cab or on a dusty shelf, its future performance is at risk.

Devices should ideally be kept in temperature-controlled, clean, and dry environments. Even when the device is not in operation, it may come into contact with vaporized substances or changes in the environment that impact its effectiveness. Inadequate storage methods are among the most neglected reasons for premature sensor malfunction.

To maximize the sensor`s operating time, transport and storage times should be kept as short as possible (ideally < 6 months).

INSTALLATION IN DEVICE

A gas tight sealing is ensured when the sensor is screwed in hand-tight. Do not use any mechanical tools to install the sensor. Using excessive force may damage the sensor.

Optimal mounting position of the sensor is when the gas sensing area faces downwards. A horizontal position is acceptable. It is not recommended to use the sensor with the gas sensing area facing upward.

Connection should be made via recommended electrical and mechanical connectors only. The specified load resistance must be taken into account. Soldering the sensor will damage it and void the warranty. Please contact NRC for further information.

Since temperature has an influence on the output signal it is not advisable to place any heat or vibration sources (i.e. electric- pumps or valves, coolers, etc.) in close proximity to the cell.

Avoid proximity of the cell to any EMC radiating units as those emit frequencies which might interfere with the sensor`s electrical connection and connecting cable.

CLEANING AND DISINFECTION

The sensor outer housing can be cleaned with a dry wipe. Do not wipe the sensor`s gas entrance side. Do not use any chemical disinfectant or sanitizer on the sensor.

POISONING

NRC sensors are designed to operate in a wide range of environments. For optimal sensor lifetime and performance it is important that exposure to high concentrations of solvent vapors is avoided during storage, installation into instruments and operation of the sensor.

Do not use adhesives directly on or near the sensor as the solvents may cause stress corrosion on the plastic parts.

Operation and handling

STABILIZATION TIME

When installing a new sensor refer to the instrument manual for stabilization time before calibration. If not specified otherwise wait at least 15 minutes to ensure that the sensor has stabilized in the instrument.

CALIBRATION INTERVAL

NRC sensors are designed to have minimal signal drift over their functional lifetime. For optimal performance and maximum measurement accuracy however they should be calibrated before each use.

IF THE SENSOR IS DROPPED

If a sensor is dropped, please check for visible mechanical damage of the sensor or if the sensor is leaking electrolyte. If this is the case, do not try to install the sensor into the device. Take safety precautions and immediately dispose the cell.

If the sensor shows no visible damage it should be placed in quarantine for at least 24 hours. Afterwards a follow-up check made by a two point calibration should be done.

RFI / EMI SUSCEPTIBILITY

NRC sensors contain metal parts and might be susceptible to RFI or EMI. Before use in MRI environments please contact NRC for further information.

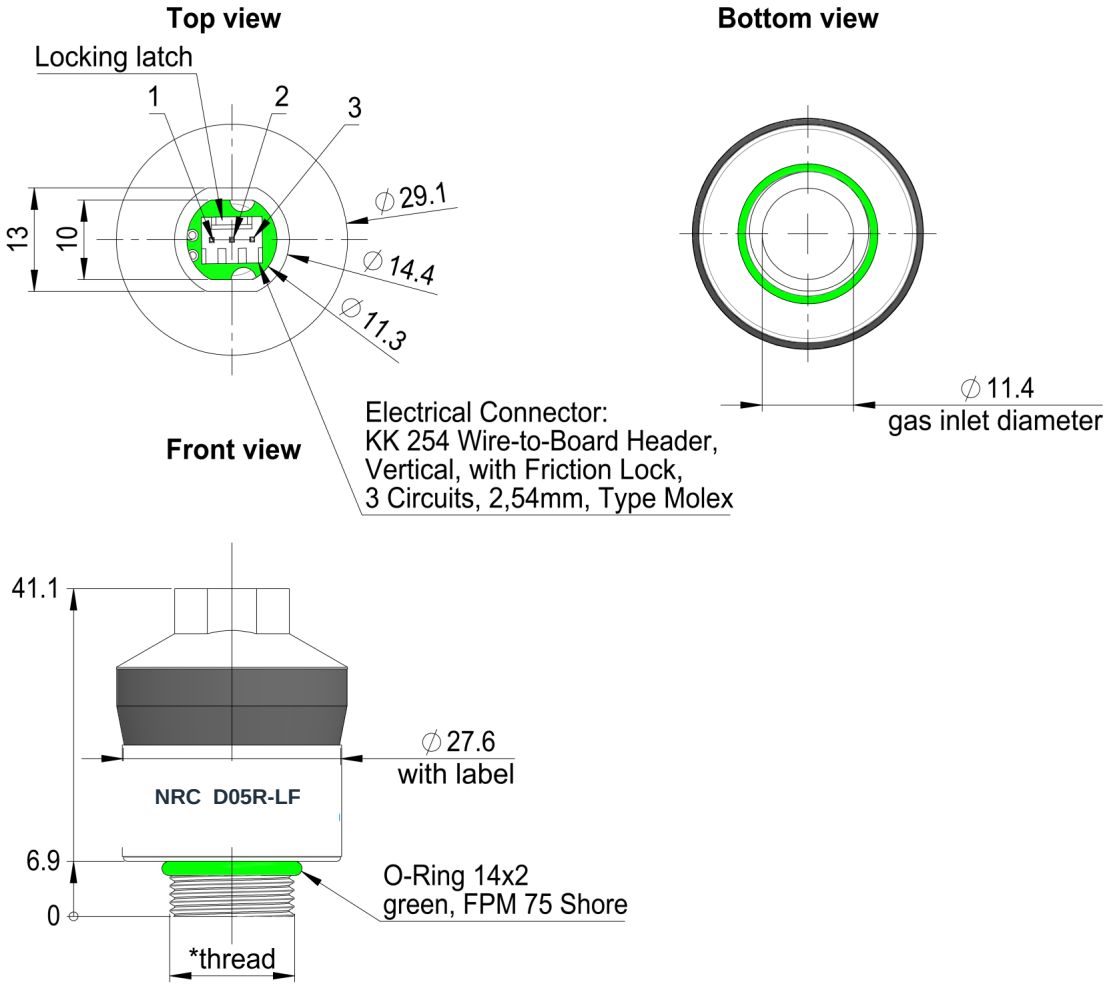
DISPOSAL

At the end of the sensors lifetime the sensor should not be disposed of in normal public waste as it may contain hazardous materials and caustic electrolyte (for more information refer to the PSDS). Please contact your local authorities for environmental legislation to relevant local waste disposal.

Technical drawing

Sensor	Part no.	Cap	Housing	Threaded ring
D05R-LF	TBD	white	grey	white

Electrical pin assignment	Pin 1: minus (-) | Pin 2: minus (-) | Pin 3: plus (+)



* thread is compatible with M16x1 and 5/8-24 UNEF

Dimension unit: mm
Dimension tolerances: linear ±0.5 mm , diameter ±0.3 mm