

Intelligent Series Gas Sensors (iseries)

Oxygen (O₂) Sensor: **iO₂**

Part Number: AAW85-07WD-CIT

Document Purpose

The purpose of this document is to present the performance specification of the intelligent iO₂ oxygen gas sensor.

This document should be used in conjunction with the Product Safety Datasheet (PSDS 5). For guidance on the safe use of the sensor, please refer to the Communication Protocol (SDCS) and Sensor Mounting Application Note.



KEY FEATURES & BENEFITS



Digital interface

The sensor has a UART protocol to communicate with the instrument with chip select option as described in Communication Protocol (SDCS).



Interchangeable

All intelligent sensors have the same dimensions and communication protocol.

All sensors in the range will work with a supply voltage from 3.1 V to 3.3 V.



Digital traceability

Sensors contain the following data: serial number, manufacturing date, and gas type for quick and easy identification of the sensor.



OEM lock

Sensors have two levels of lock codes. The first one is an OEM specific code programmed in during manufacture and cannot be modified. This lock code is provided by the OEM. Instrument can check if the sensor has the unique code - if not the instrument can refuse the sensor. The second level of lock code is left blank and can be updated by OEM/Partners during sensor integration into the instrument as needed.



Pre-calibrated

Sensors will be calibrated during manufacturing and calibration data is written in the sensor. Sensor will output gas concentration when interrogated by instrument.



Predictive calibration

The recalibration alarm will be triggered when the countdown timer is reached.



End-of-life indication

The alarm will be flagged when the sensor has taken/lost a considerable amount of water (electrolyte concentration is above or below limits).



Fault indication

Intelligent sensors can detect several internal faults like drift/fault in reference electrode, electrolyte concentration out of range, counter electrode fault; therefore notifying the user to take corrective actions.



Designed to meet global performance standards

ATEX and IEC Ex Certified per EN IEC 60079-0 and EN IEC 60079-11

Designed to meet performance standards: BS EN 50104, ANSI / ISA 92.04.01 and AS/NZS 4641-2007

RoHS

RoHS compliant



5-year life




Compact form-fit

iO₂ Parameters

iO ₂ parameters		Default Values	Configurable Range	Customisable: Implemented by City Technology (Non-configurable through the communication protocol)	Configurable: The parameter can be changed through the communication protocol by users	Notes
OEM Lock	OEM code (First layer)	Password is customisable.* (NoLock will be set by default in case the OEM lock is not required)	No more than 6 characters (ASCII format)	✓		* OEM code will be set by City Technology during sensor manufacturing. Code to be provided by OEM
	Partner code (Second layer)	–	No more than 6 characters (ASCII format)		✓	Once this code has been set by user, it is not possible to change it.
User Factor		User factor 0: 100 User factor 1: 100 UF 2-3: Reserved UF 4-9: Customisable User factors can be added to include auto-compensation for using different membranes or instruments	10 allocated slots ----- 2 user factors are already implemented (no additional membrane and with recommended membrane), 2 are reserved and the remaining 6 can be customised	✓*	✓**	* User factor 0 and 1 programmed into the sensor during manufacturing. Additional User Factors can be added to the selectable list during the manufacturing process. This user factor has to be provided by the user. ** Users can select the desired user factor from the selectable list
Calibration	Zero (fresh air)	20.9% O ₂			✓	Calibration is performed at two points throughout the operating range of the sensor. The calibration points are defined by the zero and span values. The zero value represent the response of the sensor in clean air (20.9 % O ₂)
	Span	0% O ₂			✗	Span is the calibration point that is done in the absence of oxygen (i.e. N ₂)
Alarms	Low	19.5% O ₂	Limit LOW lower: 0.5 Limit LOW upper: 25		✓	Indicates a concentration level below clean air
	High	23.5% O ₂	Limit HIGH lower: 0.5 Limit HIGH upper: 25		✓	Indicates a concentration level above clean air
Predictive calibration	Countdown timer (Cal due days)	180 days			✓	The recalibration alarm will be triggered when the countdown timer is reached
End of Life	The EoL alarm will be triggered when the countdown or the future prediction conditions are met					
	Future prediction algorithm				✗	The alarm is triggered when the sensor is too dry or too wet (electrolyte concentration is above or below limits)
	Countdown timer	1825 days			✗	The countdown timer is set for 1825 days, i.e. 5 years
Deadband	Active by default	✓			✓	With the deadband enabled the sensor will not read changes until the concentration reaches the deadband value. Is normally used to prevent measurement oscillations. The baseline of the deadband is 20.9 %O ₂ (the reference is ambient air). This function can be configured to different limits
	Incoming	0.1% O ₂	Whole measurement range		✓	Consult iseries appendix 1 (technical communication) section 4.2 for information about these parameters
	Outgoing	0.3% O ₂	Incoming ≤ Outgoing		✓	
Bump Due Days		1 day			✓	A bump test is a brief exposure of the sensor to the target gas. The test has the objective of verifying that the sensor responds and the instrument acts accordingly. The sensor will tell the user when the bump interval has been exceeded



Intrinsic Safety	
Entity Parameters	Ui = 5.88 V, Ii = 1.1 A, Pi = 1.2 W, Ci = 13.14 uF, Li = 0 uH
Intrinsic Safety Rating	IIC T4, ia, 60°C
ATEX Marking	 I M1 II 1G Ex ia I Ma Ex ia IIC Ga

Poisoning

Gas sensors are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments, and operation. When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted.

Do not glue directly on or near the sensor as the solvent may cause crazing of the plastic.

Under no circumstances should intelligent sensor pads be soldered to, as this can cause leakage of electrolyte. Connection should be made via a mounting socket and spring connector.

WARNING: SOLDERING TO PADS WILL RENDER YOUR WARRANTY VOID.

SAFETY NOTE

This sensor is designed to be used in safety-critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

In accordance with the company's policy of continued product improvement City Technology reserves the right to make product changes without notice. The products are always subject to a programme of improvement and testing which may result in some changes in the characteristics quoted. As the products may be used by the client in circumstances beyond the knowledge and control of City Technology, we cannot give any warranty as to the relevance of these particulars to an application. City Technology warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. City Technology's standard product warranty applies unless agreed to otherwise by City Technology in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to City Technology during the period of coverage, City Technology will repair or replace, at its option, without charge those items that City Technology, in its sole discretion, finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall City Technology be liable for consequential, special, or indirect damages.** Though City Technology provides application assistance personally, or through our literature and website, it is buyer's sole responsibility to determine the suitability of the product in the application. Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this writing. However, City Technology assumes no responsibility for its use.