

Petroleum Fuels

Sulfur & Nitrogen *process analyzers*



6000 SERIES

- ◆ Total sulfur and/or total bound nitrogen
 - ◆ <1 ppm
 - ◆ Meet new government sulfur regulations today
 - ◆ Low maintenance
 - ◆ Sulfur conforms to ASTM D5453
 - ◆ Nitrogen conforms to ASTM D4629
 - ◆ Worldwide installed base
 - ◆ LPG/Gas analysis
-

6000 SERIES

Application specifications

Applications

- Gasoline
- Gas Oils
- Mo-Gas
- Diesel
- Kerosine
- Naphtha
- Natural Gas
- LPG
- Other Gas and Liquid Samples

Versatile

- Total sulfur - total nitrogen - or both
- Modular designed detectors and electronics
- Low maintenance - accessible components
- Customized sample conditioning systems available
- Multi-sample configuration available
- Variety of system enclosures

Performance satisfaction

- Each application reviewed by experienced, knowledgeable, technical staff
- Sulfur complies with current ASTM Method: D5453
- Nitrogen complies with current ASTM Method: D4629
- Extensive customer reference list
- Simple to operate
- Comprehensive in-house or on-site training
- Worldwide representative/distributive network

Plant DCS communication

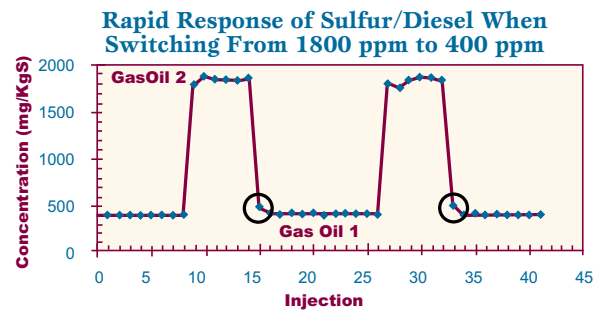
The 6000 Series uses scaled 4-20 mA and optional RS232/485 data outputs for communicating the sulfur or nitrogen concentration.

Technology link to your lab

Your laboratory probably uses an ANTEK sulfur or nitrogen analyzer. The ANTEK 6000 Series uses the same technology as the widely accepted ANTEK lab analyzers. We receive many referrals from satisfied lab customers at the same plant location. Many customers appreciate having the same methodology at the process and in the lab so that process and lab speak the same language.

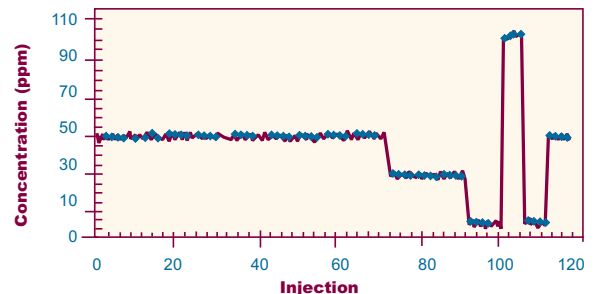
Sample conditioning

Sample conditioning system (SCS) is critical to the success of reliably measuring sulfur or nitrogen. We provide optional sample conditioning to remove contaminants and H₂O, regulate sample pressure, and control sample flow to insure that the sample enters our analyzer under constant conditions. Let us help design your SCS to optimize your analysis.



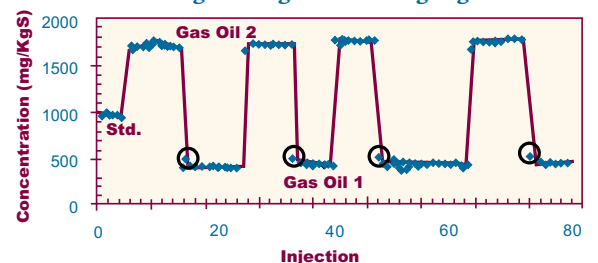
Memory Study on Gas Oil Samples with a dual range of 0-500 and 5000 mg/Kg of total sulfur. The circled data point indicates the first injection, after the sample was switched from high to low concentration.

Excellent Repeatability for Sulfur/Gasoline at Three Different Concentrations: 50 ppm, 30 ppm, and 5 ppm



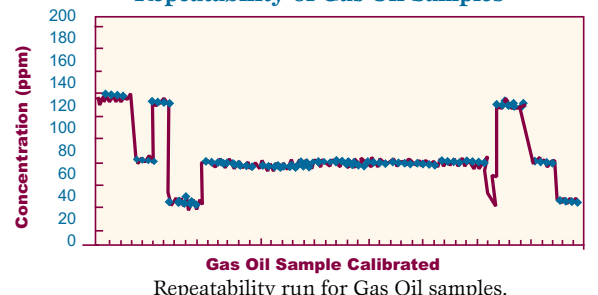
Above chart shows the excellent repeatability of a 50.44 ppm/wt Gasoline Sample with a Standard Deviation of .47 (.93% RSD). Then a sample run of 29.92 ppm/wt with a Standard Deviation of .23, with an RSD of 0.75%, then a sample of 4.95 ppm/wt with a Standard Deviation of 0.14, with an RSD of 2.87. Then the sample was spiked with approximately 103 ppm/wt for 4 Cycles, then returned to the lower range.

Gas Oil Diesel Sample Memory Study Single Range 0-2000 mg/KgS



Memory Study on Gas Oil single range of 1-2000 mg/Kg of total sulfur. The circled data point indicates the first injection, after the sample was switched from high to low concentration. Injection Cycle was 5 minutes with a 5ul injection sample.

Repeatability of Gas Oil Samples



Repeatability run for Gas Oil samples.

6000 SERIES

The leadership continues...

Building upon years of innovation, analytical leadership, and customer satisfaction, ANTEK once again sets the standard against other sulfur/nitrogen analysis instruments. Low maintenance and fast response are some of the reasons why ANTEK Industrial is the world leader in sulfur and nitrogen process on-line analysis.

The ANTEK Advantage

■ Experienced

We are the experts at sulfur and nitrogen analysis technology with over 30 years experience in analytical instrumentation.

■ Recognized

We utilize the most widely accepted methods for sulfur and nitrogen determination. These are the methods of choice by regulatory agencies and method writing institutions worldwide.

■ Responsive

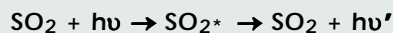
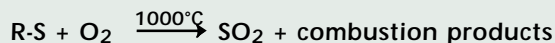
Our experienced staff of engineers and chemists will help you solve your analytical problems and fit the 6000 Series to your application. Systems are custom designed for your application.

■ Cost-effective

No expensive chemicals, no column switching, reagents, or tapes are needed. Fast analysis response time. Low consumables.

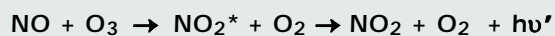
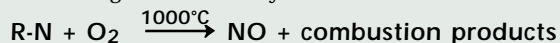
Total Sulfur Analysis - 6000 S

Our Pyro-fluorescent™sulfur analysis technology is a fast and accurate quantitation method. It provides determinations for an analytical range of down to 250 ppb up to percent levels. Flow through systems provide real-time results; discrete sampling systems provide results within minutes. This clean instrumental method is more stable than lead acetate tape methods without the consumables or lead waste disposal problems. It does not have the matrix problems of x-ray and is accurate to much lower levels of sulfur. It does not require column switching, back flushing, or measuring all sulfur species, then calculating them into total sulfur.



Total Nitrogen Analysis - 6000 N

Utilizing accuracy and precision of our Pyro-chemiluminescent technology, the 6000 N Series delivers total nitrogen determinations from 250 ppb to percent levels. Discrete sampling systems provide results within minutes. Chemiluminescence is the clean, rapid method for determining total bound nitrogen in a variety of matrices.



Product features

Patented Pyro-fluorescent™sulfur and Pyro-chemiluminescent™nitrogen technology

- fast, precise measurement of liquid, LPG, and gas samples
- sensitivity from 250 ppb to percent levels
- linear response over four orders of magnitude
- excellent reproducibility
- dual range capability
- multistream capability
- no environmentally hazardous catalysts, reagents, tapes or other wastes
- no radioactive license required
- no matrix effects
- easy to calibrate; low maintenance
- fast cycle time: 3-5 minutes per stream
- no columns
- no CO₂ interference

Test method & regulatory compliance

- ASTM D5453 total sulfur in gasoline, diesel, and oils
- ASTM D2622 and D4294 equivalency
- ASTM D4629 total nitrogen in gasoline, diesel, and oils
- Approved and Recognized: California Air Resources Board (CARB), USEPA
- CSA/NRTL
- CENELEC-ATEX certification
- EPA
- CE



P 6000 S System

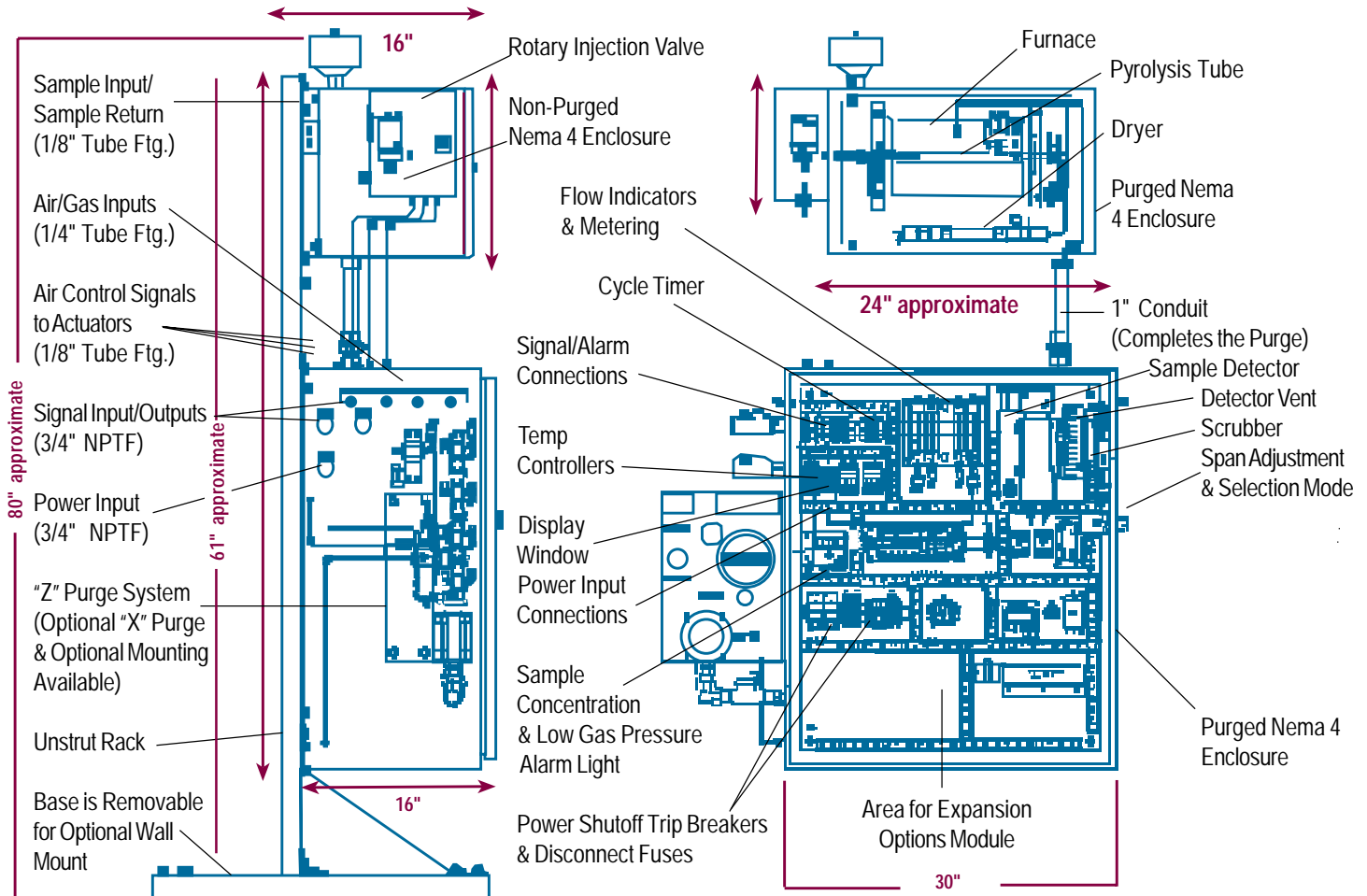


For analyzing liquids, a sample injection valve introduces a 5 μ L sample into an Argon carrier stream, that sweeps the sample into a pyrolysis tube. The sample is combusted with an excess of O₂. Sulfur compounds are converted to SO₂, nitrogen compounds to NO, and hydrocarbons to CO₂ and H₂O. Excess water is removed by a membrane dryer and the sample then passes into a UV reaction chamber. The SO₂ is excited by UV light and emits a specific wavelength that is detected using a photomultiplier tube (PMT). The PMT response is proportional to the SO₂ that fluoresces in the reaction chamber.



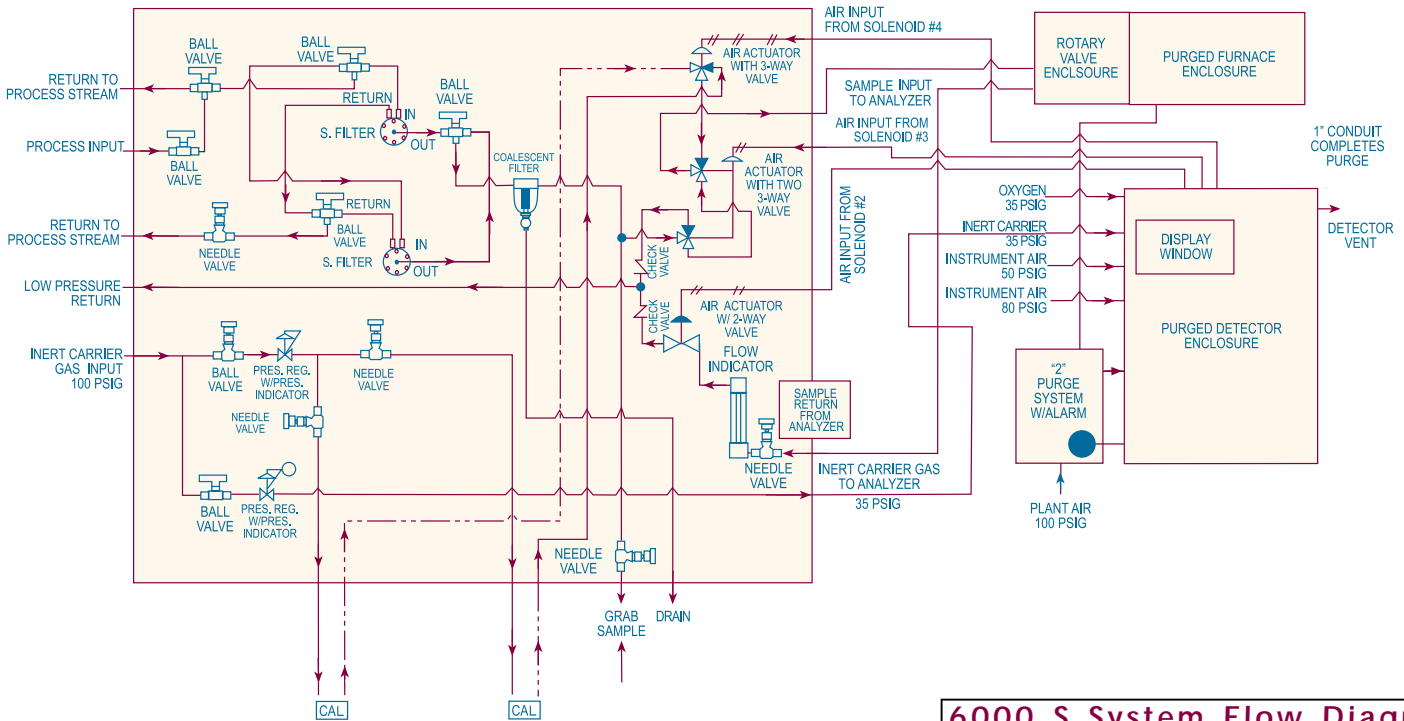
C 6000 S CENELEC System

6000 S Typical Cabinet Dimensions Drawings

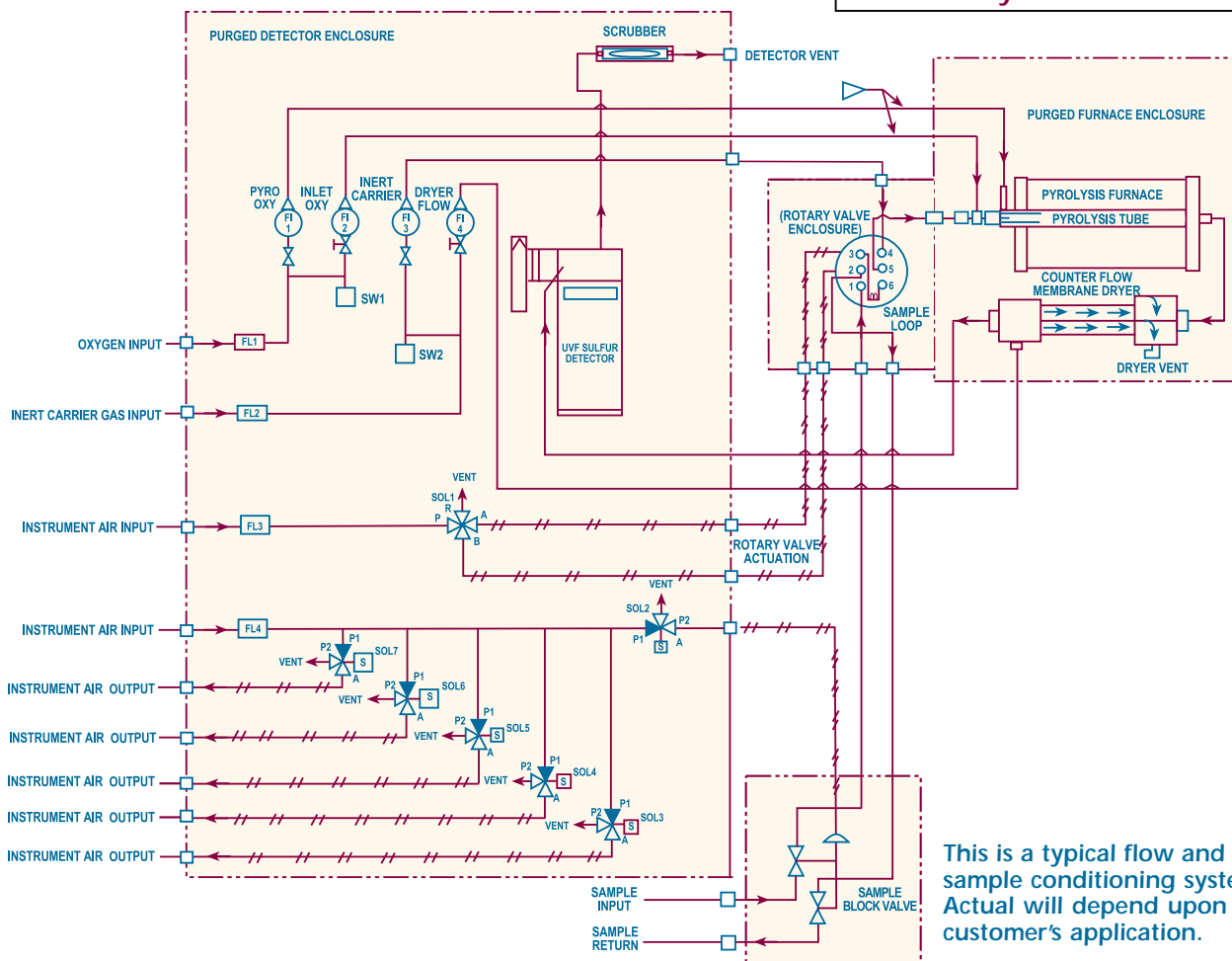


6000 SERIES

6000 Conditioning Panel



6000 S System Flow Diagram



This is a typical flow and sample conditioning system. Actual will depend upon customer's application.

Typical product specifications

Sulfur 6000 S Series

Detection Method: Pyro-fluorescence™

ASTM Method: **ASTM D5453**

Analytical Range: Lower Detection Limit: 250 ppb to percent levels

Accuracy: within < 1% of full-scale

Precision: < 1% of full-scale

Analysis Time: 2 minutes (analysis over 1000 ppm may take longer)

Cycle Time: 5 minutes

Ambient Temperature: 50-75 F (10C-24C)

Power Requirements: 110v/60Hz/1500w/20A- 220v/50Hz/1500w/10A

Cabinet Dimensions: 72"h x 32"w x 21"d - 182.88 x 81.28 x 53.34 cm

Weight: 400 pounds (181.44 Kg)

Electrical Classification: Class I Div. 1 Groups C-D (B optional) X purge
Class I Div. 2 Groups C-D (B optional) Z purge
CENELEC Eex p IIC T4 (C 6000 S)

Certifications: CSA/NRTL, CENELEC, CE, NEC

Utilities: **Carrier Gas:** Argon or Nitrogen (99.975%), regulated to 35 psig. Typical Flow Rate 10-25 cc/min

Combustion Gas: Oxygen O₂ (99.975%), regulated to 35 psig. Typical Flow Rate 350 cc/min

Instrument Air: Clean, dry, particle free for purge to 80-100 psig

Sample injection: Valve regulated to 50 psig, 5 ul sample vol.

Signal Output: 4-20mA isolated at 750 Ω, RS 232/485 optional

Sample System: Recommended option

Nitrogen 6000 N Series

Detection Method: Pyro-chemiluminescence™

ASTM Method: **D4629, DIN #38409, TEIL 27**

Analytical Range: Lower Detection Limit: 250 ppb to percent levels

Accuracy: within < 1% of full scale

Precision: < 1% of full scale

Cycle Time: 3-5 minutes

Ambient Temperature: 50-75 F (10C-24C)

Power Requirements: 110v/60Hz/1500w/20A - 220v/50Hz/1500w/10A

Cabinet Dimensions: 72"h x 32"w x 21"d - 182.88 x 81.28 x 53.34 cm

Weight: 400 pounds (181.44 Kg)

Electrical Classification: Class I Div. 1 Groups C-D (B optional) X purge
Class I Div. 2 Groups C-D (B optional) Z purge
CENELEC Eex p IIC T4

Certifications: CSA/NRTL, CENELEC, CE, NEC

Utilities: **Carrier Gas:** Argon (99.975%), regulated to 35 psig.
Typical Flow Rate 10-25 cc/min

Combustion Gas: Oxygen O₂ (99.975%), regulated to 35 psig. Typical Flow Rate 350 cc/min

Instrument Air: Clean, dry, particle free for purge to 80-100 psig

Sample injection: Valve regulated to 50 psig, 5 ul sample vol.

Signal Output: 4-20mA isolated at 750 Ω, RS 232/485 optional

Sample System: Recommended option

Continuing research and development may result in specification or appearance changes at any time.

Ordering information

Model 6000 N Nitrogen Analyzer designed for rapid analysis of liquid or gas samples for total chemically bound nitrogen. Basic system comprised of detector/electronics enclosure, furnace enclosure, and operation/service manual. Complies with **ASTM D4629**.

Model 6000 S Sulfur Analyzer designed for rapid analysis of liquid or gas samples for total sulfur. Basic system comprised of detector/electronics enclosure, furnace enclosure, and operation/service manual. Complies with **ASTM D5453**.

Model 6000 NS Nitrogen/Sulfur Analyzer designed for rapid analysis of liquid or gas samples for simultaneous detection of total chemically bound nitrogen and total sulfur. Basic system comprised of detector/electronics enclosure, furnace enclosure, and operation/service manual. Complies with **ASTM D4629 and D5453**.

The technology used in ANTEK Industrial's process instrumentation is also available for laboratory applications.

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