ONH836

Oxygen/Nitrogen/Hydrogen

This instrument now supports either Helium or Argon carrier gas. The type of carrier gas used may affect some instrument specifications, as indicated below.

Specification Sheet

Instrument Range* (1 g sample)		**Precision†**	
Oxygen:	0.00005 mg** to 50 mg	**Oxygen:**	0.000025 mg or 0.3 % RSD, whichever is greater
Nitrogen, He Carrier Gas:	0.00005 mg** to 30 mg	**Nitrogen, HE Carrier Gas:**	0.000025 mg or 0.3 % RSD, whichever is greater
Nitrogen, Ar Carrier Gas:	0.0002 mg** to 30 mg	**Nitrogen, Ar Carrier**	0.0001 mg or 0.3 % RSD, whichever is greater
Hydrogen:	0.0001 mg** to 2.5 mg		0.00005 mg or 2 % RSD, whichever is greater
Analysis Time§			
Oxygen, He Carrier Gas:	85 s	Oxygen, Ar Carrier Gas:	95 s
Nitrogen, He Carrier Gas:	100 s	Nitrogen, Ar Carrier Gas:	130 s
Hydrogen, He Carrier Gas:	90 s		100 s

Cycle Time§ *(including outgas, purge, analysis delay, and analysis time)*			
He Carrier Gas:	180 s	**Ar Carrier Gas:**	210 s
Calibration	Standards (single or muöti-point); manual, gas dose		
Sample Size	1 g (nominal)		
Detection Method	Non-Dispersive Infrared Absorption; Thermal Conductivity		
Chemical Reagents	Anhydrous Magnesium Perchlorate (MgClO4) Copper Oxide, Rare Earth Copper Oxide,Copper Turnings		Oxygen/Moisture Indicating Tube Sodium Hydroxide on an Inert Base
Gas Requirements			
He carrier Gas:	Helium (99.99 % pure), 22 psi (1.5 bar) ± 5 %		
Ar Carrier Gas:	Argon (99.999 % pure), 22 psi (1.5 bar) ± 5 %		
Pneumatic:	Compressed Air, 40 psi (2.8 bar) ± 10 %, source must be oil and water free		
Gases Optional			
Gas Dose:	Carbon Dioxide, 99.99 % pure, 20 psi (1.4 bar) ±10 %		
Gas Dose:	Nitrogen, 99.99 % pure, 20 psi (1.4 bar) ± 10 %		
Gas Flow Rates	Carrier: 490 cm^3/min		Pneumatic: 280 cm^3/analysis
Furnace	Impulse furnace with current and power control 7500 W maximum, liquid cooled		
Coolant	3.2 L LECO Coolant		
Operation Conditions	Temperature: 15 °C to 35 °C (59 °F to 95 °F)		Rel. Humidity: 20 % to 80 %, non-condensing
Sound Pressure Level	Operating Temp: 15 °C to 35 °C (59 °F to 95 °F)		Rel. Humidity: 20 % to 80 % (non-condensing)
Dimensions††	36 in H × 28 in W × 34 in D (91 cm × 71 cm × 86 cm) with touch-screen monitor		
Electrical Power	230 V~ (+ 10/-15 %; at max load); 50 A, 50/60 Hz, Single Phase; 12500 Btu/h‡		
Weight (approx.)	Analyzer: 410 lb (186 kg) without touch-screen monitor		

Part Numbers

ONH836-XXXXC	Oxygen/Nitrogen Determinator with software and external PC

Options

NOTE: Multiple configurations of options are available. Please contact your local LECO Sales Engineer for more details.

- Unit with PC, touch-screen monitor package (C)
- Optional mounted touch-screen monitor package (M)
- Optional automatic cleaner package (H

* *Use the following formula to calculate element concentration:*
% *Element concentration = ((absolute element mass in mg)/(sample mass in mg))*100.*
** *Lower range is calculated as 2σ instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.*
† *Calculated as 1σ instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.*
§ *All times listed are nominal, actual times may vary based on method settings and application.*
†† *Allow for a 6 in (15 cm) minimum access area around all sides.*
‡ *Average output based on nominal operating parameters.*

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Theory of Operation

The ONH836 Oxygen/Nitrogen/Hydrogen system is designed for simultaneous wide-range measurement ofoxygen, nitrogen, and hydrogen content of steel, refractory metals, and other inorganic materials. The instrumentfeatures custom software designed specifically for touch operation.

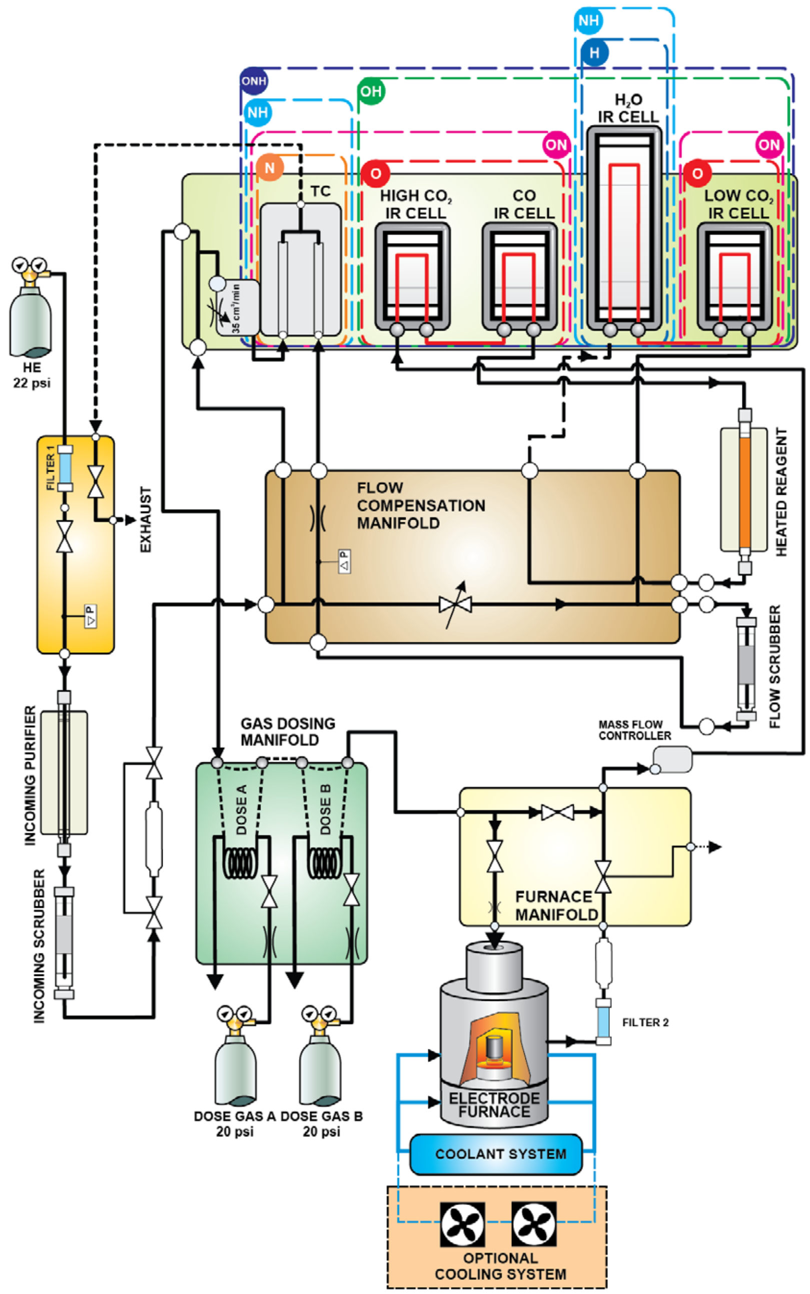
A pre-weighed sample is placed in a graphite crucible which is heated in an impulse furnace to release analyte gases. Oxygen present in the sample reacts with thegraphite crucible to form CO and CO_2. An inert gas carrier, typically helium, sweeps the liberated analyte gases out of the furnace, through a Mass Flow Controller, and through a series of detectors. CO and CO_2 are detected using non-dispersive infrared (NDIR) cells. The gas then flows through a heated reagent where the CO is oxidized to form CO, and H is oxidized to form H_2O. The gas continues through another set of NDIR cells where H_2O and CO_2 are detected. The CO and H_2O are then scrubbed out of the carrier gas stream, leaving the final analyte, nitrogen, as the only impurity. A patented Dynamic Flow Compensation (DFC) system is used to add carrier gas as a makeup for the gas lost during the scrubbing process. A Thermal Conductivity (TC) detector is used to detect nitrogen.

The detection system is comprised of both NDIR and TC detectors. NDIR cells are based on the principle that analyte gas molecules absorb infrared (IR) energy at unique wavelengths within the IR spectrum. Incident IR energy at these wavelengths is absorbed as the gases pass through the IR absorption cells. The complete set of CO and CO NDIR cells is required to give the most accurate oxygen results for a wide range of sample types and concentrations. TC detection takes advantage of the difference in thermal conductivity between carrier and analyte gases. Resistive TC filaments are placed in a flowing stream of carrier gas and heated by a bridge circuit. As analyte gas is introduced into the carrier stream, the rate at which heat transfers from the filaments will change producing a measurable deflection in the bridge circuit.

The concentration of an unknown sample is determined relative to calibration standards.To reduce interferences from instrument drift, reference measurements of pure carrier gas are made prior to each analysis.

Flow Diagram Shown for ONH836 Configuration

Configuration-specific flow diagrams available on request



Specifications and part numbers may change.
Consult LECO for latest information.

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