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miniRUEDI Datasheet

The miniRUEDI is a portable mass-spectrometer for quantification of the partial pressures of He, Ar, Kr, N_2, O_2, CO_2, CH_4, H_2, etc. in gases or in water. The instrument is designed for environmental research and allows maintenance-free on-site gas analysis during field work at remote locations. The unique coupling of a membrane inlet to the mass spectrometer (gas-equilibrium membrane-inlet mass spectrometry, GE-MIMS) allows simple but accurate quantification of dissolved gas concentrations in water. There is no need for calibration by external water standards with known gas concentrations, which are challenging to manufacture and handle. The software toolbox for instrument control and data processing is open source, supporting the transparency, reproducibility and long-term value of the analysis results. The software allows flexible implementation of application-specific scripts for gas analysis and data processing. All miniRUEDI instruments are custom-built, and the design may be adapted to suit specific customer requirements.

Features:

- Analytical range: ppm-level to 100 %-v/v
  (tested using He, Ar and Kr in air-like gas matrices)
- Analytical uncertainty: 1–3 % typical
  (tested for He, Ar, Kr, N_2 and O_2 in air-like gas matrices)
- Calibration using ambient air as standard gas for analysis of He, Ar, Kr, N_2 and O_2 in air-like gases or in water
- Gas inlet at atmospheric pressure with six inlet ports
  (number of inlets can be increased on request)
- Low sample gas consumption (0.1 ml/min or less)
- Size and weight (including carrying case): 80 cm$\times$52 cm$\times$32 cm / 32 kg
- Power supply: 24 V(DC), runs off 110–230 V(AC) mains converter (included) or batteries, solar panels, etc.
- Power consumption: 50 W (normal operation)

Accessories:

- GE-MIMS membrane modules for dissolved gas analysis in water
- Total gas pressure sensors (e.g., for GE-MIMS analysis)
- Temperature sensors (e.g., for GE-MIMS analysis)

A complete description of the operational principles, performance tests, and application examples is available in *A Portable and Autonomous Mass Spectrometric System for On-Site Environmental Gas Analysis, M.S. Brennwald, M. Schmidt, J. Oser, R. Kipfer. Environmental Science and Technology, 2016, 50 (24), pp 13455–13463, DOI: 10.1021/acs.est.6b03669*.

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