

# MLT 2

## Multi-Component Gas Analyzer

The MLT Series of gas analyzers from Emerson offer precise gas measurement analysis through its multi-component, multi-channel capabilities and supports various sensor and detector technologies, including:

- Infrared, Ultraviolet (NDIR, UV)
- Thermal conductivity detectors (TCD)
- Paramagnetic sensors ( $pO_2$ )
- Electrochemical sensors ( $eO_2$ )
- Chemiluminescence (CLD)
- Flame ionization detectors (FID)

The MLT 2 analyzer can measure up to five components and the measuring principles may be combined in a variety of combinations. Configured as a host analyzer to control an extensive measuring system or as a stand-alone unit, it is equipped with an LCD front panel with numerical and graphical measuring value indication.

All MLT 2 variations may be equipped with analog and or digital I/Os. The host analyzer I/O is available to all analyzer modules connected within the analyzer network. Upgraded with a CSA-C/US-approved Z purge pressurization system, the MLT 2 can be installed in Division 2 hazardous areas.

## Applications

- Chemical process analysis and control
- Metallurgical process gas monitoring
- Furnace atmosphere measurements in hardening gas applications
- Process monitoring in coal/wood gasification
- Ambient air monitoring in chemical plants
- Continuous Emissions Monitoring Systems (CEMS)



MLT 2 Multi-Component Gas Analyzer

## Features

- Part of PlantWeb® field-based architecture and compatible with DeltaV™
- Multi-component analyzer with multi-channel capability (up to five channels in a single unit)
- Wall-mountable stainless steel IP 65 field housing (designed to meet NEMA 4 specs)
- High-performance micro-flow NDIR detector allows ranges as low as 0 to 10 ppm CO and 0 to 5 ppm CO<sub>2</sub>
- Robust NDIR solid-state detector for higher ranges
- NDUV vacuum diode
- O<sub>2</sub>: fast response paramagnetic or long-term stable electrochemical oxygen sensor
- Thermal conductivity cell
- Process-approved sensors with solvent-resistant, corrosion-resistant, intrinsically safe measuring cells, and stainless steel tubing available
- Additional options:
  - Integrated thermostat controlled compartment for physical components
  - Integrated sample handling system
  - Analog, digital and serial interfaces
  - Impact-tested front panel, magnetically operated
  - Autocalibration via internal or external valve block
  - Pressure and flow rate measurement

# Specifications

Please contact your Emerson representative if your requirements are outside the specifications listed below. Improved performance, other products and material offerings may be available depending on the application.

**Table 1 - Gases and Measuring Ranges**

| Gas Components                  |                                   | Minimum Ranges          | Maximum Ranges         |
|---------------------------------|-----------------------------------|-------------------------|------------------------|
| Acetic acid <sup>(1)</sup>      | CH <sub>3</sub> COOH              | 0–2,000 ppm             | 0–5 %                  |
| Acetone                         | CH <sub>3</sub> COCH <sub>3</sub> | 0–500 ppm               | 0–12 %                 |
| Acrolein                        | C <sub>3</sub> H <sub>4</sub> O   | 0–2,000 ppm             | 0–2 %                  |
| Ammonia                         | NH <sub>3</sub>                   | 0–100 ppm               | 0–100 %                |
| Carbon monoxide                 | CO                                | 0–10 ppm <sup>(2)</sup> | 0–100 %                |
| Carbon dioxide                  | CO <sub>2</sub>                   | 0–5 ppm <sup>(2)</sup>  | 0–100 %                |
| Chlorine <sup>(1)</sup>         | Cl <sub>2</sub>                   | 0–1,000 ppm             | 0–100 %                |
| Hexane                          | C <sub>6</sub> H <sub>14</sub>    | 0–300 ppm               | 0–9,000 ppm            |
| Hydrogen                        | H <sub>2</sub>                    | 0–1 % <sup>(2)</sup>    | 0–100 %                |
| Hydrogen cyanide <sup>(1)</sup> | HCN                               | 0–100 ppm               | 0–40 %                 |
| Mercury vapor                   | Hg                                | 0–50 ppb                | 0–20 ppm               |
| Methane                         | CH <sub>4</sub>                   | 0–300 ppm               | 0–100 %                |
| Methanol                        | CH <sub>3</sub> OH                | 0–1,000 ppm             | 0–5 %                  |
| Nitrogen dioxide                | NO <sub>2</sub>                   | 0–10 ppm <sup>(2)</sup> | 0–5 %                  |
| Nitrogen monoxide               | NO                                | 0–150 ppm               | 0–100 %                |
| Nitrogen oxides                 | NO <sub>x</sub>                   | 0–5 ppm                 | 0–1 %                  |
| Oxygen                          | O <sub>2</sub>                    | 0–1 % <sup>(2)</sup>    | 0–100 % <sup>(1)</sup> |
| Phosgene <sup>(1)</sup>         | COCl <sub>2</sub>                 | 0–100 ppm               | 0–100 %                |
| Sulphur dioxide                 | SO <sub>2</sub>                   | 0–25 ppm                | 0–80 %                 |
| Sulphur hexafluoride            | SF <sub>6</sub>                   | 0–5 ppm                 | 0–2 %                  |
| Water vapor <sup>(3)</sup>      | H <sub>2</sub> O                  | 0–1,000 ppm             | 0–10 %                 |

(1) Non-standard components require special calibration and linearization methods (2) Non-standard specifications (3) Dew point must not exceed ambient temperature

**Table 2 - Electrical Specifications**

|                      |   |                      |   |
|----------------------|---|----------------------|---|
| <b>Input</b>         | Cable glands, internal terminals                    | <b>Input voltage</b> | 93–132V AC and 196–264V AC, 47–63 Hz        |
| <b>Rated voltage</b> | 120/230V AC, 50/60 Hz selected with internal switch | <b>Input power</b>   | 700V AC maximum, depending on configuration |

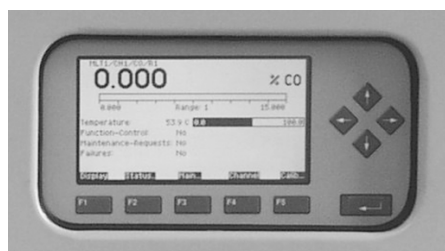


Figure 2 - Standard front panel

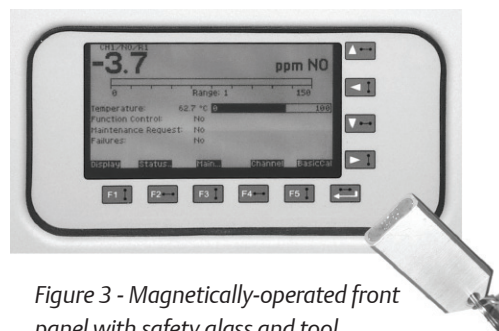


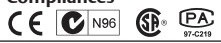

Figure 3 - Magnetically-operated front panel with safety glass and tool

Table 3 - Performance Specifications

|   | NDIR/UV   | Oxygen Sensor (pO <sub>2</sub> and eO <sub>2</sub> )                     | Thermal Conductivity (TCD)   |
|---|---|--|--|
| <b>Detection limit</b>  | ≤ 1 % <sup>(1)(4)</sup>   | < 1 % <sup>(1)(4)</sup>  | < 1 % <sup>(1)(4)</sup>  |
| <b>Linearity</b>  | ≤ 1 % <sup>(1)(4)</sup>   | ≤ 1 % <sup>(1)(4)</sup>  | ≤ 1 % <sup>(1)(4)</sup>  |
| <b>Zero-point drift</b>   | ≤ 2 % per week <sup>(1)(4)</sup>  | ≤ 2 % per week <sup>(1)(4)</sup>   | ≤ 2 % per week <sup>(1)(4)</sup>   |
| <b>Span (sensitivity) drift</b>   | ≤ 0.5 % per week <sup>(1)(4)</sup>  | ≤ 1 % per week <sup>(1)</sup>  | ≤ 1 % per week <sup>(1)(4)</sup>   |
| <b>Repeatability</b>  | ≤ 1 % <sup>(1)(4)</sup>   | ≤ 1 % <sup>(1)(4)</sup>  | ≤ 1 % <sup>(1)(4)</sup>  |
| <b>Response time (t<sub>90</sub>)</b>   | 3 s < t <sub>90</sub> < 7 s <sup>(3)(5)</sup>   | ≤ 5 s <sup>(3)(6)</sup> < Approx. 12 s <sup>(3)(9)</sup>                 | 15 s < t <sub>90</sub> ≤ 30 s <sup>(3)(7)</sup>                              |
| <b>Permissible gas flow</b>   | 0.2–1.5 l/min   | 0.2–1.0 l/min <sup>(6)</sup> /0.2–1.5 l/min. <sup>(9)</sup>              | 0.2–1.5 l/min. ± 0.1 l/min   |
| <b>Influence of gas flow</b>  |   | ≤ 2 % <sup>(1)(4)</sup>  | ≤ 1 % <sup>(1)(4)(13)</sup>  |
| <b>Maximum gas pressure</b>   | ≤ 1,500 hPa abs. (≤ 7 psig)   | Atm. pressure <sup>(6)</sup> /≤ 1,500 hPa abs. <sup>(9)</sup> (≤ 7 psig) | ≤ 1,500 hPa abs. (< 7 psig)  |
| <b>Influence of temperature</b><br>- At constant temperature<br>- With pressure compensation <sup>(8)</sup> | ≤ 0.1 % per hPa (2)<br>≤ 0.01 % per hPa (2)   | ≤ 0.1 % per hPa (2)<br>≤ 0.01 % per hPa (2)                              | ≤ 0.1 % per hPa (2)<br>≤ 0.01 % per hPa (2)                                  |
| <b>Permissible ambient temperature</b>  | +5 °C to +40 °C <sup>(10)</sup>   | +5 °C to +40 °C <sup>(10)</sup>  | +5 °C to +40 °C <sup>(10)</sup>  |
| <b>Influence of temperature</b><br>(at constant pressure)<br>- On zero point<br>- On span (sensitivity)     | ≤ 1 % per 10 K <sup>(1)</sup><br>≤ 1 % per 10 K <sup>(1)</sup><br>≤ 5 % (+5 to +40 °C) <sup>(1)(11)</sup> | ≤ 1 % per 10 K <sup>(1)</sup><br>≤ 1 % per 10 K <sup>(1)</sup>           | ≤ 1 % per 10 K in 1 h <sup>(1)</sup><br>≤ 1 % per 10 K in 1 h <sup>(1)</sup> |
| <b>Thermostat control</b> <sup>(12)(14)</sup>   | None  | Approx. 55 °C <sup>(6)</sup> /None <sup>(9)</sup>                        | Approx. 75 °C  |
| <b>Warm-up time</b> <sup>(12)(14)</sup>   | Approx. 50 minutes <sup>(5)</sup>   | Approx. 50 minutes <sup>(6)</sup>  | Approx. 50 minutes   |

- (1) Related to full scale
- (2) Related to measuring value
- (3) From gas analyzer inlet at gas flow of 1.0 l/min (electr. = 2 s)
- (4) Constant pressure and temperature
- (5) Dependent on integrated photometer bench
- (6) Paramagnetic oxygen measurement (pO<sub>2</sub>)
- (7) Depending on measuring range
- (8) Pressure sensor is required
- (9) Electrochemical oxygen measurement (eO<sub>2</sub>), not for use with sample gas containing FCHC's
- (10) Higher ambient temperature (45 °C) on request
- (11) Starting from 20 °C (to +5° or to +40 °C)
- (12) Sensor/cell only
- (13) Flow variation within ± 0.1 l/min
- (14) Option "thermostated box" with temperature 55° C

## Performance Specifications

|   |   |
|---|---|
| <b>Compliances</b><br>       | CSA–C/US, EN61326, EN 61010, NAMUR, PAC, C–Tick<br>GOST: VNIIMS, Pattern (Belarus)  |
| <b>Suitability tests</b><br> | TÜV Rheinland:<br>CO/SO <sub>2</sub> /NO/NO <sub>2</sub> /O <sub>2</sub> , acc. TI Air,<br>13 <sup>th</sup> BImSchV and 17 <sup>th</sup> BImSchV<br>EN 14181, EN 14956<br>TÜV Nord:<br>FDA test: 0–10 ppm CO and 0–5 ppm CO <sub>2</sub>  |
| <b>Measuring Components</b>   | More than 60 gases are detectable, e.g.:<br>NO, NO <sub>2</sub> , SO <sub>2</sub> , CO, CO <sub>2</sub> , CH <sub>4</sub> , C <sub>6</sub> H <sub>14</sub> , SF <sub>6</sub> , H <sub>2</sub> O, N <sub>2</sub> O, O <sub>2</sub> , NH <sub>3</sub> ,<br>R13a, H <sub>2</sub> , etc.                            |
| <b>Gas connections for sample, reference or purge gas</b>   | MLT 2: 8 fittings, 6/4 mm PVDF<br>Option: stainless steel 6/4 mm, 1/4"; for more options c.f  |
| <b>Protection class of enclosure</b>  | IP 65 according to IEC 60529 (designed to meet NEMA 4)<br>for outdoor installation to be protected against direct sunlight  |
| <b>Permissible humidity</b><br>(non-condensing)   | < 90 % rel. humidity at 20 °C (68 °F)<br>< 70 % rel. humidity at 40 °C (104 °F)   |
| <b>Weight</b>   | Approx. 30–35 kg depending on configuration   |
| <b>Options</b>  | Integrated flow sensor and pressure sensors and thermostated box for physical components (standard 55 °C, optional up to 120 °C), integrated pump, fine dust filter with throttle, solenoid valve blocks, magnetically operated and impact tested front panel, pressurization systems for Division 2 (CSA–C/US) |

## Signal Outputs, Interface

### SIO and DIO (Options)

#### 2–8 analog signal outputs

(SIO, optically isolated, sub-modular structure):

- 0–10 V and 0–20 mA  
(R<sub>B</sub> ≤ 500 Ω)
- 2–10 V and 4–20 mA  
(R<sub>B</sub> ≤ 500 Ω)

#### 3 relay contacts (SIO, NAMUR):

- Contact rating: 1 A, 30 V

#### Serial Interfaces (SIO, option):

- RS 232 C or RS 485

**Digital I/Os** (DIO, optically isolated, freely programmable from a list of commands)

- 8 digital inputs, 0–30V DC / 2.2 mA (for remote functions)
- 24 digital outputs, 5–30V DC/500 mA

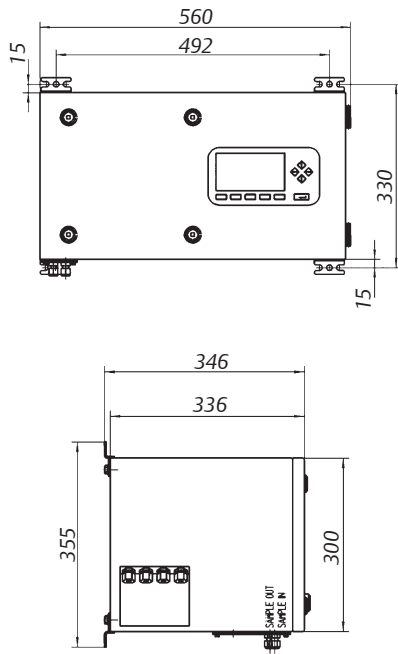
#### Network

- FOUNDATION™ fieldbus
- LON (analyzer network)

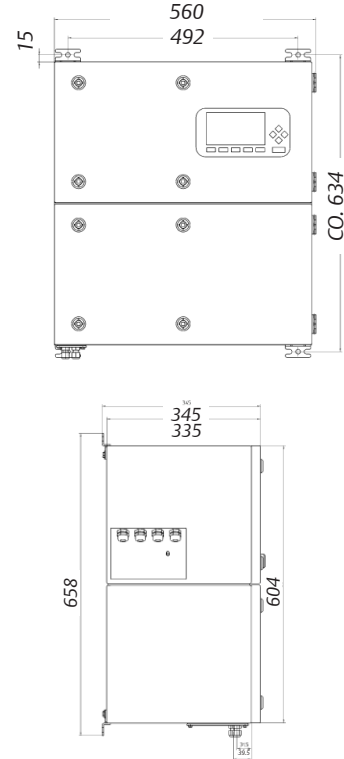
## Dimensions

The drawings below represent the minimum recommended installation guidelines for the MLT 2 Multi-Component Gas Analyzer. Please contact your Emerson representative for detailed installation recommendation of your application.

**MLT 2 - Single Housing Version**



**MLT 2 - Dual Housing Version**



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