

continuous
emissions
monitoring



LAND

Combustion & Environmental Monitoring

An **AMETEK**® Company

FGA

Continuous Emissions & Combustion Efficiency Monitoring



The FGA range of analyzers use dual sensor technology to measure the levels of Nitrogen Oxides, Carbon Monoxide and Oxygen in flue gas.

Land's measurement technique ensures stable long-term operation with high accuracy and very low drift. Engineered for ease of maintenance and packaged for the industrial environment, FGA series analyzers are simple to install and trouble-free in operation.

for stand-alone use or as part of a fully-integrated system
- to meet the demands of modern environmental legislation.

Features & Benefits

- **Fully integrated system in a single compact box** - *no additional components required*
- **Suitable for a wide range of applications** - *up to 3 gases in a single analyzer*
- **Low maintenance** - *straightforward servicing without specialist skills*
- **Proven high performance** - *dual sensor measurement technique, TÜV & MCerts approved/Certified to US EPA standards*
- **True measured Total NO_x** - *separate NO + NO₂ sensors for true NO_x monitoring, no converters necessary*
- **Simple installation** - *locate the analyzer anywhere, including outside locations*
- **Automatic calibration option** - *for continuous unattended operation in compliance monitoring applications*
- **Combustion Efficiency measurement option** - *for optimizing process efficiency where conditions are changing*

Compact Weatherproof Design

FGA analyzers are very compact. The choice of installation location and access is therefore made much simpler. They are packaged in weatherproof cabinets, intended for mounting directly on to a convenient wall or structure, inside or outside.

True NO_x Measurement

The analyzer measures both NO and NO₂ separately, these are combined to give a true NO_x measurement output. The inherent problems with catalytic NO₂ converters are therefore completely avoided.



Flexible Configuration

FGA analyzers are available in a range of configurations, as shown in the table.

Automatic Calibration

Each analyzer is fitted with manual calibration as standard. Automatic calibration is optional and enables the analyzer to perform a calibration without operator intervention.

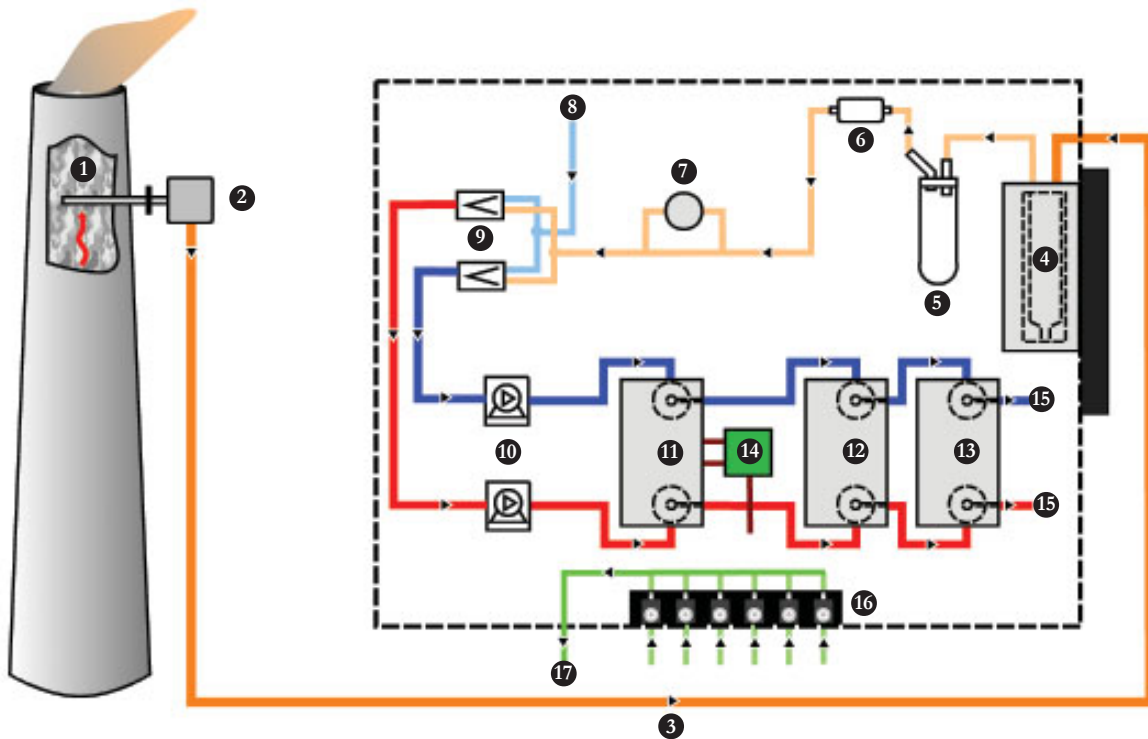
Efficiency

A calculation of overall combustion efficiency can be made for process optimization. It is optional on analyzers fitted with Oxygen sensors.

CO₂

A calculated CO₂ output can be provided on all models that measure O₂.

Model	Gas Type				
	CO	O ₂	NO	NO ₂	NO _x
900	•				
930	•	•			
940		•	•		•
942		•	•	•	•
945			•	•	•
950	•	•	•		•



How the Analyzer Works

FGA is an extractive sampling multi-gas analyzer system. The flue gas is extracted using a sample probe. The gas is then transported via a sample line, to the cooler unit fitted inside the analyzer, where the moisture is removed. The dry and cooled sample gas is then filtered to remove particulates before being directed into the measurement system. The measurement system is made up of pairs of sensors. Each sensor is fed alternately with sample gas and air. The sensors generate an electrical output in proportion to a specific gas component. Measured values are then displayed and output as analog signals (4-20 mA).

Key

- Flue Gas Stream
 - Sample Probe
 - Sample Line
 - Peltier Sample Cooler Unit
 - Catch Pot
 - Particulate Filter
 - Flow Indicator
 - Air Inlet
 - Solenoid Valves
 - Sample Pumps
 - Gas Sensor Pair #1
 - Gas Sensor Pair #2
 - Gas Sensor Pair #3
 - CO Sensor Purge Unit
 - Exhaust
 - Automatic Calibration Gas Module (optional)
 - Calibration Gas to Sample Probe (with automatic option)
- Hot Sample Gas
— Cooled/Cleaned Sample Gas
— Air
— Measurement Channel #1
— Measurement Channel #2
— Calibration Gas

FGA SYSTEMS

CEM Systems - Tailored to your Needs

FGA series analyzers are extremely compact, and are ideal for incorporation into custom-built systems. Land can create solutions which conform with the most exacting specifications. From site-specific installation drawings to complete system engineering packages, Land has the experience to produce designs which perform to the highest standards.

- Special mounting arrangements
- Gas bottle cabinets and regulators
- Termination boxes and isolation relays
- Multiple probes with manual or automatic selection
- Explosion-proof systems
- Customer-specific drawings and manuals



Probes and Sample Lines for all Applications

Our experience will help determine which probe and type of sample line will give the best possible results in your application. A full range of heated and unheated probes, filters and sample lines is available to meet all requirements; and more importantly, to keep operating continuously and very efficiently, with the minimum of maintenance.

- Heated filter probes
- Ceramic probes for hot or acidic conditions
- Regulated and self-regulating heated sample lines
- Unheated sample lines

Advanced Capability Systems

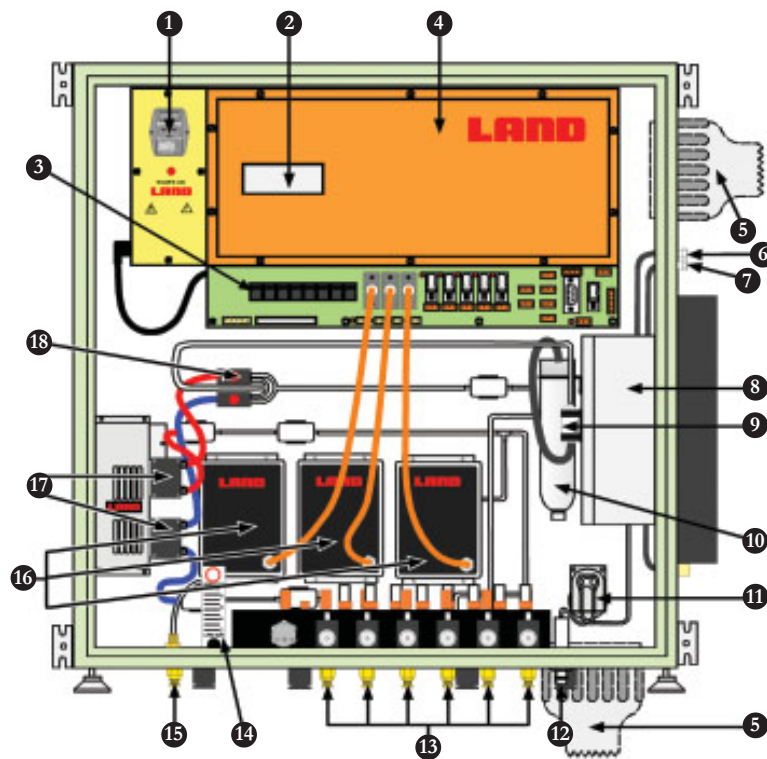
The FGA^{II} series of analyzers can measure up to six gases (CO, NO, NO₂, SO₂, O₂ and CO₂) in the same compact format. The ChillerProbe is a stack-mounted sampling system, which uniquely filters and cools the flue gas at the sampling point, before being transported to the FGA^{II} for analysis.

For further information please refer to data sheets for FGA^{II} Analyzer (pds 195) and FGA^{II} ChillerProbe (pds 199).

Data Acquisition and Reporting

Comprehensive data acquisition and analysis systems are available with all FGA analyzers. The PC-based software is a highly flexible and fully configurable data acquisition and reporting system for continuous emissions monitoring systems. This inherent flexibility enables it to meet the requirements of Environmental Regulation Authorities throughout the world.

Key Components of the Analyzer



Dual Sensor Technology

FGA analyzers use Dual Sensor Technology to give high measurement accuracy and repeatability. The main advantage of this technology is the automatic zero drift correction the analyzer performs every 30 minutes. In addition, the analyzer performs a measurement verification during the drift correction cycle, ensuring a reliable, repeatable reading.

Continuous emissions monitoring systems using dual sensor technology are in use worldwide and have been certified to US EPA standards PS-3, PS-4 and PS-4A; are MCerts certified; and TÜV approved to the 13th and 17th BImSchV and TA Luft.



Key

1. Power Switch & Fuse
2. LCD Display
3. Menu Operation Keys
4. Electronics Panel
5. Sample Line Connection Boot
(optional heated/ anti-freeze sample line)
6. Compressed Air Inlet
7. Sample Gas Inlet (standard sample line)
8. Peltier Sample Cooler Unit
9. Particulate Filter
10. Catchpot
11. Condensate Peristaltic Pump
12. Condensate Drain
13. Calibration Gases and Air Inlets[#]
14. Calibration Gas Flowmeter and Needle Valve[#]
15. Calibration Gas outlet to probe
16. Sensor Units 1, 2 and 3
17. Sample Pumps
18. Solenoid Valves

[#]Fitted on Automatic Calibration models only

Office Locations

UK - Dronfield

Tel: +44 (0) 1246 417691

E-Mail: combustion.info@landinst.com

Web: www.landinst.com

USA - Pittsburgh

AMETEK Process Instruments

Tel: +1 412 828 9040

E-Mail: combsales@ametek.com

Web: www.landinstruments.net

USA - Delaware

Tel: +1 302 456 4400

USA - Texas

Tel: +1 281 463 2820

Canada

Tel: 403-235-8400

China - Beijing

Tel: +86 10 8526 2111

China - Shanghai

Tel: +86 21 6426 7049

China - Chengdu

Tel: +86 28 8675 8111

France - Bailly

Tel: +33 (0) 1 30 80 89 20

E-Mail: info-combustion@landinst.fr

Web: www.landinst.fr

France - Elancourt

Tel: +33 1 30 68 89 20

Germany - Meerbusch

Tel: +49 (0) 21 59 91 36 0

Italy - Milan

Tel: +39 02 9904 0423, 9108 0020

E-Mail: comb.info@landinst.it

Web: www.landinst.it

Middle East - Dubai

Tel: +971 4 881 2052

Mexico - Mexico City

Tel + 52 55 5281 1165

E-Mail: ventas@landinstruments.net

Poland - Krakow

Tel: +48 (0) 12 632 82 62

E-Mail: land@land.com.pl

Web: www.land.com.pl

Singapore

Tel: +65 6484 2388

Specifications

Measurement Ranges

CO Ranges: 0 - 50 ppm up to 0 - 2 000 ppm
 NO Ranges: 0 - 50 ppm up to 0 - 2 000 ppm
 NO₂ Ranges: 0 - 50 ppm up to 0 - 200 ppm
 Resolution: 1 ppm / 1 mg/m³
 Linearity: < 2 % of range
 Zero drift: < 2 % of range per month
 Span drift: < 2 % of range per month

O₂ Ranges: 0 - 5 % to 0 - 25 %
 Resolution: 0.1 Vol %
 Linearity: < 0.2 Vol %
 Zero drift: < 0.2 Vol % per month
 Span drift: < 0.2 Vol % per month

Calibration: Microprocessor controlled
 Standard: Manual gas selection

Display: LCD with backlight
Indicators: External "Power On" and "System OK" LEDs

Outputs/Inputs

Analog outputs: Isolated current loop outputs
 One per gas measured plus NO_x if NO & NO₂ measured
 Efficiency (on instruments with selected option)
 0, 2 or 4 to 10 or 20mA.
 Relay outputs: System OK, Maintenance/Calibration
 Relay rating: Isolated changeover S.P. 1 A @ 240 V a.c.
 5 A @ 24 V d.c. resistive for
 Alarm - one per gas measured
 Span and Zero Gas Relays for calibration gases
 Inputs: Current loop inputs for ambient & process temperatures
 (only needed for efficiency calculation)

Environmental

Environmental rating: IP65 / NEMA 4
 Operating (ambient) temperature: 0 to +35 °C / 32 to 95 °F standard
 to -20 °C / -4 °F with optional case heater
 to +50 °C / 122 °F with optional air conditioner

Compliance

Measurement standards: Meets the requirements of ISO 12039, ISO 10849
 & ISO 7935
 Approvals: TÜV approved to the 13th & 17th BImSchV and TA Luft
 MCerts certified Continuous Emissions Monitoring System
 USEPA certified to PS-3, PS-4 and PS-4A
 Electrical safety: Conforms to EN-61010-2
 EMC: Conforms to EN-50 081 & EN-50 082

Power

Power supply: 110 V a.c. or 230 V a.c. ±20%, 50 - 60 Hz
 Power consumption: 300 W

Gas and Air Requirements

Instrument air (zero calibration): 2 bar / 30 psi clean and dry, 5 l/min / 0.2 cfm
 Instrument air (cooling): 2 - 10 bar / 30 - 150 psi clean and dry, 90 l/min / 3 cfm
 Calibration gas (recommended): 2 bar / 30 psi, 5 l/min / 0.2 cfm
 20 litres / 0.7 cu.ft. per calibration approx.
 Calibration gas type: Specific to each gas type and measurement span

Dimensions (H x W x D): 600 x 600 x 350 mm / 24" x 24" x 14"
Weight: 53 kg / 117 lb

Options

Special Measurement Ranges
 Automatic Calibration
 Efficiency Measurement
 Probe Type
 Sample Line Type
 Case Heater
 Air Conditioner/Vortex Cooler

Continuous product development may make it necessary to change these details without notice

LAND

www.landinst.com

An **AMETEK**® Company

LAND has a comprehensive range of Combustion and
 Environmental Monitoring Instrumentation.



Approval applies to products designed and
 manufactured in the UK



Approval applies in the USA



Sira MC 040019/00
 - MC 040026/00

PDS207/03/07