

ABB MEASUREMENT & ANALYTICS | DATA SHEET

# EasyLine EL3000 Series

## Continuous gas analyzers



## Flame-ionization detector Fidas24

### Measurement principle

Flame-ionization detector

The analyzer complies with the requirements for measuring instruments with flame ionization detection according to EN 12619.

### Sample components and measurement ranges

#### Sample components

Hydrocarbons (THC). The sample component concentration in the sample gas should not exceed 100 % of the LEL.

#### Number of sample components

1 sample component

#### Smallest measurement range

0–5 to 0–1500 mg org. C/m<sup>3</sup> or  
0–10 to 0–3000 ppm C1

#### Largest measurement range

0–18 to 0–5000 mg org. C/m<sup>3</sup> or  
0–35 to 0–10000 ppm C1

#### Measurement range quantity

2 measurement ranges

#### Measurement range limits

The measurement range limits can be freely set in the ranges specified above.

### Stability

The following data apply only if all influence factors (e.g. flow rate, temperature, atmospheric pressure) are constant. They apply to measurement ranges  $\geq 50$  mg org. C/m<sup>3</sup>, for smaller ranges these only apply if they are factory-set per customer order.

#### Linearity deviation

$\leq 2$  % of the span to 5000 mg org. C/m<sup>3</sup>

this value applies in one (calibrated) measurement range

#### Repeatability

$\leq 0.5$  % of measurement range

#### Zero-point and sensitivity drift

$\leq 0.5$  mg org. C/m<sup>3</sup> per week

#### Output fluctuation (2 $\sigma$ )

$\leq 0.5$  % of span at electronic T90 time = 20 sec,  
not smaller than 10  $\mu$ g org. C/m<sup>3</sup>

#### Detection limit (4 $\sigma$ )

$\leq 1$  % of span at electronic T90 time = 20 sec,  
not smaller than 20  $\mu$ g org. C/m<sup>3</sup>

### Influence effects

#### Oxygen dependence

$\leq 2$  % of measured value for 0–21 vol.% O<sub>2</sub> or  $\leq 0.3$  mg org. C/m<sup>3</sup>,  
the larger value applies

#### Temperature effect

Ambient temperature in permissible range  
at zero-point and on sensitivity:  $\leq 2$  % per 10 °C in measurement  
range of 0–15 mg org. C/m<sup>3</sup>

#### Pressure effect

No effect of ambient pressure or process pressure fluctuations  
within the permissible sample gas inlet pressure range

#### Power supply effect

DC 24 V  $\pm 5$  %:  $\leq 0.2$  % of span or

AC 230 V  $\pm 10$  %:  $\leq 0.2$  % of span

## Dynamic response

### Warm-up time

≤ 2 hours

### 90% response time

$T_{90} < 1.5$  sec at sample gas flow = 80 l/h and electronic  $T_{90}$  time = 1 sec

## Calibration

### Zero-point calibration

With synthetic air or catalytically purified air or nitrogen, depending on application

### Sensitivity calibration

With propane or another hydrocarbon (substitute gas) in air or nitrogen, depending on application

## Materials in contact with the sample medium

### Analyzer, gas lines and connectors

Stainless steel 1.4305 (SAE 303) and 1.4571 (SAE 316Ti), FPM, PTFE, FFKM

## Gas connections

See page 35

## Operating gases and test gases

### Instrument air

Quality per ISO 8573-1 class 2 (max. particle size 1  $\mu\text{m}$ , max. particle concentration 1  $\text{mg}/\text{m}^3$ , max. oil content 0.1  $\text{mg}/\text{m}^3$ , pressure dew point at least 10 °C below the lowest foreseeable ambient temperature)

Inlet pressure  $p_e = 4000 \pm 500$  hPa

Flow rate typically approx. 1800 l/h (1200 l/h for air injector and approx. 600 l/h for housing purge), maximum approx. 2200 l/h (1500 l/h + 700 l/h)

### Combustion air

Synthetic air or catalytically purified air with an organic C content < 1 % span

Inlet pressure  $p_e = 1200 \pm 100$  hPa

Flow rate < 20 l/h

### Combustion gas

Hydrogen ( $\text{H}_2$ ), grade 5.0, or  $\text{H}_2/\text{He}$  mixture (40/60 %)

Inlet pressure  $p_e = 1200 \pm 100$  hPa

Flow rate ≤ 3 l/h ( $\text{H}_2$ ) or approx. 10 l/h ( $\text{H}_2/\text{He}$ )

A flow limiting device must be provided on the hydrogen supply (see section "Safe operation of the gas analyzer").

### Test gases

Zero-point calibration: Nitrogen, grade 5.0, or synthetic air or catalytically purified air

Sensitivity calibration: Sample component or substitute gas component in nitrogen or air

Inlet pressure  $p_e = 1000 \pm 100$  hPa

Flow rate 130–250 l/h

## Sample gas inlet conditions

The sample gas may not be explosive at any time.

The analyzer must not be used for measurement of gases containing organometallic compounds, e.g. leaded gasoline additives or silicone oils.

### Temperature

≤ thermostat temperature

(Thermostat temperature for measurement gas path, detector and air injector ≤ 200 °C, factory-set to 180 °C)

### Inlet pressure

$p_{\text{abs}} = 800\text{--}1100$  hPa

### Outlet pressure

Atmospheric pressure

### Flow rate

Approx. 80–100 l/h at atmospheric pressure (1000 hPa)

### Humidity

≤ 40 %  $\text{H}_2\text{O}$

### Flammable gases

The analyzer can be used for measurement of flammable gases as long as the total flammable portion does not exceed 15 vol.%  $\text{CH}_4$  or C1 equivalents.

## Note

The analyzer cannot be used in combination with the integral gas feed.

## Safe operation of the gas analyzer

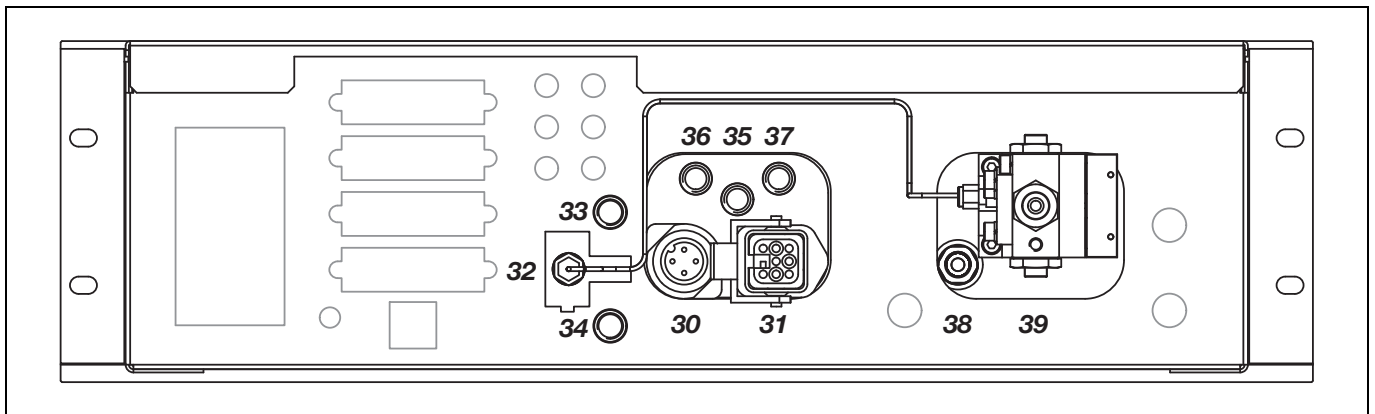
The device concept ensures that a concentration of combustible gas or an explosive mixture of combustible gas and ambient air cannot occur in the interior of the gas analyzer during normal operation. The interior of the gas analyzer cannot be allocated to an (explosion protection) zone; an explosive gas mixture cannot escape to the outside.

The end user must make the following provisions to ensure safe operation of the gas analyzer:

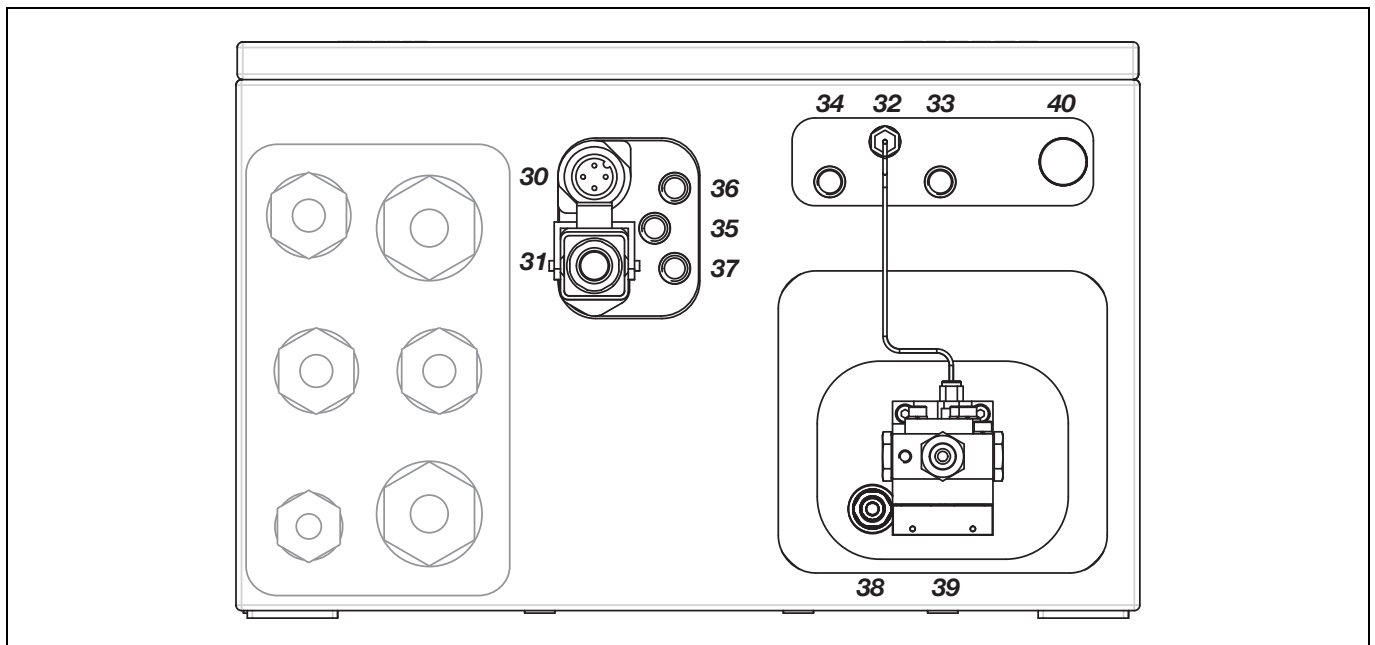
- The combustion gas flow rate must be limited to a maximum of 10 l/h of  $\text{H}_2$  or 25 l/h of  $\text{H}_2/\text{He}$  mixture. For this purpose, the end user has to provide suitable measures outside the gas analyzer.
- A shut-off valve must be installed in the combustion gas supply line to increase the safety in the following operating states: Shutting down the gas analyzer, failure of the instrument air supply, leakage in the combustion gas feed path inside the gas analyzer. This shut-off valve should be installed outside the analyzer house in the vicinity of the combustion gas supply.

## Gas connections and electrical connections Fidas24

### Model EL3020



### Model EL3040



**30** Power supply AC 115 V or 230 V for heating of detector and sample gas inlet (4-pin male plug, connecting cable supplied)

**31** Electrical connection to heated sample gas inlet (fixed)

**32** Test gas outlet

**33** Zero-point gas inlet

**34** End-point gas inlet

**35** Combustion air inlet

**36** Combustion gas inlet

**37** Instrument air inlet

Design:  $\frac{1}{8}$  NPT female thread (stainless steel 1.4305/SAE 303) for threaded connections (not supplied)

**38** Exhaust outlet

Design: Threaded connection for 6-mm outer diameter tubing, permissible maximum length of 30 cm; after that point the inner diameter of the exhaust line should be increased to  $\geq 10$  mm.

**39** Sample gas inlet, heated or unheated

Design: Threaded connection for PTFE or stainless steel tubing with a 6-mm outer diameter

**40** Pressure compensation opening with protection filter (only in wall-mount housing)