

# ON836 Oxygen/Nitrogen

## Specification Sheet

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



### Instrument Range\* (1 g sample)

Oxygen:	0.00005** to 50 mg
Nitrogen, He Carrier Gas:	0.00005** to 30 mg
Nitrogen, Ar Carrier Gas:	0.0002** to 30 mg

### Precision†

Oxygen:	0.000025 mg or 0.3% RSD, whichever is greater
Nitrogen, He Carrier Gas:	0.000025 mg or 0.3% RSD, whichever is greater
Nitrogen, Ar Carrier Gas:	0.0001 mg or 0.3% RSD, whichever is greater

### Analysis Time (including outgas, purge, and analysis delay)

Oxygen, He Carrier Gas:	85 seconds	Oxygen, Ar Carrier Gas:	95 seconds
Nitrogen, He Carrier Gas:	100 seconds	Nitrogen, Ar Carrier Gas:	130 seconds

### Cycle Time, He Carrier Gas

180 seconds (nominal)

### Cycle Time, Ar Carrier Gas

210 seconds

### Calibration

Standards (single or multi-point); manual; gas dose

### Sample Size

1 g (nominal)

### Detection Method

Non-Dispersive Infrared Absorption; Thermal Conductivity

### Chemical Reagents

- Anhydrous Magnesium Perchlorate ( $MgClO_4$ )
- Sodium Hydroxide on an Inert Base
- Rare Earth Copper Oxide, Copper Turnings
- Oxygen/Moisture Indicating Tube

### Gas Requirements

He Carrier Gas:	Helium (99.99% pure), 22 psi (1.5 bar) $\pm 5\%$
Ar Carrier Gas:	Argon (99.999% pure), 22 psi (1.5 bar) $\pm 5\%$
Pneumatic:	Compressed Air, 40 psi (2.8 bar) $\pm 10\%$ , source must be oil and water free

### Gases Optional

Gas Dose:	Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) $\pm 10\%$
Gas Dose:	Nitrogen, 99.99% pure, 20 psi (1.4 bar) $\pm 10\%$

### Gas Flow Rates

Carrier:	490 cc/minute
Pneumatic:	280 cc/analysis

### Furnace

Impulse furnace with current and power control 7500 Watts maximum, liquid cooled

### Coolant

3.2 L LECO Coolant

### Operating Conditions

Temperature	15 to 35°C (59 to 95°F)
Rel. Humidity	20 to 80%, non-condensing

### Dimensions††

Height:	36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engaged
Width:	27.75 in. (71 cm)
Depth:	30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitor

### Electrical Power

230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr<sup>‡</sup>

### Weight (approximate)

Analyzer: 410 lb. (186 kg) without touch-screen monitor

\*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 2  $\sigma$  instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.

† Calculated as 1  $\sigma$  instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.

†† Allow for a 6 in. (15 cm) minimum access area around all sides.

‡ Average output based on nominal operating parameters.

V~ denotes VAC.

## Part Numbers

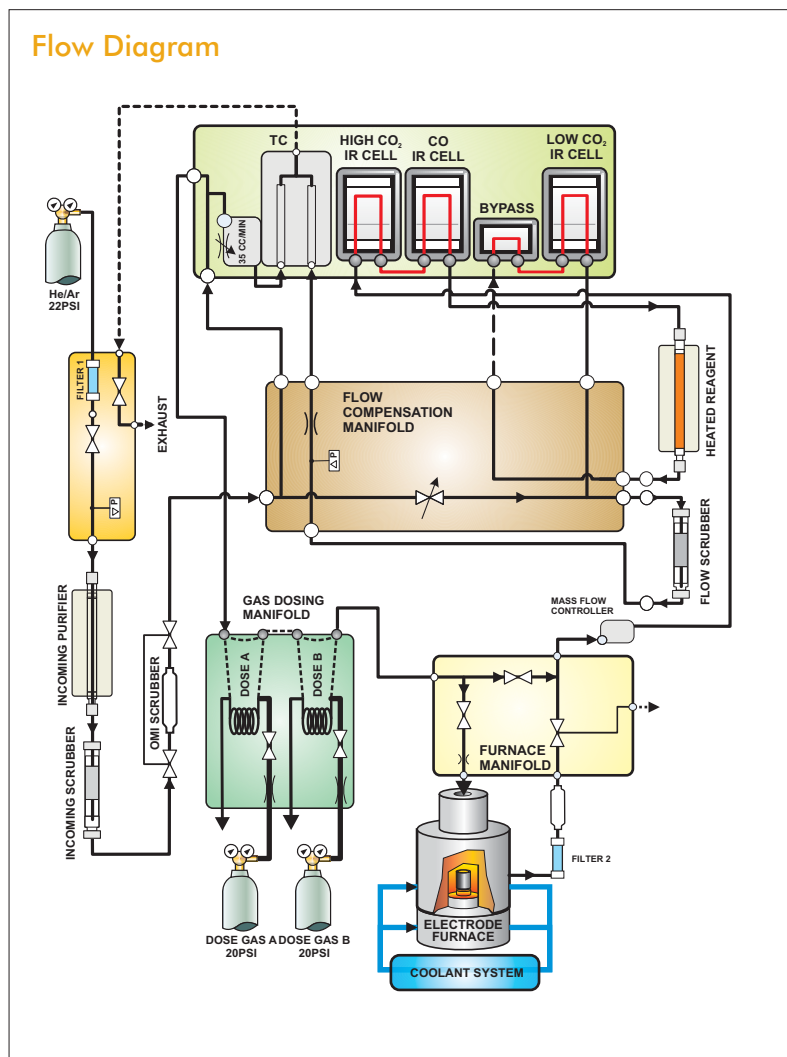
ON836-MC	O/N w/PC and touch-screen
ON836-C	O/N w/PC
ON836-HC	O/N w/PC and autocleaner
ON836-HMC	O/N w/PC, touch-screen, and autocleaner

## Theory of Operation

The ON836 Oxygen/Nitrogen system is designed for wide-range measurement of oxygen and nitrogen content of steel, refractory metals, and other inorganic materials. The patented detection system supports the true simultaneous analysis of oxygen and nitrogen during a single analysis, with one crucible. The instrument features custom MS Windows®-based software designed specifically for touch operation.

A pre-weighed sample is placed in a graphite crucible which is then heated in an impulse furnace to release analyte gases. An inert gas carrier, typically helium, sweeps the liberated analyte gases out of the furnace and through a Mass Flow Controller to a series of detectors. Oxygen present in the sample reacts with the graphite crucible to form CO and CO<sub>2</sub>, which are detected using non-dispersive infrared (NDIR) cells. The gas then flows through a heated reagent, where the CO is oxidized to form CO<sub>2</sub>, and H<sub>2</sub> is oxidized to form H<sub>2</sub>O. The gas then continues through another set of NDIR cells where CO<sub>2</sub> is detected. These analytes are then scrubbed out of the carrier gas stream. A patented Dynamic Flow Compensation (DFC) system is used to add carrier gas as a make-up for the gas lost during the scrubbing process. The final component in the flow stream is a Thermal Conductivity (TC) detector which is used to detect nitrogen.

The detection system is comprised of both NDIR and TC detectors. NDIR cells are based on the principle that CO and CO<sub>2</sub> 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<sub>2</sub> NDIR cells is required to give the most accurate oxygen results for a wide range of sample types and concentrations. TC detection is based on the principle that heated filaments within a bridge circuit are maintained at a constant voltage in a flowing stream of carrier gas. Changes to the composition of the gas stream will cause a change to the resistance of the filaments. Nitrogen from the sample will cause this type of change, which is recorded as the analytical signal. The concentration of an unknown sample is determined relative to calibration standards. To reduce interferences from instrument drift, NDIR reference measurements of pure carrier gas are made prior to each analysis while TC reference measurements are made throughout each analysis.



Specifications and part numbers may change.  
Consult LECO for latest information.  
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3000 Lakeview Avenue • St. Joseph, MI 49085 • Phone: 800-292-6141 • Fax: 269-982-8977  
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