

## SPECIFICATIONS: NO-NO<sub>2</sub>-NO<sub>x</sub> ANALYZER

### A: Analyzer Section

1. Measurement Method: Microprocessor controlled Chemiluminescence
2. Must have an operating temperature range of 5-40°C.
3. Must have fold down front and rear panels for ease of maintenance.
4. Must be 40 pounds or less.
5. Ranges shall be user selectable from 0 -50 ppb to 0 - 20 ppm in increments of 1 ppb, user selectable. NO, NO<sub>2</sub>, and NO<sub>x</sub> ranges shall be independent. Analyzer shall have auto range capability.
6. Outputs: Three (3) separate analog outputs for a recorder and a datalogger. Outputs can be independently set to be \* 100 mv, \* 1 V, \* 5 V, \* 10 V.
4. Minimum Detectable Limit: <0.4 ppb. (RMS)
5. Zero Noise: <0.2 ppb. (RMS)
6. Span Noise: 0.5% of Reading (RMS) above 50 ppb
7. Precision: 0.5% of Reading
8. Linearity: 1% of Full Scale
9. Zero Drift: <0.5 ppb/24 hrs <1 ppb/7 days
10. Span Drift: <0.5%/24 hours, <1%/7 days
11. Rise and Fall time (to 95%): <60 seconds
12. Sample flow rate shall be less than or equal to 0.5 LPM.
13. Five year warranty on motherboard
14. Analyzer shall use a high capacity ozone generator internal to the instrument
15. Ozone shall be scrubbed from the instrument without the use of charcoal or other expendables.
16. Zero drift shall be corrected by a periodic Auto Zero routine, which physically routes the sample from the reaction cell
17. Particulate filter shall be front panel accessible with ability to view filter condition without disassembly.
18. Other than filters analyzer shall have no scheduled maintenance for a period of six months.
19. Analyzer shall have US EPA approval, automatically adjusting time constant for optimal time

response.

20. High capacity pump shall be external to the analyzer. Pump maintenance period shall be at least one year.
21. Sample and ozone flow rates shall be controlled by critical orifices and be displayed using front panel display
22. Measurement shall be temperature and pressure compensated.
23. Unit to be supplied with a complete instruction and maintenance manual.
24. Warranty shall be two years, parts and labor.
25. Shall contain internal datalogging capability with capacity to log a minimum of 900,000 data values.
  - a. to log five years worth of 5 minute averages for NO, NO<sub>2</sub> and NO<sub>x</sub> along with calibration factors, flow and pressure data.
  - b. Ability to log data at a selectable frequency or upon occurrence of a defined event.
  - c. Ability to log averages, instantaneous or min-max values.4. Ability to log multiple averaging periods simultaneously
26. All printed circuit boards shall be contained in the analyzer. All circuit boards shall use surface mount technology for durability. The analog input digitizing card and the computer card shall be separate cards to facilitate servicing.
27. Shall provide Diagnostic warning messages in case of out of tolerance of key parameter:
  - Analog Output Calibration
  - Auto Zero Out of Range
  - Box Temperature
  - Dynamic Span
  - Dynamic Zero
  - Configuration Erased
  - Converter Temperature
  - DAS Data Erased
  - PMT Power Supply
  - IZS Temperature
  - Ozone Flow
  - Ozone Generator
  - PMT Temperature
  - Reaction Cell Pressure
  - Reaction Cell Temperature
  - Mother Board Communication
  - Relay Board Communication
  - Sample Flow
  - System Reset

**B: RS232, Ethernet, and Status Output**

1. Shall provide bi-directional RS232 interface capability to accommodate both printers and host computers/terminals.
2. Any function that can be accomplished from keyboard shall be capable of being performed through the RS232.
3. RS232 message types shall include:
  - DAS Reports (R)Warning Messages
  - Analyzer Control/Status Reports
  - Diagnostics Commands/Reports
  - Test Measurements/Instrument Variables: Monitoring/Modifying
4. Status output shall provide isolated contact closures for zero cal, span cal, flow, temperature, system warning, and when in diagnostic mode
5. Analyzer shall have ability to connect to an Ethernet and shall support a unique IP address for access from anywhere on the network.
6. Ethernet port shall have a standard RJ45 connector