## **ON836 Oxygen/Nitrogen**

## **Specification Sheet**

Instrument Range\* (1 g sample)

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



| Oxygen: 0.00005*** to 30 mg   Nitrogen, Ar Carrier Gas: 0.00002*** to 30 mg   Precision <sup>1</sup> 0.00002** to 30 mg   Oxygen: 0.000025 mg or 0.3% RSD, whichever is greater   Nitrogen, Ar Carrier Gas: 0.000025 mg or 0.3% RSD, whichever is greater   Nitrogen, Ar Carrier Gas: 0.00017 mg or 0.3% RSD, whichever is greater   Anadysis Time (including outgors, purge, and analysis delay) Oxygen, Ar Carrier Gas: 95 seconds   Nitrogen, He Carrier Gas: 100 seconds Nitrogen, Ar Carrier Gas: 130 seconds   Cycle Time, He Carrier Gas: 100 seconds Nitrogen, Ar Carrier Gas: 130 seconds   Calibration Standards (single or multi-point); manual; gas dose 210 seconds 210 seconds   Calibration Standards (single or an uner Base • Oxygen/Moisture Indicating Tube 260 seconds   Detection Method Non-Dispersive Infrared Absorption; Thermal Conductivity • Rare Earth Copper Oxide, Copper Turnings   • Sodium Hydroxis Magnesium Perchlorate (MgCIO.) • Rare Earth Copper Oxide, Copper Turnings • Sodium Hydroxide on an Iner Base • Oxygen/Moisture Indicating Tube   Gas Requirements • Carrier Gas: Argon (99.99% pure), 22 psi (1.5 bar) ±5% • Oxygen/Moisture Indicating Tube   | Instrument kange* (1 g sampl                                | ie)   |                                  |             |  |
|--|---|---|----------------------------------|-------------|--|
| Nitrogen, Ar Carrier Gas: 0.0002** to 30 mg   Precision" 0xygen: 0.000025 mg or 0.3% RSD, whichever is greater   Nitrogen, Ar 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 outges, purge, and analysis delay) 95 seconds   Oxygen, He Carrier Gas: 85 seconds Oxygen, Ar Carrier Gas: 130 seconds   Cycle Time, He Carrier Gas: 100 seconds (noninal) Cycle Time, Ar Carrier Gas: 130 seconds   Cycle Time, He Carrier Gas: 130 seconds (noninal) Cycle Time, Ar Carrier Gas: 210 seconds   Calibration Standards (single or multi-point); manual; gas dose 210 seconds 210 seconds   Calibration Standards (single or multi-point); manual; gas dose \$ are Earth Copper Oxide, Copper Turnings \$ Socium Hydroxide on an Inert Base \$ Oxygen/Moisture Indicating Tube   Chemical Reagents * Anhydroxide on an Inert Base \$ Oxygen/Moisture Indicating Tube \$ Oxygen/Moisture Indicating Tube   Gas Requirements * Garpers Gas: Helium (99.99% pure), 22 psi (1.5 bar) ±5% \$ Norticeating Tube \$ Oxygen/Moisture Indicating Tube   Gas Bose: Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10% <t< th=""><th>Oxygen:</th><th>0.00005** to 50 mg</th><th></th><th></th></t<>  | Oxygen:   | 0.00005** to 50 mg  |                                  |             |  |
| Precision"0.000025 mg or 0.3% RSD, whichever is grouter or 0.000 RSD, whi |   | 0.00005** to 30 mg  |                                  |             |  |
| Oxygen:0.00025 mg or 0.3% RSD, whichever is greaterNitrogen, He Carrier Gas:0.00010 mg or 0.3% RSD, whichever is greaterNitrogen, Ar Carrier Gas:0.0001 mg or 0.3% RSD, whichever is greaterOxygen, Ar Carrier Gas:0.0001 mg or 0.3% RSD, whichever is greaterNitrogen, Ar Carrier Gas:85 secondsOxygen, He Carrier Gas:100 secondsNitrogen, He Carrier Gas:100 secondsCycle Time, He Carrier Gas:100 seconds (nominal)Cycle Time, He Carrier Gas:100 seconds (nominal)Cycle Time, He Carrier Gas:100 seconds (single or multi-point); manual; gas doseSample Size1 g (nominal)Detection MethodNon-Dispersive Infrared Absorption; Thermal ConductivityChemical Reagents• Anhydrous Magnesium Perchlorate (MgCIO.)• Rare Earth Copper Oxide, Copper Turnings<br>• Sodium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas Requirements• Anhydrous Magnesium Perchlorate (MgCIO.)• Rare Earth Copper Oxide, Copper Turnings<br>• Sodium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas Requirements• Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water freeGas Sose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%Gas Ibow Rates• Sas CanalysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolent3.2 L LECO CoolantOperating Conditions3.2 L LECO CoolantOperating Conditions5 to 35°C (59 to 95°F)<br>Rel. HumidityRel. Humidity20 to 80%, non-conden  | Nitrogen, Ar Carrier Gas:                                   | 0.0002** to 30 mg   |                                  |             |  |
| Nitrogen, He Carrier Gas:0.000025 mg or 0.3% RSD, whichever is greaterNitrogen, Ar Carrier Gas:0.0001 mg or 0.3% RSD, whichever is greaterAnalysis Time (including outper, purge, and analysis delay)Oxygen, Ar Carrier Gas:95 secondsNitrogen, He Carrier Gas:100 secondsNitrogen, Ar Carrier Gas:130 secondsKiltrogen, He Carrier Gas:100 seconds (nominal)Cycle Time, Ar Carrier Gas:130 secondsCalibrationStandards (single or multi-point); manual; seconds210 secondsCalibrationStandards (single or multi-point); manual; seconds210 secondsCalibrationNon-Dispersive Infrared Absorption; Thermal ConductiveVide, Copper TurningsChemical Reagents- Sodium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas Requirements- Sodium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas Requirements:Compressed Air, 40 psi (2.8 bar) ± 10%, source must be oil and water freeGas Sea OptionalCarbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ± 10%Gas Ibow Rates- Sodium Hydroxide or an Inert Base- Sodium VideGas Requirements:- Sodium Lyde, 99.99% pure, 20 psi (1.4 bar) ± 10%Gas Bose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ± 10%Gas Ibow Rates- Sodium Carmier and power current and power current 7500 Watts maximum, liquid cooledCordier:280 cc/analysisFurnaceImpulse furnace with current and power current 7500 Watts maximum, liquid cooledCoolent3.1 LECC CoolentOperating Conditions- So 35°C (59 to 95°F)<   | Precision <sup>†</sup>                                      |   |                                  |             |  |
| Nitrogen, Ar Carrier Gas: 0.0001 mg or 0.3% RSD, whichever is greater   Analysis Time (including outges, purge, and analysis delay) 0xygen, Ar Carrier Gas: 95 seconds   Oxygen, 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 Jose 210 seconds 210 seconds   Sample Size 1 g (nominal) Oxygen, Ar Carrier Gas: 210 seconds 210 seconds   Calibration Non-Dispersive Infrared Absorption; Thermal Conductivity Seconds (nopper Oxide, Capper Turnings 's oxygen/Moisture Indicting Tube   Chemical Reagents * Anhydrous Magnesium Perchlorate (MgCLO, ) * Rore Earth Copper Oxide, Capper Turnings 's oxygen/Moisture Indicting Tube   Gas Requirements: Kagen (99,999% pure), 22 psi (1.5 bar) ±5% * Oxygen/Moisture Indicting Tube   Arcarrier Gas: Helium (99.99% pure), 22 psi (1.5 bar) ±5% * Seconds   Arcarrier Gas: Nitrogen, 99.99% pure, 20 psi (1.4 bar) ±10% Seconds   Gas Dose: Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10% Seconds   Gas Iow Rates 20 cc/minute * Seconds   Pneumatic:   | Oxygen:   | 0.000025 mg or 0.3% RSD, whichever is greater                                       |                                  |             |  |
| Analysis Time (including outges, purge, and analysis delay) Oxygen, He Carrier Gas: 85 seconds Oxygen, Ar Carrier Gas: 95 seconds   Nitrogen, He Carrier Gas: 100 seconds (nominal) Cycle Time, 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 210 seconds Calibration   Standards (single or multi-point); manual; gas dose Sample Size 1 g (nominal) Cycle Time, Ar Carrier Gas: 210 seconds   Calibration Standards (single or multi-point); manual; gas dose Sample Size 1 g (nominal) Sample Size   Chemical Reagents - Anhydrous Magnesium Perchlorate (MgClO.) • Rare Earth Copper Oxide, Copper Turnings • Oxygen/Moisture Indicating Tube   Gas Requirements - Helium (99.99% pure), 22 psi (1.5 bar) ±5% - Oxygen/Moisture Indicating Tube • Oxygen, 99.99% pure), 22 psi (1.5 bar) ±5%   Ar Carrier Gas: Argon (99.99% pure), 22 psi (1.5 bar) ±5% - Sample Size • Oxygen/Moisture Indicating Tube   Gas Sose: Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10% Sas Sos Sample Size Sample Size   Gas Flow Rates - Carbon Dioxide, regressing <  | Nitrogen, He Carrier Gas:                                   | 0.000025 mg or 0.3% RSD, whichever is greater                                       |                                  |             |  |
| Oxygen, He Carrier Gas:85 secondsOxygen, Ar Carrier Gas:95 secondsNitrogen, He Carrier Gas:100 secondsNitrogen, Ar Carrier Gas:130 secondsCycle Time, He Carrier Gas:180 seconds (nominal)Cycle Time, Ar Carrier Gas:210 secondsCalibrationStandards (single or multi-point); manual; gas dose210 seconds210 secondsSample Size1 g (nominal)Detection MethodNon-Dispersive Infrared Absorption; Thermal ConductivityChemical Reagents• Anhydrous Magnesium Perchlorate (MgClO,)<br>• Sadium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas RequirementsHelium (99.99% pure), 22 psi (1.5 bar) ±5%<br>• Ar Carrier Gas:Argon (99.99% pure), 22 psi (1.5 bar) ±5%<br>• Oxygen/Moisture Indicating TubeGas Dose:<br>Gas Dose:<br>Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Bose:Sadiure Landicating TubeGas Ilow Rates280 cc/nninute<br>Pneumatic:280 cc/nninute<br>Pneumatic:Sadiure Landicating TubeFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolentOperating Conditions15 to 35°C (59 to 95°F)<br>Rel. Humidity20 to 80%, non-condensingImmensions"Dimensions"Height:<br>Mith:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engaged<br>With:27.75 in. (71 cm)<br>Depth:Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power   | Nitrogen, Ar Carrier Gas:                                   | 0.0001 mg or 0.3% RSD, whichever is greater   |                                  |             |  |
| Nitrogen, He Carrier Gas:100 secondsNitrogen, Ar Carrier Gas:130 secondsCycle Time, He Carrier Gas180 seconds (nominal)Cycle Time, Ar Carrier Gas:210 secondsCalibrationStandards (single or multi-point); manual; gas doseSample Size1 g (nominal)PetertionDetection MethodNon-Dispersive Infrared Absorption; Thermal ConductivityChemical Reagents• Anhydrous Magnesium Perchlorate (MgClO,)<br>• Sadium Hydroxide on an Inert Base• Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating TubeGas RequirementsHeium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas:Argon (99.99% pure), 22 psi (1.5 bar) ±5%<br>Pneumatic:Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water freeGas Sose:Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:Gas Flow Rates280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledColant3.2 L LECO CoolantOperating Conditions15 to 35°C (59 to 95°F)<br>Rel. HumidityTemperature15 to 35°C (59 to 95°F)<br>Rel. HumidityTemperature36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engaged<br>Width:With:2.7.75 in. (71 cm)<br>Depth:Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>3</sup>   | Analysis Time (including outgas, purge, and analysis delay) |   |                                  |             |  |
| Cycle Time, He Carrier Gas180 seconds (nominal)Cycle Time, Ar Carrier Gas210 secondsCalibrationStandards (single or multi-point); manual; gas doseSample Size1 g (nominal)Detection MethodNon-Dispersive Infrared Absorption; Thermal ConductivityChemical Reagents• Anhydrous Magnesium Perchlorate (MgClO <sub>4</sub> )• Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating TubeGas Requirements• Anhydrous Magnesium Perchlorate (MgClO <sub>4</sub> )• Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating TubeGas RequirementsHelium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas:Argon (99.999% pure), 22 psi (1.5 bar) ±5%<br>• Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water freeGase Optional<br>Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:Carrier:490 cc/minute<br>Pneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooled<br>CoolentColent3.2 L LECO CoolantOperating ConditionsT<br>TemperatureTemperature15 to 35°C (59 to 95°F)<br>Rel, Humidity20 to 80%, non-condensingDimensions**Height:<br>30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>4</sup>  | Oxygen, He Carrier Gas:                                     | 85 seconds  | Oxygen, Ar Carrier Gas:          | 95 seconds  |  |
| Calibration Standards (single or multi-point); manual; gas dose   Sample Size 1 g (nominal)   Detection Method Non-Dispersive Infrared Absorptior; Thermal Conductivity   Chemical Reagents • Anhydrous Magnesium Perchlorate (MgCIO.)<br>• Sodium Hydroxide on an Inert Base • Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating Tube   Gas Requirements He Carrier Gas: Helium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas: Argon (99.999% pure), 22 psi (1.5 bar) ±5%<br>Pneumatic:   Pneumatic: Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water free   Gass 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 280 cc/analysis   Furnace Impulse furnace with current and power control 7500 Watts maximum, liquid cooled   Colant 3.2 L LECO Coolant   Operating Conditions Temperature   Temperature 15 to 35°C (59 to 95°F)<br>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   Depth: <  | Nitrogen, He Carrier Gas:                                   | 100 seconds   | Nitrogen, Ar Carrier Gas:        | 130 seconds |  |
| Sample Size1 g (nominal)Detection MethodNon-Dispersive Infrared Absorption; Thermal ConductivityChemical Reagents• Anhydrous Magnesium Perchlorate (MgClO,)<br>• Sadium Hydroxide on an Inert Base<br>• Oxygen/Moisture Indicating TubeGas RequirementsHelium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas:<br>Argon (99.999% pure), 22 psi (1.5 bar) ±5%<br>Pneumatic:<br>Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water freeGass Optional<br>Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:<br>Nitrogen, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:Carrier:490 cc/minute<br>Pneumatic:Pneumatic:280 cc/analysisFurnace<br>Impuse furnace with current and power control 7500 Watts maximum, liquid cooled<br>Coolant<br>3.2 L LECO CoolantOperating Conditions<br>Temperature<br>   | Cycle Time, He Carrier Gas                                  | 180 seconds (nominal)   | Cycle Time, Ar Carrier Gas       | 210 seconds |  |
| Detection Method   Non-Dispersive Infrared Absorption; Thermal Conductivity     Chemical Reagents   * Anhydrous Magnesium Perchlorate (MgCIO.)<br>• Sodium Hydroxide on an Inert Base   * Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating Tube     Gas Requirements   *   He Carrier Gas:   Helium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas:   Argon (99.999% pure), 22 psi (1.5 bar) ±5%<br>Pneumatic:   Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water free     Gase Optional<br>Gas Dose:   Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:   Nitrogen, 99.99% pure, 20 psi (1.4 bar) ±10%     Gas Flow Rates   *   Carrier:   490 cc/minute<br>Pneumatic:   Page Colonal     Furnace   Impulse furnace with current and power control 7500 Watts maximum, liquid cooled   Coolent     Operating Conditions   *   Temperature   15 to 35°C (59 to 95°F)<br>Rel. Humidity   20 to 80%, non-condensing     Dimensions <sup>#†</sup> *   Height:   36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engaged<br>Width:   27.75 in. (71 cm)     Depth:   30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitor   200 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>1</sup>  | Calibration   | Standards (single or multi-point); manual;  | gas dose                         |             |  |
| Chemical Reagents• Anhydrous Magnesium Perchlorate (MgClO,)<br>• Sodium Hydroxide on an Inert Base• Rare Earth Copper Oxide, Copper Turnings<br>• Oxygen/Moisture Indicating TubeGas Requirements• Helium (99.99% pure), 22 psi (1.5 bar) ±5%<br>Ar Carrier Gas:• Argon (99.999% pure), 22 psi (1.5 bar) ±5%<br>Pneumatic:• Compressed Air, 40 psi (2.8 bar) ±10%<br>source must be oil and water freeGase Optional<br>Gas Dose:Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:• Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%<br>Gas Dose:• Angon (polymer), 22 psi (1.4 bar) ±10%<br>Gas Dose:• Angon (polymer), 22 psi (1.4 bar) ±10%<br>Gas Dose:• Angon (polymer), 20 psi (1.4 bar) ±10%<br>  | Sample Size   | 1 g (nominal)   |                                  |             |  |
| Chemical Reagents• Sodium Hydroxide on an Inert Base• Oxygen/Moisture Indicating TubeGas RequirementsHe 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 freeGases OptionalCarrior: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 Plow RatesCarrier:Pneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCollant3.2 L LECO CoolantOperating ConditionsTemperatureTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensionst"Height:Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>1</sup>   | Detection Method  | Non-Dispersive Infrared Absorption; Therm   | al Conductivity                  |             |  |
| 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 freeGases OptionalGas Dose: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 RatesCarrier:Carrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperatureTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>++</sup> Height:Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>4</sup>   | Chemical Reagents   |   |                                  |             |  |
| 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 freeGases OptionalCarbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%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 RatesCarrier:Carrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledColant3.2 L LECO CoolantOperating ConditionsTemperatureTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>#1</sup> Height:Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>3</sup>  | Gas Requirements  |   |                                  |             |  |
| Pneumatic:Compressed Air, 40 psi (2.8 bar) ±10%, source must be oil and water freeGases OptionalGas 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 RatesCarrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions**Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>   | He Carrier Gas:   | Helium (99.99% pure), 22 psi (1.5 bar) ±5   | %                                |             |  |
| Gases OptionalGas 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 RatesCarrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>#†</sup> Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Ar Carrier Gas:   |   |                                  |             |  |
| 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 Rates490 cc/minuteCarrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensionst <sup>+</sup> Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>3</sup>   | Pneumatic:  |   |                                  |             |  |
| Gas Dose:Nitrogen, 99.99% pure, 20 psi (1.4 bar) ±10%Gas Flow RatesCarrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>tt</sup> Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>   | Gases Optional  |   |                                  |             |  |
| Gas Flow RatesCarrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsTemperatureTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>tt</sup> Height:Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Gas Dose:   | Carbon Dioxide, 99.99% pure, 20 psi (1.4 bar) ±10%                                  |                                  |             |  |
| Carrier:490 cc/minutePneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsIs to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>t†</sup> Impulse furnace mining (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>   | Gas Dose:   |   |                                  |             |  |
| Pneumatic:280 cc/analysisFurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsImpulse for 35°C (59 to 95°F)Temperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>t+</sup> ImpulseHeight:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>   | Gas Flow Rates  |   |                                  |             |  |
| FurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsImpulse for 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensionsttImpulse for 10 cm monitority 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Carrier:  | 490 cc/minute   |                                  |             |  |
| FurnaceImpulse furnace with current and power control 7500 Watts maximum, liquid cooledCoolant3.2 L LECO CoolantOperating ConditionsImpulse for 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensionsttImpulse for 10 cm monitority 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Pneumatic:  | 280 cc/analysis   |                                  |             |  |
| Operating ConditionsTemperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>tt</sup> Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Furnace   | Impulse furnace with current and power co   | ntrol 7500 Watts maximum, liq    | uid cooled  |  |
| Temperature15 to 35°C (59 to 95°F)Rel. Humidity20 to 80%, non-condensingDimensions <sup>t†</sup> Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Coolant   | 3.2 L LECO Coolant  |                                  |             |  |
| Rel. Humidity20 to 80%, non-condensingDimensions**Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr*   | Operating Conditions  |   |                                  |             |  |
| Dimensions <sup>tt</sup> 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>   | Temperature   | 15 to 35°C (59 to 95°F)   |                                  |             |  |
| Height:36 in. (91.5 cm) nominal; 39.25 in. (100 cm) with load head cover lift engagedWidth:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>   | Rel. Humidity   | 20 to 80%, non-condensing   |                                  |             |  |
| Width:27.75 in. (71 cm)Depth:30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitorElectrical Power230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Dimensions <sup>++</sup>                                    |   |                                  |             |  |
| 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>  | Height:   | 36 in. (91.5 cm) nominal; 39.25 in. (100 cr   | m) with load head cover lift eng | aged        |  |
| <b>Electrical Power</b> 230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Width:  |   |                                  |             |  |
| <b>Electrical Power</b> 230 V~ (+10/-15%; at max load); 50A, 50/60 Hz, Single Phase; 12,500 BTU/hr <sup>‡</sup>  | Depth:  | 30 in. (76 cm) without monitor; 31.5 in. (80 cm) with attached touch-screen monitor |                                  |             |  |
|  | Electrical Power  |   |                                  |             |  |
|  | Weight (approximate)  |   | _                                |             |  |

\*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.

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

<sup>‡</sup>Average output based on nominal operating parameters.

V~ denotes VAC.



**Delivering the Right Results** 

<sup>&</sup>lt;sup>†</sup>Calculated as 1 σ instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.

## **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<sup>®</sup>-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 makeup 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. Windows<sup>®</sup> is a registered trademark of Microsoft Corporation.

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