

TCH600 Nitrogen/Oxygen/Hydrogen Determinator

Specification Sheet

Instrument Range at 1 gram*

Oxygen:	0.05 ppm to 5.0%
Nitrogen:	0.05 ppm to 3.0%
Hydrogen:	0.1 ppm to 0.250%

Precision**

Oxygen:	0.025 ppm or 0.5% RSD; whichever is greater
Nitrogen:	0.025 ppm or 0.5% RSD; whichever is greater
Hydrogen:	0.05 ppm or 2.0% RSD; whichever is greater

Readability†

Oxygen:	0.001 ppm
Nitrogen:	0.001 ppm
Hydrogen:	0.001 ppm

Calibration

standards, single or multi-point;
manual; gas dose

Cycle Time

Oxygen:	85 seconds nominal
Nitrogen:	100 seconds nominal
Hydrogen:	90 seconds nominal (includes purge/outgas/analysis)

Sample Size

1 gram nominal

Detection Method

Oxygen:	Non-dispersive infrared absorption
Nitrogen:	Thermal conductivity
Hydrogen:	Non-dispersive infrared absorption

Chemical Reagents

- Anhydrous Magnesium Perchlorate (MgClO₄)
- Sodium Hydroxide on an inert base
- Copper Oxide Wire
- Copper Sticks and Turnings
- Supelco™ OMI Filter

Gas Requirements

Carrier:	Helium, 99.99% pure, 20 psi (1.4 bar) ±10%
Pneumatic:	Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water free
Dosing (optional):	Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10% Nitrogen, 99.99% pure, 20 psi (1.4 bar) ±10%

Gas Flow Rates

Carrier:	450 cc/minute
Reference Flow:	30 cc/minute
Pneumatic:	280 cc/analysis

Furnace

Type:	Electrode furnace; current, power, and temperature control
Power:	7500 Watts, maximum

Data Storage

Weight List:	No practical limit
Result List:	No practical limit

Printer (external) Color Deskjet Printer (optional)
Dot Matrix Printer (optional)

Single Furnace/Determinator Dimensions**
31 in. H x 26 in. W x 30 in. D (79 x 66 x 76 cm)

Environmental Conditions

Operating Temp: 50 to 86°F
Rel. Humidity: 20 to 80%, non-condensing

Electrical Power Requirements 230 V~ (±10%; at max load),
50/60 Hz, single phase, 40 A,
31,400 BTU/hr

Weight (approximate)

TCH600 410 lb. (186 kg)
Total Shipping 460 lb. (209 kg)

Part Numbers

TCH600C Nitrogen/Oxygen/Hydrogen
Determinator with Windows®-based
software, free-standing PC, and flat
panel display

Options

617-970	Autocleaner Kit
621-527	Cassette Autoloader/Autocleaner Kit
619-901	Batch Autoloader Kit
619-902	Batch Autoloader/Autocleaner Kit
751-300-160	L-250 Balance and Interface Kit (0.1 mg)
750-000-160	L-050 Balance and Interface Kit (1.0 mg)
764-216	Helium Regulator
768-593	CO ₂ Regulator
766-036	Air Regulator
615-763	SmartLine® Modem-Based Remote Diagnostics
710-198-B/O	SmartLine Internet-Based Remote Diagnostics
621-434-110	Deskjet Printer Kit (110 V)
612-917	Dot Matrix Printer Kit (110 V); Serial

*The range may be extended beyond listed values.

**One sigma, conformance tested by gas dose analysis.

†Display capability.

‡Allow a 6-inch (15 cm) minimum access area around all units.

V~ denotes VAC.



Theory of Operation

The TCH600 measures nitrogen, oxygen, and hydrogen in a wide variety of metals, refractories, and other inorganic materials, employing the inert gas fusion principle. The instrument features a Windows®-based operating system. A weighed sample, placed in a high-purity graphite crucible, is fused under a flowing helium gas stream at temperatures sufficient to release oxygen, nitrogen, and hydrogen. The oxygen in the sample, in whatever form present, combines with the carbon from the crucible to form carbon monoxide. The nitrogen present in the sample releases as molecular nitrogen, and any hydrogen present is released as hydrogen gas.

Oxygen Measurement

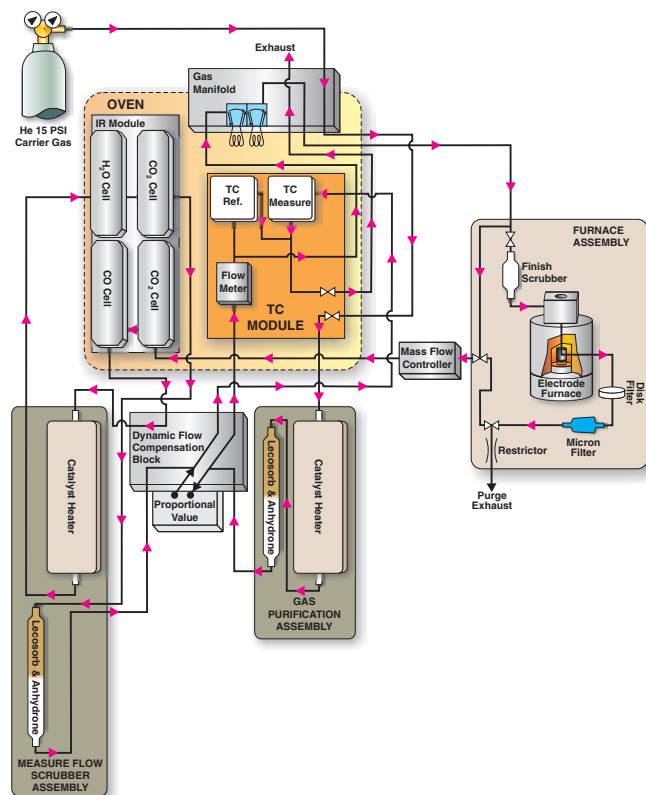
Oxygen is measured by infrared (IR) absorption. Sample gases first enter the IR module and pass through CO and CO₂ detectors. Oxygen present as either CO or CO₂ is detected. Following this, sample gas is passed through heated copper oxide to convert CO to CO₂ and any hydrogen to water. Gases then re-enter the IR module and pass through a separate CO₂ detector for total oxygen measurement. This configuration maximizes performance and accuracy for both low and high range. The instrument automatically chooses the optimum detection range.

Nitrogen Measurement

Nitrogen is measured by thermal conductivity (TC). Sample gases pass through heated copper oxide which converts CO to CO₂ and hydrogen to water. CO₂ and water are then removed with a Lecosorb/Anhydron trap to prevent detection by the TC cell. Gas flow then passes through the TC cell for nitrogen detection.

Hydrogen Measurement

Hydrogen is measured by infrared absorption. Sample gases pass through heated copper oxide which converts CO to CO₂ and hydrogen to H₂O. Gases enter the IR module and pass through an H₂O detector for total hydrogen measurement.



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

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