

GAS DETECTION INSTRUMENTS FOR HYPERGOLIC FUEL AND OXIDIZER

INTERSCAN CORPORATION offers a full range of field proven monitoring instrumentation for hydrazines (hydrazine, monomethylhydrazine, unsymmetrical dimethyl hydrazine) and nitrogen dioxide (NO₂), also known as nitrogen tetroxide (N₂O₄).

Our Compact Portable Analyzers are designed expressly for survey work. Operating off integral rechargeable batteries, they can also be employed for occasional longer term studies. These units are UL Classified intrinsically safe, for Class I, Groups A, B, C, and D locations.

Our LD Series Continuous Monitoring Systems feature ultra-tough construction and a wide variety of alarm options. They are internationally acknowledged to be the most rugged and reliable single point monitoring systems available.

Our Rack-Mount configured analyzers are intended for those applications in which line power operation is desired, but the industrial type packaging of the LD Series is not required. Designed to be installed in a standard 19 inch (483mm) rack, or to be used on the bench, they can be readily incorporated into larger instrument systems.

Our Multipoint Systems are intended for monitoring several different locations within the same general area. Custom designed to meet your exact needs, they offer a cost-effective and organized means to protect an area and document its condition, as well. Full data acquisition capability is available with the Multipoint Systems, and with all of our instruments.



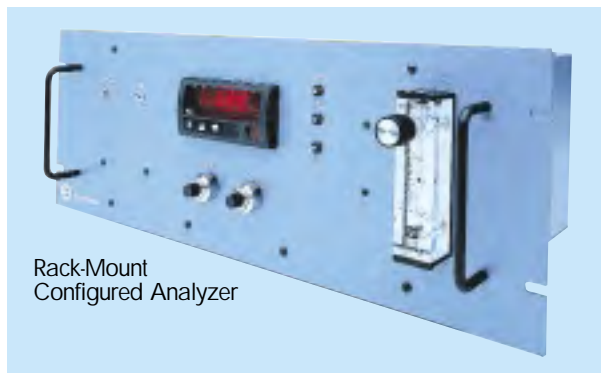
Compact
Portable
Analyzer



LD Series Continuous
Monitoring System



Multipoint System
(PLC Style)



Rack-Mount
Configured Analyzer



interScan corporation

SENSOR PRINCIPLE OF OPERATION

The INTERSCAN voltammetric sensor (U.S. Patent number 4,017,373) is an electrochemical gas detector operating under diffusion controlled conditions.

Gas molecules from the sample are adsorbed on an electrocatalytic sensing electrode, after passing through a diffusion medium, and are electrochemically reacted at an appropriate sensing electrode potential. This reaction generates an electric current directly proportional to the gas concentration. This current is converted to a voltage for meter or recorder readout.

The diffusion limited current, i_{lim} is directly proportional to the gas concentration according to the simplified equation:

$$i_{lim} = \frac{nFADC}{\delta}$$

where i_{lim} is the limiting diffusion current in amps, F is the Faraday constant (96,500 coulombs), A is the reaction interfacial area in cm^2 , n is the number of electrons per mole reactant, δ is the diffusion path length, C is the gas concentration in moles/ cm^3 , and D is the gas diffusion constant, representing the product of the permeability and solubility coefficients of the gas in the diffusion medium. An external voltage bias maintains a constant potential on the sensing electrode, relative to a nonpolarizable reference counterelectrode in the two-electrode Interscan sensor. Nonpolarizable means that the counterelectrode can sustain a current flow without suffering a change in potential. Thus, the counterelectrode acts also as a reference electrode, eliminating the need for a third electrode and a feedback circuit, as would be required for sensors using a polarizable air counterelectrode.

ORDERING INFORMATION

COMPACT PORTABLE - 4000 SERIES

HYDRAZINE

Model No.	Ranges
4183	0-0.5/0-2 ppm
4186	0-2/0-10 ppm
4187	0-100/0-2000 ppb
4189	0-100/0-1000 ppb

NO₂

Model No.	Ranges (ppm)
4152	0-2/0-10
4154	0-10/0-50

LD SERIES HYDRAZINE

Model No.	Range (ppm)
LD18-0	0-1999
LD18-1	0-199.9
LD18-2	0-19.99
LD218-0	0-1999 (two point system)
LD218-1	0-199.9 (two point system)
LD218-2	0-19.99 (two point system)

RM SERIES HYDRAZINE

Model No.	Range (ppm)
RM18-0	0-1999
RM18-1	0-199.9
RM18-2	0-19.99

NO₂

Model No.	Range (ppm)
LD15-0	0-1999
LD15-1	0-199.9
LD15-2	0-19.99
LD215-0	0-1999 (two point system)
LD215-1	0-199.9 (two point system)
LD215-2	0-19.99 (two point system)

NO₂

Model No.	Range (ppm)
RM15-0	0-1999
RM15-1	0-199.9
RM15-2	0-19.99

PLC SERIES

HYDRAZINE

Model No.	Sampling Points
PLC318	3 pt
PLC418	4 pt
PLC518	5 pt

NO₂

Model No.	Sampling Points
PLC315	3 pt
PLC415	4 pt
PLC515	5 pt

Suffix	Range (ppm)
-0	0-1999
-1	0-199.9
-2	0-19.99

SPECIAL RANGES ARE AVAILABLE

COMMON SPECIFICATIONS

(Pertaining to all analyzer configurations EXCEPT Models 4187 and 4189)

Specification parameters are defined per ISA's S5.1 Committee and SAMAs RC-20-11-1964 standard. Performance of a particular model may vary from these specifications, and may also

be influenced by environmental factors. For further data, please consult the factory.

Accuracy:	Analog units: $\pm 2.0\%$ of full scale Digital units: $\pm 2.0\%$ of reading, \pm least significant digit. (Limited to accuracy of calibration standard)	Calibration:	Against standard gas mixture, or via INTERSCAN's Electronic Calibration Service
Repeatability:	$\pm 0.5\%$ of full scale	Lag Time:	Less than 1 second
Minimum Detectability:	1.0% of full scale	Rise Time:	2 minutes to 90% of final value*
Linearity:	$\pm 1.0\%$ of full scale	(Hydrazine)	
Zero Drift:	$\pm 1.0\%$ of full scale (24 hours)	Fall Time:	2 minutes to 10% of original value*
Span Drift:	Less than $\pm 2.0\%$ of full scale (24 hours) The zero and span drift specifications assume that the analyzer is equilibrated, and is at constant temperature, with a properly maintained sensor. Drift is defined as an undesired change in output over a period of time, which change is unrelated to input, operating conditions or load.	(Hydrazine)	
		Rise Time:	20 seconds to 90% of final value
		(NO ₂)	
		Fall Time:	20 seconds to 10% of original value
		(NO ₂)	

*Longer rise and fall times due to chemisorption effects

COMMON SPECIFICATIONS FOR MODELS 4187 AND 4189

Accuracy:	$\pm 15\%$ of full scale	Zero Drift:	$\pm 10\%$ of full scale (4 hours)
Repeatability:	$\pm 10\%$ of full scale	Span Drift:	$\pm 10\%$ of full scale (4 hours)
Minimum Detectability:	10% of full scale	Rise Time:	2 minutes to 50% of final value
Linearity:	$\pm 10\%$ of full scale	Fall Time:	1 minute to 50% of original value

INTERFERING GAS DATA

No analytical method is totally specific. Other gases may affect instrument response. Interferences are not necessarily linear, and may also exhibit time dependent characteristics.

The following chart shows the approximate ppm con-

centration of interfering gas required to cause a 1 ppm deflection in the chosen analyzer. In many cases specificity can be improved. These response values are not absolute, and may vary depending on sensor formulation. (Neg) = negative response.

INTERFERING GAS	CONCENTRATION (PPM) NEEDED TO CAUSE 1 PPM RESPONSE ON HYDRAZINE ANALYZERS	CONCENTRATION (PPM) NEEDED TO CAUSE 1 PPM RESPONSE ON NO ₂ ANALYZERS
C ₂ H ₅ SH	10	3 (Neg)
Cl ₂	5 (Neg)	0.7
CO	1000	350 (Neg)
H ₂	>10 ⁴	6000 (Neg)
H ₂ S	0.5	0.7 (Neg)
HCl	45	4 (Neg)
HCN	8	2 (Neg)
Hydrazine		0.7 (Neg)
Hydrocarbons Saturated	>10 ⁴	>10 ⁴
Hydrocarbons Unsaturated	>500	>500
N ₂ O	>10 ⁴	>10 ⁴
NH ₃	1000	15 (Neg)
NO	1300	250
NO ₂	30 (Neg)	
SO ₂	3.5	1 (Neg)
SO ₃	>10 ⁴	>10 ⁴



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