# MGA *prime*

## High end flue gas emission analyser

for long time measurements of industrial combustions, large boilers, gas engines and turbines, furnaces and many more



- Precise measuring technique with lowest offset drift by means of special non-dispersive infrared (NDIR), for enhanced long-time measurements!

- Up to 8 NDIR low range gas measurement: $CO/CO_2/C_3H_8/CH_4/SO_2/NO/NO_2/N_2O$ and oxygen with either long-life $O_2$-ECS or $O_2$-PM (paramagnetic cell)

- Remote display through MRU4U App over bluetooth on smartphone or tablet or through VNC server via LAN/WiFi

## MRU – over 30 years of innovative gas analysis

# MGA
# *prime* – high end analysis technology

## Simultaneous analysis of up to 9 gas components

$O_2$  $CO$  $CO_2$  $NO$  $NO_2$  $SO_2$  $C_3H_8$  $CH_4$  $N_2O$

The new MGA*prime* achieves a maximum of versatility through the combination of infrared technology (NDIR).
The use of LINUX operating system allows smart, intuitive touch and swipe technique of the coloured display and many data communication interfaces. Data exchange and transfer is also possible by means of the remote control using a smartphone with the MRU4u app.

### MAIN FEATURES MGA*prime*

- 7" high-resolution (800x480 pixel) TFT colour display with swipe and touch technique as for smartphones, with LINUX operating system

- Intuitive icons and country specific language on display

- Modern and robust design, Aluminium enclosure with synthetic material molded impact protection for use in harsh industrial environment

- Advanced algorithms to control analyser's operation, like warming up, compensation of cross-sensitivity values, response time - all which have impact on the quality and performance.

- Measurement of many additional parameters: temperatures (ambient and flue gas), pressures (atmospheric and differential), internal sample flow monitoring

- Measurement of flue gas flow velocity (using of Pitot tube) and calculation of stack gas flow rate

- Calculation of all combustion parameters like: heat loss, combustion efficiency, excess air coefficient, dew point temperature a.m.

- Results stored in database - possibility to view entire measurement session in graphical form, create measurement reports, export data to CSV files, and more

- PC communication via LAN - Ethernet

- Wireless data transfer via Bluetooth dongle or WiFi dongle
  Long distance data transfer via RS485 cable

- Analog outputs (8-channels), analog inputs (4-channels)

### SAMPLE GAS CONDITIONING - integrated into analyzer

- Dual gas cooler (Peltier) with dual condensate draining pumps, with constant dew point +5°C when connected to mains power supply

- Condensate monitoring and alarm on display

- Strong gas sampling pump, regulated flow of approx 1l/min

- Efficient, user replaceable Teflon fine filter

- Ambient air auto zero for long time measurements

- Internal sample flow (1l/min) monitoring with flow alarm on display

- Sample gas venting via active VENT port (for use inside laboratories)

- Robust, versatile probe with optimized filtering & firm stack connection

- Gas sampling probe heated, with exchangeable probe tubes, including K-type thermocouple for flue gas temperature measurement

- Heated sampling line, Teflon 6/4mm, 3 m - 5 m - 10 m and other lengths

Useful nylon protection case with shoulder strap

Trolley for comfortable and safe transport

Pitot tube for flow velocity
measurements and
flow rate calculation

## Gas sampling probes

- ■ for high or low dust gas sampling
- ■ for flue gas temperatures up to 800 °C
  (stainless steel), up to 1100 °C (Inconel)
  and up to 1700 °C (ceramic tube)
- ■ with heated filter
- ■ with heated sampling line
- ■ different lengths of gas sampling
  probe tubes

## Combustion calculations
(fuel type depending)

- ■ $CO_2$
- ■ $CO/CO_2$ ratio (poison index)
- ■ dew point
- ■ excess air
- ■ efficiency
- ■ heat loss (Siegert formula)

## Emission calculations

- ■ $mg/Nm^3$ (all toxic gases)
- ■ user settable $O_2$ reference
- ■ $NO_x$ as $NO_2$ ($mg/Nm^3$)
- ■ True $NO_x = NO + NO_2$
  and $NO_x$ als $mg/Nm^3$
- ■ Flow rate and mass emission calculations
  using Pitot tube

# Connections and interfaces

1. Pressure-/diff. pressure
2. Pressure-/diff. pressure
3. Combustion air temperature
4. AUX-socket
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 WiFi 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

Product information
under www.mru.eu
or scan attached
QR-code

# MGA *prime*

## Technical data

| Gas measurement | 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 % |
| $CO_2$ - carbon dioxide | NDIR | 0 … 5 / 40 % | 0,01 % | ±0,2 % or 2 % reading |
| CO - carbon monoxide | NDIR | 0 … 200 / 10.000 ppm | 1 ppm | ± 4 ppm or 2 % reading |
| $CH_4$ - methane | NDIR | 0 … 500 / 10.000 ppm | 1 ppm | ±10 ppm or 2 % reading |
| $C_3H_8$ - propane | NDIR | 0 … 200 / 10.000 ppm | 1 ppm | ± 4 ppm or 2 % reading |
| NO - nitric monoxide | NDIR | 0 … 250 / 4.000 ppm | 1 ppm | ± 5 ppm or 2 % reading |
| $NO_2$ - nitric dioxide | NDIR | 0 … 200 / 1.000 ppm | 1 ppm | ± 4 ppm or 2 % reading |
| $SO_2$ - sulphur dioxide | NDIR | 0 … 200 / 4.000 ppm | 1 ppm | ± 4 ppm or 2 % reading |
| $N_2O$ - nitrous oxide | NDIR | 0 … 200 / 1.000 ppm | 1 ppm | ± 4 ppm or 2 % reading |

| OTHER MEASUREMENTS / CALCULATIONS | Method | Measuring range | Resolution | Accuracy ** |
|---|---|---|---|---|
| $T_{gas}$ - stack gas temperature | NiCrNi | 0 °C … 1.200 °C, K-type | 1 °C | ± 1 °C or 2 % reading |
| $T_{air}$ - combustion air temperature | NiCrNi | 0 °C … 500 °C, K-type | 1 °C | ± 1 °C or 1 % reading |
| $T_{amb}$ - ambient air temperature | RTD | 0 °C … 100 °C, PT2000 | 1 °C | ± 1 °C or 2 % reading |
| Diff.pres. - differential pressure | Piezoresistive | -120 … +120 hPa | 1 Pa | ± 2 Pa or 1 % reading |
| GasFlow - flow velocity - differential pressure | Pitot | 3 … 100 m/s | 1 m/s | ± 1 m/s or 1 % reading |
| AUX - auxiliary connector - | Software | for K-thermocouple, | | |
| standardized external signal | | 0 … 10 Vdc, 4 … 20 mA, | | |
| Combustion calculations - fuel type dependent | Software | RS485, heat loss, ExcAir, Air Ratio ($\lambda$), dewpoint | | |
| Emission calculations | Software | mg/Nm$^3$, reference to $O_2$, g/kWh, g/s, kg/h | | |

### GENERAL TECHNICAL DATA

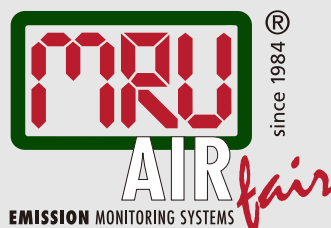| | |
|---|---|
| Operating system | LINUX |
| Display, operation | 7" TFT (800 x 480 px) colour display, backlit, with touch pad |
| Data storage type / capacity | internal 10.000 data sets, external USB stick |
| Interface to external PC/notebook | Ethernet, Bluetooth, WiFi, RS485 |
| Cable communication interface | RS485, RJ45 (Ethernet) |
| Wireless communication | Bluetooth, WiFi |
| Thermal printer | external USB / WiFi printer |
| Analog output 4-20 mA/analog input 4-20 mA | 8 channel out / 4 channel in/user configurable |
| Universal analog input - AUX - | 0…10 Vdc / 4…20 mA / NiCrNi / RS485 |
| System warming up time | 15 minutes (typical) |
| Warming up temperature NDIR bench | 55°C |
| Mains free operation time / stand-by only | 1 hour |
| Internal battery | Li-Ion , 96W, for standby |
| Operating conditions | +5°C ... +45°C, RH up to 95% non condensing |
| Storage temperature | -20°C ... +50°C |
| Power supply / consumption | 86 .. 265 Vac / 47…63 Hz / 105 W (analyser only) |
| Caseing material | aluminium, synthetic material molded impact protection |
| Protection class | IP20 (or IP42 inside transport case) |
| Dimensions | 430 x 290 x 150 (WxHxD mm) |
| Weight | approx. 10 kg only device / approx. 15 kg packed in bag with accessories |

** which ever is larger

* overload range of ECS is usable only for short duration

Data subject to change without notice.

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MRU representative: