

STANDARD SPECIFICATION

Model NSX-2100H

Trace Nitrogen, Sulfur and Halogen Analyzer system utilizing oxidative sample combustion.

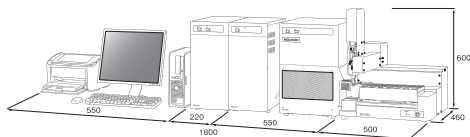
| Trace Elemental Analyzer NSX-2100H | |
|------------------------------------|---|
| Samples | Solid, Non-aqueous liquid, Gaseous, LPG |
| Analytical method | Oxidative Pyrolysis and detection |
| Furnace | Max. 1,100°C, two part independent controlled. Horizontal electric furnace HF-210. Open/Close type. |
| Detector | Ultraviolet Fluorescence (UVFL) for Sulfur - Model SD-210. temperature controlled cell |
| | Chemiluminescence (CLD) for Nitrogen - Model ND-210. temperature controlled cell |
| | Microcoulometry for Chlorine and Sulfur - Model MCD-210. |
| Measuring range | UVFL-Sulfur solid: 0.05-10,000µg/g, liquid: 0.05 - 5,000µg/ml |
| | CLD-Nitrogen solid: 0.5-5,000µg/g, liquid: 0.2 - 5,000µg/ml |
| | Coulometry Chlorine 0.01 - 500µg (0.1 - 5,000µg/ml) |
| | Coulometry Sulfur 0.05 - 50µg (0.5 - 500µg/ml) |
| Typical sample size | Solid 30mg (up to 150mg) |
| | Non-aqueous liquid 50µl (up to 100µl) |
| Measuring time | UVFL/CLD 3-10min. (simultaneous Nitrogen/Sulfur available) |
| | Coulometry less than 10min |
| Gas | Ar and O ₂ |
| Others | Vacuum pump for ND-210 |
| Electric | 100-240VAC 50/60Hz |

| Module specification | Power consumption | Dimension WDH mm | Mass |
|----------------------|-------------------|------------------|------|
| Furnace HF-210 | 1000 VA | 320 x 430 x 500 | 25Kg |
| Detector SD-210 | 150 VA | 220 x 375 x 500 | 21Kg |
| Detector ND-210 | 300 VA | 220 x 375 x 500 | 22Kg |
| Detector MCD-210 | 150 VA | 220 x 375 x 500 | 14Kg |

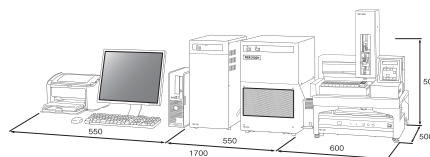
| | |
|-----------|--|
| PC | |
| OS | Microsoft Windows® 10 professional 64bit |
| Processor | 2.4 GHz or more |
| Memory | 2 GB or more |
| HD | 160 GB or more |
| Drive | one CD-ROM or DVD disk drive |
| Display | 15 inches display or more |
| Printer | compatible to OS |
| Port | 1 serial port (RS-232C, D-sub9) |

● Configuration and dimension examples (unit: mm)

Two detector system with solid/liquid sampler



One detector system with ABC+liquid sampler



Note: Follow instructions in manuals to correctly install, connect and operate the instruments. Contents of catalogues are subject to change without prior notice when improvements are made in performance. The actual color of the goods may appear different from color printed. All screen images are simulated. *Company and product names contained herein are the trademarks or registered trademarks of the company concerned.

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CAT No.05090520041E

NSX-2100H

Trace Elemental Analyzer Horizontal System



Nittoseiko Analytech Co.,Ltd.

NSX-2100H

Fuel, Oil, Lubricant, LPG, Plastics, Powder, Rubber, Coal, Inorganics for the industries of Energy, Chemical, Environment, Electronics, Automobile.
Oxidative combustion technique has been widely recognized and utilized for various purposes.

NSX-2100H: 4 different detectors can be connected to 1 furnace depending on your requirement.

- Nitrogen: Chemiluminescence.
- Sulfur: UVFL, Coulometry.
- Chlorine: Coulometry.
- S, F, Cl, Br, I: Ion Chromatography.

● 40 boats for Solid automation



● Liquid handle in solid sampler



● Open/Close furnace for daily maintenance



■ TWO RANGE SELECTION, EASY OF USE.

Simpler sensitivity selection of detector.

| $\mu\text{g/g}$ | Sulfur | Nitrogen |
|-----------------|------------|-----------|
| High sense | 0.05 - 10 | 0.5 - 50 |
| Low sense | 1 - 10,000 | 1 - 5,000 |

■ HANDLING LIQUID WITH SOLID SAMPLER.

Solid sampler ASC-240S can handle liquid sample by liquid port. No need to change set up for urgent sample request.

■ EASY DAILY MAINTENANCE.

Unique Open/Close furnace provide easier daily preparation before start.

■ LOW RUNNING COST.

Less gas consumption than before by newly designed detector.

■ MODULARITY, FLEXIBILITY.

Customized system for today's requirement and for future possibility.

Sample injectors



Detectors



Furnace



C-IC prep station



Software

Intuitive advanced software will increase usability of protection, operation, and integration.

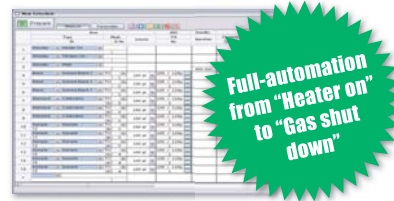
■ PROTECTION

Three level login function can protect method and data from unforeseen change.

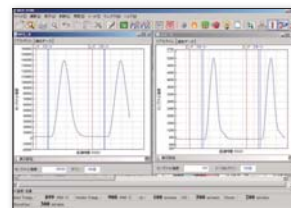


■ OPERATION

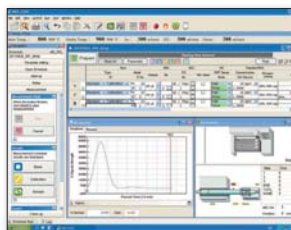
[Stand by] heating, [Auto shut down] function increase operability and save energy.



■ REAL TIME MONITOR OF PEAK PROFILE



■ CUSTOMIZABLE DISPLAY LAYOUT AS REQUIRED, SIMPLE or DETAILED.

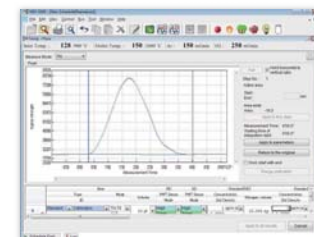


■ LINK to LIMS

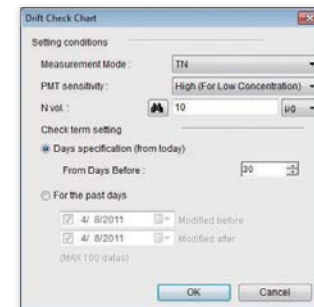
Software Add-in operation will help data handling easier. It can output result data simultaneously in various style as serial port (RS-232C) or file format (CSV, TXT).

■ RECALCULATION, SAVING TIME, SAMPLE and WASTE

Stored peak can be recalculated, reduce re-analysis.



■ STABILITY CHECK



● Methods in Petroleum Products

| Element | Sulfur | Nitrogen | Chlorine | Sulfur |
|---------------------|----------------------------|-----------------------------------|----------------------------|--------------|
| Method of detection | Ultraviolet Fluorescence | Chemiluminescence | Coulometric titration | |
| ASTM | D5453, D6667, D7183, D7551 | D4629, D5176, D6069, D7184, D5762 | D4929, D5808, D6721, D7457 | D3120, D3246 |
| UOP | 987-11, 988-11 | 981-10, 971-00, 936-95 | 910-07 | — |

MEASUREMENT Principle

UVFL Sulfur (SD-210 detector)

Sulfur Measurement

The sample is injected with argon carrier gas into the pyrolysis tube of high temperature (900 to 1000°C). Sulfur compounds in the sample are pyrolyzed and oxidized with O₂ gas.



The produced SO₂ gas is excited (SO₂^{*}) by irradiating the ultraviolet ray $\nu 1$ (190-230nm). Then, SO₂^{*} emits the energy (fluorescent ultraviolet ray) and returns to the ground state.

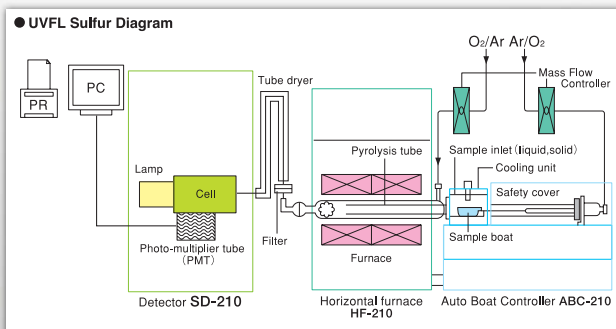


This fluorescent ultraviolet ray $\nu 2$ (300-400nm) is received by the photomultiplier tube and AREA value is obtained. The sulfur concentration is obtained by calibration curve preliminarily drawn with the standard solution.

UVFL Sulfur Applications

| Sample | Sample size (μl) | Rep | Sulfur | | Nitrogen | |
|----------------------------------|------------------|-----|--------------|---------|--------------|---------|
| | | | Result (ppm) | RSD (%) | Result (ppm) | RSD (%) |
| Naphtha | 10 | 5 | 181 | 0.6 | 1.9 | 2.9 |
| Light Oil | 10 | 3 | 133 | 0.6 | 10 | 1.9 |
| Kerosene | 10 | 3 | 25 | 1.2 | 3.5 | 1.9 |
| Gasoline | 10 | 3 | 145 | 1.8 | 35 | 1.8 |
| Lubricant Oil | 10 | 5 | 2870 | 1.2 | 5.6 | 1.2 |
| Heavy Oil | 10 | 3 | 1340 | 0.5 | 99 | 0.2 |
| Pulp | 5mg | 3 | 206 | 1.6 | 420 | 0.7 |
| Polybutylene Terephthalate (PBT) | 30mg | 5 | 303 | 2.6 | 3.3mg | 3.6 |

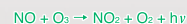
SD-210 Detector



Chemiluminescence Nitrogen (ND-210 detector)

Nitrogen Measurement

Sample is injected into a high-temperature (900 to 1000°C) pyrolysis tube by argon carrier gas. After nitrogen compounds in the sample are pyrolyzed, it is combusted, oxidized, and converted to nitric oxide (NO). After removing moisture from the combustion gas by a dehumidifier (tube dryer), the following oxidation reaction occurs by reaction of NO with ozone.



By this reaction, 590 to 2,500nm wavelength light is generated. The optical intensity of this light is proportional to the NO concentration at a wide frequency range. After emitted light is detected by a photomultiplier tube and signal processing is run, an area value is obtained. Using the relation between area and concentration (calibration curve) obtained from standard solutions, the total nitrogen concentration in the sample is calculated. Though some samples generate interfering substances such as SO_x and CO in the process of decomposition to NO, there is little influence on measurement by chemiluminescence method by reduced pressure method.

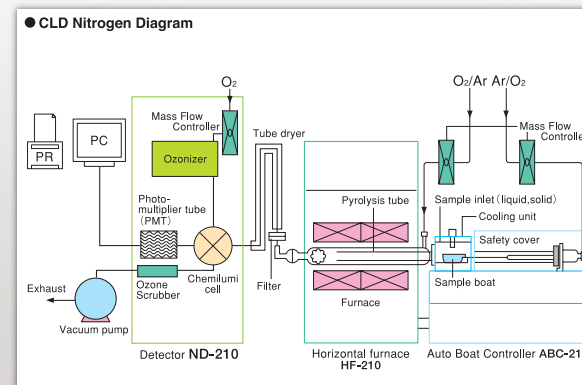
Chemiluminescence Nitrogen Applications

| Sample | Sample Size (mg) | Rep | Result (ppm) | RSD (%) |
|---------------|------------------|-----|--------------|---------|
| Light Oil | 20μl | 3 | 52 | 2.1 |
| Heavy Oil | 20μl* | 3 | 2350 | 1.6 |
| Lubricant Oil | 20μl* | 3 | 375 | 1.8 |
| Polyethylene | 12 | 5 | 27 | 3.8 |
| Polycarbonate | 13 | 5 | 2.5 | 4.5 |
| Epoxy resin | 11 | 5 | 31 | 1.2 |
| Pulp | 3 | 5 | 3750 | 2.1 |
| Toner | 8 | 5 | 355 | 1.5 |
| Rubber | 5 | 3 | 270 | 1.2 |

ND-210 Detector with Vacuum Pump



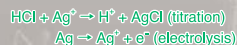
*Diluted by toluene



Microcoulometry (MCD-210 detector)

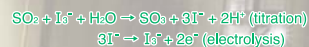
Chlorine Analysis

Samples are combusted in an argon/oxygen atmosphere. The resulting hydrogen chloride is led into a titration cell where it is automatically titrated by silver ions generated coulometrically. The amount of chlorine is calculated from the quantity of electricity required for the titration.

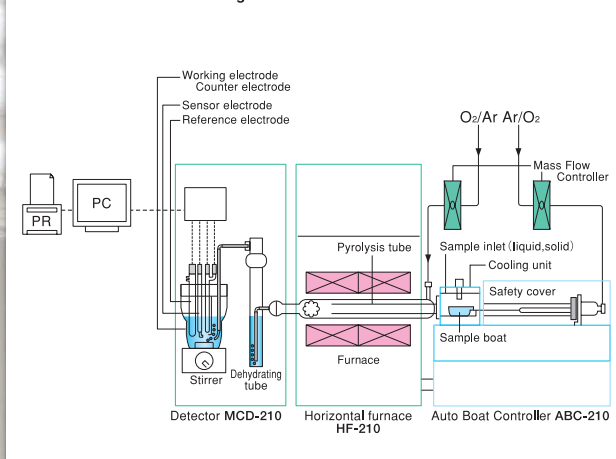


Sulfur Analysis

Samples are combusted in an argon/oxygen atmosphere. The resulting sulfur dioxide is led into a titration cell where it is automatically titrated by triiodide ions generated coulometrically. The amount of sulfur is calculated from the quantity of electricity required for the titration.



Microcoulometric Titration Diagram



Microcoulometry Applications

Chlorine

| Sample | Sample Size (mg) | Rep | Result (ppm) | RSD (%) |
|---------------|------------------|-----|--------------|---------|
| Toluene | 100μl | 3 | 0.14 | 12.3 |
| Naphtha | 100μl | 3 | 0.17 | 14.1 |
| Lubricant Oil | 50μl | 3 | 34 | 4.2 |
| Crude Oil | 10 | 3 | 7.5 | 3.2 |
| Rubber | 10 | 3 | 580 | 2.1 |
| Polycarbonate | 20 | 3 | 7.9 | 3.4 |
| Foil | 20 | 3 | 5.5 | 6.5 |
| Waste Oil | 15μl | 3 | 3600 | 3.2 |
| Cement | 10 | 3 | 280 | 4.1 |

Sulfur

| Sample | Injection (mg) | Rep | Result (ppm) | RSD (%) |
|-----------------|----------------|-----|--------------|---------|
| Lubricant Oil A | 5μl | 3 | 1.20% | 3.5 |
| Lubricant Oil B | 10μl | 3 | 0.76% | 3.5 |
| Lubricant Oil C | 10μl | 3 | 520 | 4.3 |
| Rubber | 15 | 3 | 740 | 3.2 |
| Resin | 15 | 3 | 130 | 2.4 |
| Crude Oil | 5 | 3 | 120 | 3.1 |
| Coal | 10 | 3 | 320 | 6.1 |
| Coke | 10 | 3 | 570 | 3.2 |

MCD-210 Detector

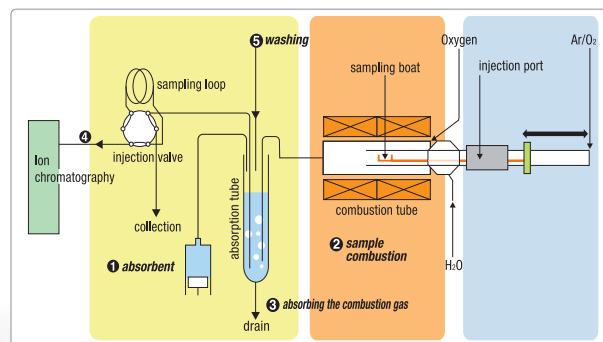
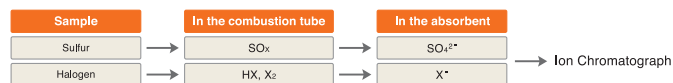


APPLICATION and OPTION

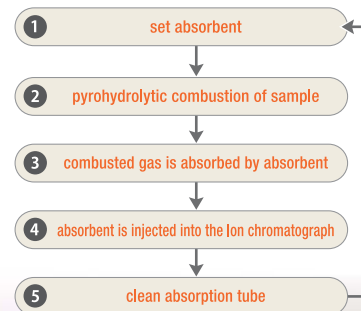
■Prep-station for combustion-IC (Sulfur and Halides) analysis.

Measuring Principle

After samples are thermally digested in Argon atmosphere they are combusted with oxygen and H₂O. Sulfur in the samples changes to SO_x and Halogens turn to Hydrogen Halide and Halogen gas. These elements will be trapped by the absorbent solution, then injected for IC analysis.



Process Flowchart



ASTM: D5987, D7359

ISO:2828

JIS: K7392, R1616, R1603, Z7302

KS: M0180

JEITA: ET-7304A

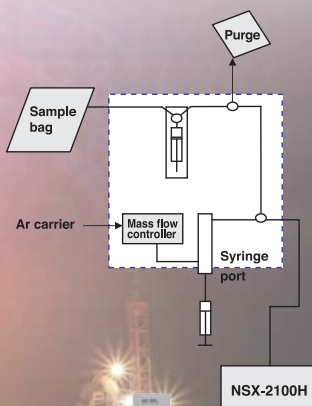
UOP: 991-11

■Gas Injector Model GI-220

Operator safety in flammable gas handling and automatic injection.



| | |
|-----------|---|
| MODEL | GI-220 Gas injector |
| Sample | Non-pressurized gas, Volatile liquid |
| Injection | 10µl for liquid max.100 ml by syringe pump for gas |
| Carrier | Argon |
| Heat | 80°C for liquid |
| Power | 100 -240VAC, 50/60Hz, 70VA |
| Dimension | 180(W) x 360(D) x 500(H) mm |
| Mass | 13kg |



OPTION

■ABC-210



| | |
|------------------|-------------------------------|
| MODEL | ABC-210 Auto Boat Controller |
| Sample | Solid, Liquid |
| Amount of sample | Solid 150 mg Liquid 100 µl |
| Boat | quartz, disposable ceramic |
| Boat cooling | Peltier |
| Power | 100 - 240VAC, 50/60Hz, 40VA |
| Dimension | 445(W) x 250(D) x 180(H) mm |
| Mass | 9 kg |

■ASC-270LS



| | |
|---------------------------------|---|
| MODEL | Automatic sample changer for solid and liquid samples |
| Sample | Solid, Liquid |
| Amount of sample | Solid 150mg Liquid 100µl |
| Boat, number of sample (Solid) | Ceramic, 49 pos. |
| Vial, number of sample (Liquid) | 4ml: 84 pos, 2ml: 120 pos. |
| Boat cooling | Electronic cooling |
| Power | 100-240VAC, 50/60Hz, 192VA |
| Dimension | 500 (W) x 460 (D) x 600 (H) mm |
| Mass | 27 kg |

■ASC-250L



| | |
|------------|------------------------------------|
| MODEL | ASC-250L Liquid sample changer |
| Sample | Liquid (non-aqueous, aqueous) |
| Injection | max 150µl (depend on sample) |
| Inj. speed | 0.4 - 50µl/sec (depend on sample) |
| number | 50pos in each 2, 4, 6ml vial tray. |
| Power | 100 - 240VAC, 50/60Hz, 180VA |
| Dimension | 460(W) x 320(D) x 470(H) mm |
| Mass | 16 kg |

■GI-210



| | |
|-----------|--------------------------------------|
| MODEL | GI-210 Gas injector |
| Sample | Non-pressurized gas, Volatile liquid |
| Injection | 10µl for liquid, 10ml for gas |
| Carrier | Argon |
| Heat | 80°C for liquid |
| Power | 100 - 240VAC, 50/60Hz, 20VA |
| Dimension | 220(W) x 200(D) x 110(H) mm |
| Mass | 4kg |

OTHER OPTION

■GA-211 gas absorption unit for Ion Chromatography analysis



| | |
|---------------------------------|---|
| Elements | Sulfur and Halogen compounds |
| Function | gas absorption of pyrohydrolytic combusted sample |
| Sample introduction to analyzer | loop, 6-way valve |
| Absorption tube | 10,20 ml |
| Dispenser | 5ml gastight syringe pump |
| Drain | peristaltic pump |
| Sample line | PTFE, PEEK |
| Communication | contact signal to analyzer |
| Power | 100 - 240VAC, 50/60Hz, 50VA |
| Dimension | 250(W) x 430(D) x 500(H) mm |
| Mass | 22Kg |

■ES-211



| | |
|------------------|-----------------------------------|
| MODEL | ES-210 External Solution Selector |
| Sample | Liquid |
| Number of sample | max 4 |
| Sample injection | PC control |

*Some options are in preparation, please ask local distributor.



WolfLabs

Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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