

NH836 Nitrogen/Hydrogen

Specification Sheet

This instrument now supports either 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)

Nitrogen, He Carrier Gas:	0.00005** to 30 mg
Nitrogen, Ar Carrier Gas:	0.0002** to 30 mg
Hydrogen:	0.0001** to 2.5 mg

Precision†

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
Hydrogen:	0.00005 mg or 2% RSD, whichever is greater

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

Nitrogen, He Carrier Gas:	100 seconds	Nitrogen, Ar Carrier Gas:	130 seconds
Hydrogen, He Carrier Gas:	90 seconds	Hydrogen, Ar Carrier Gas:	100 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
- 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:	Nitrogen, 99.99% pure, 20 psi (1.4 bar) $\pm 10\%$
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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[‡]

Weight (approximate)

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

*Use the following formula to calculate element concentration:

$$\% \text{ element concentration} = ((\text{absolute element mass in mg}) / (\text{sample mass in mg})) * 100$$

**Lower range is calculated as 2 σ instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.

†Calculated as 1 σ 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.

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Part Numbers

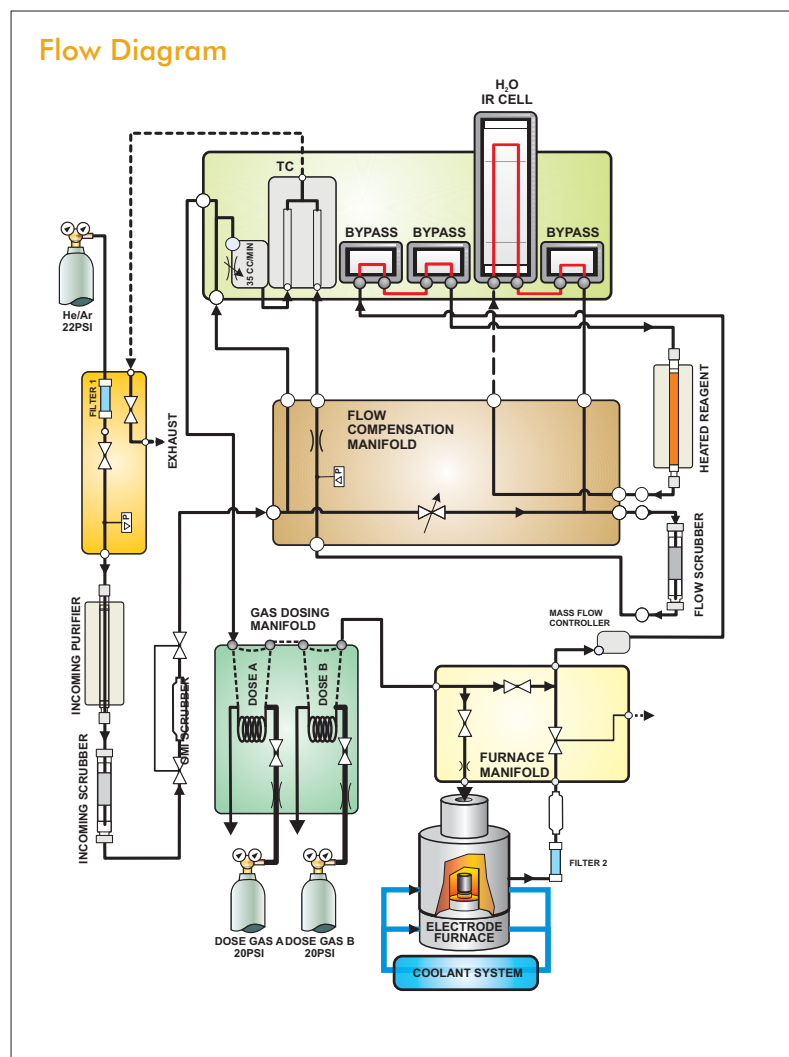
NH836-MC	N/H w/PC and touch-screen
NH836-C	N/H w/PC
NH836-HC	N/H w/PC and autocleaner
NH836-HMC	N/H w/PC, touch-screen, and autocleaner

Theory of Operation

The NH836 Nitrogen/Hydrogen system is designed for wide-range measurement of nitrogen and hydrogen content of steel, refractory metals, and other inorganic materials. The patented detection system supports the true simultaneous analysis of nitrogen and hydrogen during a single analysis, with one crucible and no carrier gas changeover. 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 CO₂, which flows through a heated reagent, where the CO is oxidized to form CO₂, and H₂ is oxidized to form H₂O. The gas then continues through an NDIR cell where H₂O 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 H₂O absorbs 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. 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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