Nephrolux® Human Breath Ammonia Analyzers

Specifications

Nephrolux® is Pranalytica’s ammonia sensor for noninvasive diagnostics of kidney disorder and malfunction in human patients. When an individual suffers kidney disorder, the level of urea nitrogen and creatinine in the blood of the individual rises. Traditional techniques for determining the blood urea nitrogen and creatinine involve drawing blood samples from the patients and subsequent laboratory analysis, which may take as long as 24-48 hours. Pranalytica’s Nephrolux® sensor measures the concentration of ammonia in the human exhaled breath, which has been shown to have one-to-one correlation with blood urea nitrogen and creatinine concentration. The breath ammonia concentration determination takes about 2 minutes and provides the needed data without the use of invasive, expensive and non-real time blood sampling. Because of the completely non-invasive manner in which breath ammonia testing is carried out, the test could be administered to a patient to determine the blood urea nitrogen and creatinine clearance for a patient with terminal kidney failure undergoing a dialysis treatment. The test could be administered often during a dialysis session and the results obtained instantaneously for assuring adequate dialysis.

There are other potential applications of the Nephrolux® is in the general area of abnormal pregnancy including preeclampsia where monitoring breath ammonia concentration may provide early warning of likely problems.

**Nephrolux®**

- **Minimum detectivity**: 1 ppb (parts-per-billion)
- **Measurement cycle**: Continuous or single shot
- **Measurement process**: Direct measurement ammonia, no preconcentration or conversion required
- **Measurement time**: 120 seconds
- **Analyzer operation**: Autonomous (no operator attention necessary)
- **Selectivity**: No interference from other ammonium containing compounds, hydrocarbons, hydrogen sulfide, sulfur dioxide, water and NOx
- **Linearity**: ±10% over the range of interest for measuring breath ammonia
- **Accuracy**: ±1 ppb or ±10% of the reading (whichever is greater)

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Precision: ±1 ppb or ±10% of the reading which ever is larger (relative accuracy)

Zero drift: ±1 ppb per week (non-cumulative)

Control processor: Pentium class microcomputer embedded in the Nitrolux

Operating system: LINUX based to assure high reliability

Data storage:
- Embedded in the Nephrolux®
- All completely solid state memory for crash-proof reliability
- User data storage capacity for > 1 year (Option EDS provides over 4 years of continuous data storage capability)

Data display:
- Touch screen display on the sensor showing the last measurements of ammonia, carbon dioxide, humidity and date and time. Touch screen permits continuous or single shot measurements
- Optional full color graphical display showing ammonia, CO₂, and humidity as a function of time (option DS1)

Data output:
- RS 232 serial data (optional)
- USB key
- Network connection

Gas handling: Internal vacuum pump with gas flow of ~1.6 lpm

Gas inlet temperature: 0 to 40 C

Special gas needs: None

Routine calibration: Not required at the quoted sensitivity; recommended calibration every six months (using the optional calibration system CAL1)

Consumables: Fresh gas collection face mask and Breath Capacitor® needed for each new subject

Operating environment: 10 to 30 C; 0-95% RH (non-condensing); requires no special cooling

Electrical:
- 110-230V AC, 60 Hz
- Power consumption: Sensor: <300W
  Display: <200W (optional)

Physical:
- 19"W X 26" D X 8" H (rack mount configuration)

Weight:
- Sensor 65 lbs
- Display 22 lbs