CS844

Carbon/Sulfur Determination

Specification Sheet

Instrument Range*		
Carbon:**	0.0006 mg to 60 mg	
Sulfur:**	0.0006 mg to 60 mg	
Precision†		
Carbon:	0.0003 mg or 0.5 % RSD, whichever is greater	
Sulfur:	0.0003 mg or 0.5 % RSD, whichever is greater	
Calibration	Standards, multi-point, gas dose	
Analysis Time§	40 s	
Cycle Time§	130 s (including gas, purge, analysis delay, and analysis time)	
Throughput	27 samples/h (nominal)	
Sample Size	1 g (nominal)	
Detection Method	Non-Dispersive Infrared Absorption	
Chemical Reagents	• Anhydrous Magnesium Perchlorate ($MgClO_4$) • Sodium Hydroxide on an Inert Base • Rare Earth Copper Oxide	• Platinized Silica Gel • Cellulose
Gas Requirements	• Carrier: Oxygen, 99.5 % pure, 35 psi (2.41 bar) ±10 % • Pneumatic: Compressed Air (oil, water free), 40 psi (2.76 bar) ±10 % • Dosing: Carbon Dioxide, 99.99 % pure, 20 psi (1.38 bar) ±10 %	
Gas Flow Rates	Carrier: 3 L/min	Pneumatic: 1 L/analysis
Furnace	Induction, 2.2 kW max (rampable 0 % to 100 % power), liquid cooled	
Coolant	300 mL LECO Coolant	
Operation Conditions	Operating Temp: 15 °C to 35 °C (59 °F to 95 °F) Rel. Humidity: 20 % to 80 % (non-condensing)	
Sound Pressure Level	62 dBa excluding vacuum (max reading at operator's level per IEC/EN 61010-1)	
Physical Dimensions††	33 in H × 26 in W × 30 in D (84 cm × 64 cm × 75 cm) with touch-screen monitor	
Electrical Power Requirements	230 V~ (+10/-15 % at max load); 50/60 Hz, single phase, 25 A; 5500 Btu/h‡	
Weight (approx.)	308 lb (140 kg) with monitor	292 lb (132 kg) without monitor

Part Numbers

CS844-C	Carbon/Sulfur Determinator with software and external PC
C844-C	Carbon Determinator with software and external PC
S844-C	Sulfur Determinator with software and external PC

Options

NOTE: Multiple configurations of options are available. Please contact your local LECO Sales Engineer for more details.

- Optional mounted touch-screen monitor package (M)
- Optional automatic cleaner and tube removal package (H)

* *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 2σ instrument blank deviation. Method range may differ due to factors such as sample type and method parameters.*
† *Calculated as 1σ instrument blank deviation. Method precision may differ due to sample inhomogeneity or other external factors.*
§ *All times listed are nominal, actual times may vary based on method settings and application.*
†† *Allow for a 6 in (15 cm) minimum access area around all sides.*
‡ *Average output based on nominal operating parameters.*

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Theory of Operation

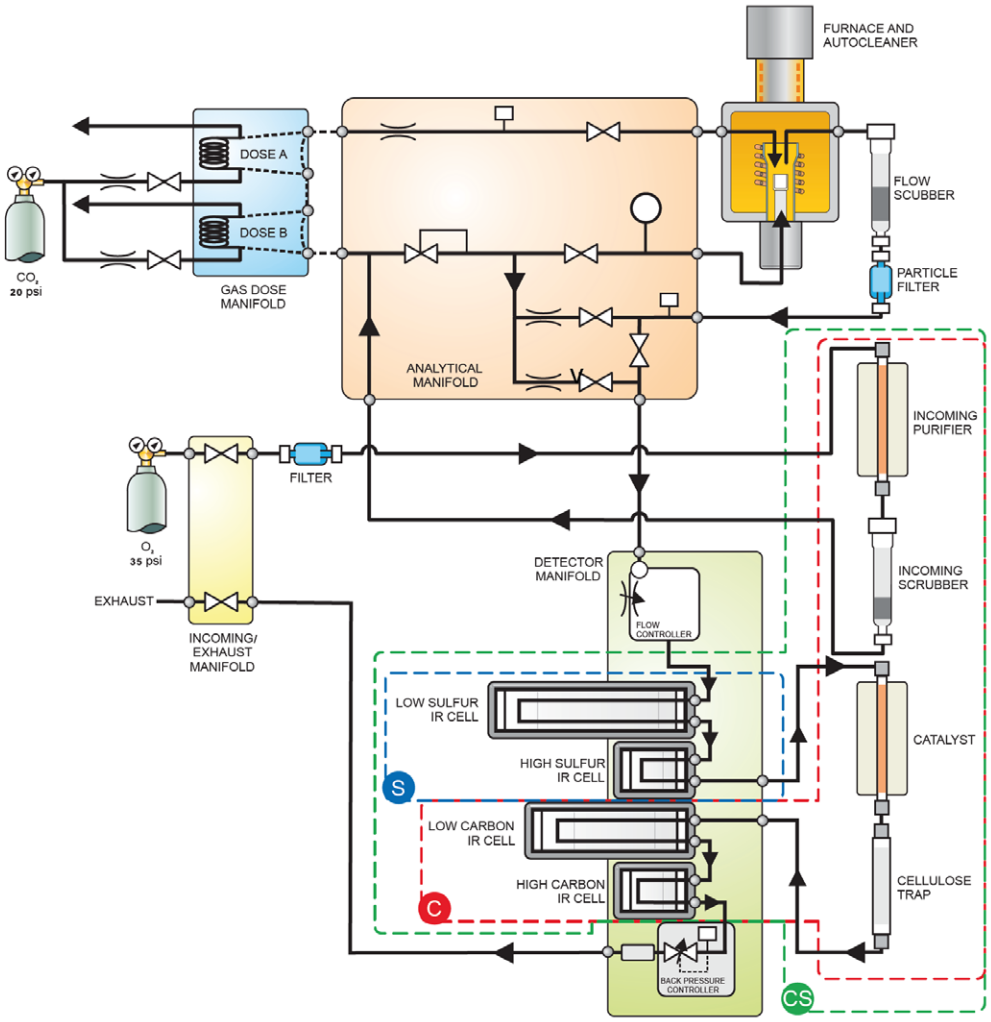
The CS844 Carbon/Sulfur system is designed for wide-range measurement of carbon and sulfur content of metals, ores, ceramics, and other inorganic materials. The instrument features custom software designed specifically for touch operation.

A pre-weighed sample of approximately 1 g is combusted in a stream of purified oxygen using RF induction to heat the sample. Carbon and sulfur present in the sample are oxidized to carbon dioxide (CO_2) and sulfur dioxide (SO_2), and swept by the oxygen carrier through a heated dust filter, a drying reagent, and then through two non-dispersive infrared (NDIR) cells, where sulfur is detected as SO_2. The gas flow continues past a heated catalyst, where carbon monoxide (CO) is converted to CO_2 and where SO_2 is converted to sulfur trioxide (SO_2), which is subsequently removed by a filter. Carbon is then detected as CO_2 by a second pair of NDIR cells.
A pressure controller is used to maintain constant pressure in the NDIR cells so as to reduce interference from natural variations in atmospheric pressure. The final component in the flow stream is an electronic flow sensor, which is used for diagnostic purposes to monitor the carrier flow.

Non-dispersive infrared cells are based on the principle that CO_2 and SO_2 absorb infrared (IR) energy at unique wavelengths within the IR spectrum. Incident IR energy at these wavelengths is absorbed as the gases pass through IR absorption cells. Since absorption is dependent upon the path length, short and long pathlength IR cells are provided for measurement of high and low range signals. The software automatically selects which cell to use for optimum measurement. The concentration of unknown samples is determined relative to calibration standards. To reduce interferences from instrument drift, reference measurements of pure carrier gas are made prior to each analysis.

Flow Diagram Shown for CS/S844ES Configuration

Configuration-specific flow diagrams available on request



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