828 Series Determinator

Specification Sheet

Instrument Range*	**Helium Carrier Gas**		**Argon Carrier Gas**	
	10 cm^3 Aliquot Loop	**3 cm^3 Aliquot Loop**	**10 cm^3 Aliquot Loop**	**3 cm^3 Aliquot Loop**
Nitrogen, FP828**	0.04 mg to 300 mg	0.08 mg to 300 mg	0.12 mg to 300 mg	0.24 mg to 300 mg
Nitrogen, FP828P and CN828	0.02 mg to 300 mg	0.04 mg to 300 mg	0.06 mg to 300 mg	0.12 mg to 300 mg
Carbon, CN828	0.02 mg to 175 mg	0.04 mg to 175 mg	0.02 mg to 175 mg	0.04 mg to 175 mg
Precision Range† *(mg vs RSD, whichever is greater)*				
Nitrogen, FP828	0.02 mg or 0.6% RSD	0.04 mg or 1.2% RSD	0.06 mg or 1.2% RSD	0.12 mg or 2.4% RSD
Nitrogen, FP828P and CN828	0.01 mg or 0.3% RSD	0.02 mg or 0.6% RSD	0.03 mg or 0.6% RSD	0.06 mg or 1.2% RSD
Carbon, CN828	0.01 mg or 0.4% RSD	0.02 mg or 0.8% RSD	0.01 mg or 0.4% RSD	0.02 mg or 0.8% RSD
Sample Mass				
FP828 and FP828P	up to 1.0 g, 0.5 g nominal			
CN828	up to 0.5 g, 0.25 g nominal			
Cycle Time/Throughput†† (Analyzing EDTA at Nominal Mass)				
	Helium Carrier Gas		**Argon Carrier Gas**	
FP828, FP828P, and CN828	2.8 mins / 21 samples/hr		3.0 mins / 20 samples/hr	
Detection Method				
Nitrogen	Thermal Conductivity (TC Cell) Detector			
Carbon	Non-Dispersive Infrared (NDIR) Absorption			
Gases Required				
Carrier Gas	Helium or Argon (99.99% purity) @ 25 psi (1.7 bar) ±10%			
Combustion Gas	Oxygen (99.99% purity) @ 25 psi (1.7 bar) ±10%			
Pneumatic Gas	Compressed Air (oil and water free), 40 psi (2.8 bar) ±10%			
Resistance Furnace	1050 °C max (Primary and Secondary Furnace)			
Autoloader	30-sample position (up to 120-sample position optional)			
Operating Conditions	**Temp:** 15 °C to 35 °C (59 °F to 95 °F) **Rel. Humidity:** 20% to 80%, non-condensing			
Sound Pressure Level	58 dBa (max reading at operator's level per IEC/EN 61010-1)			
Electrical Power	230 V~ (+10%/-15%; at max load), 50/60 Hz, single phase, 12A max, 2,400 Btu/hr§			
Dimensions‡				
Instrument with touch-screen	31.5 in H x 25.3 in W x 31 in D (80 cm H x 59 cm W x 79 cm D) *Distance from instrument back panel to front foot is 22 in (56 cm)*			
Weight (approx.)	250 lb (113 kg)			

Part Numbers	
FP828-MC	FP828 base model with single loop aliquot (10 cm^3), software, PC, and touch-screen display
FP828P-MC	FP828 performance model with dual loop aliquot (10 cm^3 and 3 cm^3), software, PC, and touch-screen display
CN828-MC	CN828 performance model with dual loop aliquot (10 cm^3 and 3 cm^3), software, PC, and touch-screen display

**Lower range is calculated as 2 sigma instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.*
***10 cm^3 aliquot loop installed in FP828 model, 3 cm^3 aliquot loop parts included with the instrument as an option for installation in place of the standard 10 cm^3 aliquot loop*
†Calculated as 1 sigma instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.
††Cycle Time and Throughput represent the time between two sequential samples results being reported with portions of the Analysis time for the samples being interleaved
‡Allow for a 6-inch (15 cm) minimum access area around the side of the instrument; space not required behind the instrument.
§Average output based on nominal operating parameters.

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Theory of Operation

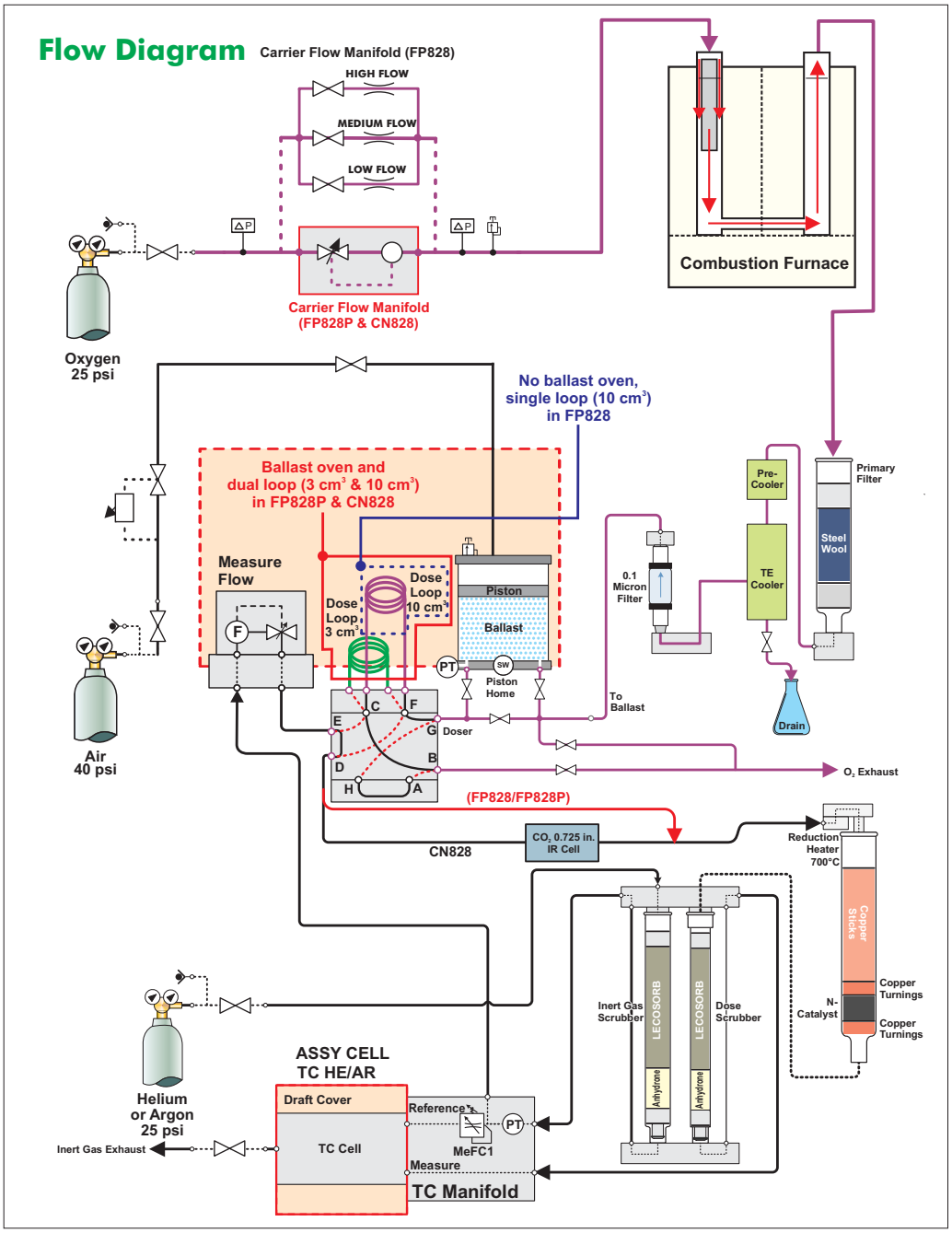
The 828 Series determines nitrogen/protein or carbon/nitrogen in a multitude of organic matrices from food and feeds to soils and fertilizers. The system utilizes a combustion technique with a vertical quartz furnace designed to handle diverse sample matrices with rapid cycle times and extended reagent lifetimes, delivering unsurpassed throughput coupled with superior instrument uptime.

To begin an analysis, the sample is weighed into a tin capsule or encapsulated within tin foil and placed into the loader. A fully automated analysis sequence transfers the sample to a sealed purge chamber, where atmospheric gas is removed. The purged sample is transferred automatically into a reticulated ceramic crucible within the furnace. To ensure complete and rapid combustion (oxidation) of the sample, the furnace environment is composed of pure oxygen with a secondary oxygen flow being directed to the sample within a reticulated crucible via a quartz lance. The combustion gases are swept from the furnace through a thermoelectric cooler to remove moisture, and are collected in a thermostatically controlled ballast volume. The gases equilibrate and mix within the ballast before a representative aliquot of the gas is extracted and introduced into a flowing stream of inert gas for analysis. Depending upon the analyzer model, the aliquot gas is carried to a non-dispersive infrared (NDIR) cell for the detection of carbon (as carbon dioxide) and a thermal conductivity cell (TC) to detect nitrogen (N_2). Unlike NDIR cells, TC cells are chemically non-specific, so a series of reagents and scrubbers are used to ensure quantitative detection of N_2 without chemical interference. A heated reduction tube, filled with copper, is used to convert nitrogen oxide species (NO_x) to N_2 and to remove excess oxygen. Carbon dioxide (CO_2) is removed by LECOSORB and water (H_2O) is removed by Anhydrone.

Careful sequencing of the analysis by Cornerstone® brand software provides maximum sample throughput by interleaving the sample loading sequence with quantitation of the aliquot gases from the previous sample.

The determined composition of the sample is displayed in weight percent or parts-per-million, and can also be displayed in other custom units if preferred.

Many diagnostic sensing capabilities are included in the 828 Series analyzer. Multiple Pressure Transducers (PT) have been included to provide the ability to leak check individual segments of the flow path. Digital Mass Flow Controllers (MFC's) are used to control and measure critical gas flows. Thermal sensors and heaters are used to thermostatically control the temperature of critical components such as the furnace, the ballast, the dose loop, the MFC, the NDIR cell, and the TC cell.



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