# VARIO luxx

# THE NEW STANDARD IN EMISSION TESTING

SAMSUNG

AMR4U SN009468

Program 2 — Light oil no.2

Table — Graph

| O2 % | |
|---|---|
| CO ppm | 2.3 |
| NO ppm | 87 |
| NO2 ppm | 25 |
| SO2 ppm | 3 |
| | 66 |

Start — Save

MRU 4U

**Icons (left side):** Touch, USB, SD, Bluetooth, AUX, LAN, 4-20 mA

**Measurement parameters:** O2, CO, CO2, NO, NO2, NOx, SO2, H2S, H2, CH4 C3H8, °F, Δ°F, ΔP, Draft, Pressure, Flow

VARIO luxx

MRU AIRfair — EMISSION MONITORING SYSTEMS — since 1984 ®

Over 30 years of innovative gas analysis!

- Portable and Semi-Continuous Applications
- High precision gas analysis accuracy
- Intuitive touch screen and LINUX OS
- CTM 30, CTM 34 and ASTM D6522 compliance

# PORTABLE EMISSION ANALYZER

**For tuning, trouble-shooting, compliance reporting or long-term, semi-continuous monitoring of nearly any combustion/emission application**

- $O_2$, $CO$, $CO_2$, $NO$, $NO_2$, $SO_2$, $H_2$, $H_2S$, CO-high, & CO-very high,
  - Up to 6 electrochemical sensors,
  - plus $CO_2$ / $CO$ / $CH_4$ ($C_3H_8$) NDIR is possible!
  - Low CO, NO, $NO_2$, $SO_2$ and ranges are available

- Emission calculations such as mass flow, calculated or True NO(x), plus $O_2$ referencing to user defined values

- Gas temperature measurement up to 2,012°F
  (use stainless steel up to 1,200°F, use Inconel tubes up to 2,012°F)
  (use ceramic up to 3,090°F)

- Integrated Peltier cooler with automatic condensate drain pump

- Automatic zeroing using 3-way solenoid valve

- Internal sample flow monitoring

- Strong, regulated sample gas pump

- Fresh air inlet nozzle

- Differential pressure or stack gas pressure +/- 40 $inH_2O$ (100 hPa)

- Combustion air temperature up to 930°F, using adequate NiCrNi probes

- 7" high contrast, color touchscreen with graphical data display

- Automatic data logging

- Automatic, internal diagnostics

- Direct csv or pdf reporting

- Data transfer over LAN Ethernet or USB

- 8 channel analog outputs and 4 channel analog inputs (4-20mA)

- Single universal input 0-10V. 4-20mA, t/c, or RS485

- Internal 10,000 data memory and external 4GB USB-stick

- Universal power supply handles up to 600W heated sample line

- Rugged aluminum enclosure with rubber molded impact protection

# SMART GAS ANALYSIS

## PROBES AND PROBE TUBES
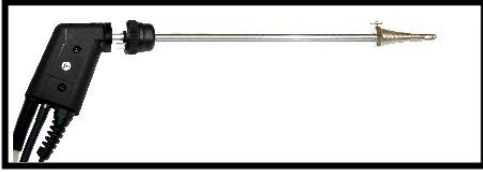
Low cost industrial probe for interchangeable probe tubes with 9' or 16' rugged, braided sheated sampling line and Viton hose for clean combustions only

probe tubes (4" to 80" long) in SS (1,200°F) or Inconel (2,000°F) Also available with sintered metal filter

Industrial probe for interchangeable probe tubes with 9' or 16' sampling line and heated probe handle and easy replaceable quartz glass wool filter Available with and without heated sampling line

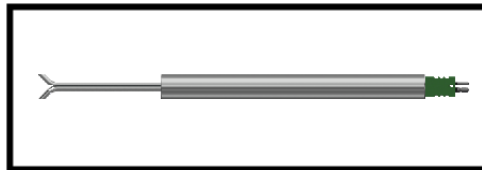High temp ceramic probe (3,000°F) With temperature measurement with easy replaceable quartz glass wool filter
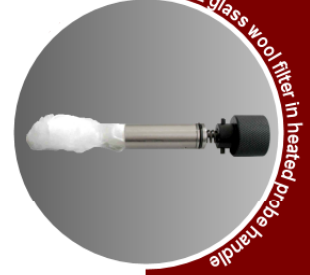
L-Type SS with or without K-Type t/c in sizes from 4" (0.12Ø) to 79" (0.47 Ø)

## PITOT TUBES
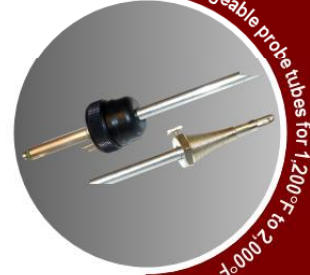
S-Type SS with K-Type t/c (59" lead) and 1.1"Ø protection tube available in 19" or 39" lengths (0.31"Ø)


Heated probe and heated sampling line


Heated probe handle to aviod condensation


Quartz glass wool filter in heated probe handle


Exchangeable probe tubes for 1,200°F to 2,000°F


Gas cooler

| 1 | Pressure-/diff. Pressure |
| 2 | Pressure-/diff. Pressure |
| 3 | Combustion air temperature |
| 4 | AUX-port |
| 5 | Probe electrical connector |
| 6 | Outlet fan of gas cooler |
| 7 | Sample gas inlet |
| 8 | Fresh air inlet port |
| 9 | Sample gas outlet port (VENT) |
| 10 | Condensate outlet port |
| 11 | Sample gas filter |
| 12 | Loudspeaker |
| 13 | Ethernet (LAN) |
| 14 | USB socket* |
| 15 | Second USB socket (option) |
| 16 | RS485 (option) |
| 17 | Analog outputs 4 … 20 mA |
| 18 | Mains power supply |

*)  including USB stick in MRU design for data storage and transfer
optional USB to WLAN dongle for wireless data transfer
optional USB to Bluetooth dongle for wireless data to smartphone with MRU4u app
optional RS485 connector for long cable data transfer using Modbus RTU protocol

## TECHNICAL SPECIFICATIONS

| | |
|---|---|
| **VARIO** *luxx* | Portable analyzer with up to 6 electrochemical sensors and 3 gas NDIR bench |
| **Fuel types** | Natural gas, propane, butane, #2, #5, & #6 light oils, heavy oil, kerosene, distillate #1, diesel, coal, coal anthracite & bituminous, wood (dry, 10%, 20%, 30%, &40% M.), pellets, and four user defined fuel types |

| Measurement components | | Method | Meas. range (0…min / max) * | Resolution | Accuracy ** |
|---|---|---|---|---|---|
| $O_2$ | Oxygen (long-Life) | ECS | 0 … 25.00 % | 0,01% | 0,2% |
| $O_2$ | Oxygen | PM | 0 … 25.00 % | 0,01% | 0,1% |
| CO-low | CO - low | ECS | 0 … 500 ppm | 0.1 ppm | ± 2 ppm or 5 % reading |
| CO | Carbon monoxide $H_2$ compensated | ECS | 0 … 10,000 / 20,000 ppm | 1 ppm | ± 10 ppm or 5 % reading |
| CO - high | Carbon monoxide | ECS | 0 … 2.00 / 10.00 % | 0,01% | ± 0.01 % or 5 % reading |
| NO-low | Nitric oxide | ECS | 0 … 300 ppm | 0.1 ppm | ± 2 ppm or 5 % reading |
| NO | Nitric oxide | ECS | 0 … 1,000 / 5,000 ppm | 1 ppm | ± 5 ppm or 5 % reading |
| $NO_2$-low | Nitrogen dioxide | ECS | 0 … 100 ppm | 0.1 ppm | ± 2 ppm or 5 % reading |
| $NO_2$ | Nitrogen dioxide | ECS | 0 … 200 / 1,000 ppm | 1 ppm | ± 5 ppm or 5 % reading |
| $SO_2$-low | Sulfur dioxide | ECS | 0 … 100 ppm | 0.1 ppm | ± 2 ppm or 5 % reading |
| $SO_2$ | Sulfur dioxide | ECS | 0 … 1,000 / 5,000 ppm | 1 ppm | ± 10 ppm or 5 % reading |
| $H_2S$-low | Hydrogen sulfide | ECS | 0 … 50 / 500 ppm | 1 ppm | ± 2 ppm or 5 % reading |
| $H_2S$ | Hydrogen sulfide | ECS | 0 … 2,000 / 5,000 ppm | 1 ppm | ± 5 ppm or 5 % reading |
| $H_2$ | Hydrogen | ECS | 0 … 1,000 / 2,000 ppm | 1 ppm | ± 5 ppm or 5 % reading |

| Measurement components | | Method | Meas. range (0…min / max) | Resolution | Accuracy ** |
|---|---|---|---|---|---|
| CO | Carbon monoxide | NDIR | 0 … 3,000 / 30,000 ppm | 1 ppm | ± 15 ppm or 2 % reading |
| CO | Carbon monoxide | NDIR | 0 … 1.00 / 10.00 % | 0,01% | ± 0.1 % or 2 % reading |
| $CO_2$ | Carbon dioxide | NDIR | 0 … 5.00 / 40.00 % | 0.1 ppm | ± 0.3 % or 2 % reading |
| HC | Hydrocarbons ($CH_4$) | NDIR | 0 … 3,000 / 10,000 ppm | 1 ppm | ± 20 ppm or 2 % reading |
| HC | Hydrocarbons ($C_3H_8$) | NDIR | 0 … 1,000 / 10,000 ppm | 1 ppm | ± 10 ppm or 2 % reading |
| HC | Hydrocarbons ($CH_4$) | NDIR | 0 … 1.00 / 4.00 % | 0,01% | ± 0.05 % or 2 % reading |

\* overload range of ECS is usable only for short duration      \*\* which ever is larger

| OTHER MEASUREMENTS AND CALCULATIONS | | Method | Meas. range (0…min / max) | | Resolution | | Accuracy ** |
|---|---|---|---|---|---|---|---|
| T-gas | Flue gas temperature | NiCrNi | 32 °F … 2,192 °F | (0 °C … 1.200 °C) | 2 °F | (1 °C) | ± 2°F or 2 % reading |
| T-air | Combustion air temperature | NiCrNi | 32 °F …. 932 °F | (0 °C … 500 °C) | 2 °F | (1 °C) | ± 2°F or 2 % reading |
| T-amb | Ambient air temperature | PT2000 | 32 °F …. 212 °F | (0 °C … 500 °C) | 2 °F | (1 °C) | ± 2°F or 2 % reading |
| P-Press | Differential pressure | Piezoresistiv | -48 … +48 inH2O | (-120 … +120 hPa) | 1 Pa | | ± 2 Pa or 1 % reading |
| V-flow | flow velocity measurement | Diff.pressure | 3 … 100 m/s | | 1 m/s | | ± 1 m/s or 1 % reading |

| | Method | |
|---|---|---|
| **AUX-connector** | Software | for K-thermocouple, 0 … 10 Vdc , 4 … 20 mA, RS485 |
| **Combustion analysis** | Software | Losses, excess air, Lambda, dew point |
| **Emission calculations** | Software | mg/Nm3, reference $O_2$, g/s, kg/h |

## GENERAL TECHNICAL DATA

| | |
|---|---|
| **Operating system** | LINUX |
| **Display, operation** | 7" TFT (800 x 480 px) color display, backlit, with touch and swipe operation |
| **Data storage type** | 10,000 data sets internal and external USB-Stick |
| **Interface to PC / Notebook** | Ethernet, Bluetooth, WLAN, RS485 |
| **Data transfer over cable / wireless** | RS485, RJ45 (Ethernet) / Bluetooth, WLAN |
| **Analog output 4 … 20 mA** | 8 channel, user free configurable |
| **Analog input 4 … 20 mA** | 4 channel, user free configurable |
| **Universal analog input - AUX** | 0 … 10 Vdc / 4 … 20 mA / K-type / RS485 |
| **Mains free operation** | Li-Ion , 48 Wh, for appr. 1 hr „stand-by" (optional additional battery, 48 Wh Li-Ion) |
| **Operating temperature** | 41°F … 122°F; RH up to 95 % not condensing |
| **Storage temperature** | -4°F …122°F |
| **Power supply** | 86 … 265 Vac / 47 … 63 Hz / 105 W (up to 600 W with heated sampling line) |
| **Protection class** | IP20 (or IP42 inside transport case) |
| **Dimensions** | (W x H x D) 16.92" x 11.41" x 5.9" (430 x 290 x 150 mm) |
| **Weight** | appr. 16.5lbs (7,5 kg), for minimal configuration |

**Data subject to change without notice**

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