

ATEX II 3 G WDG-IV Series

Close-coupled aspirated analyzers for measurement of oxygen, combustibles and methane in flue gas streams up to 1648°C.

The WDG-IV series analyzers mount directly on the combustion process and are designed for direct measurement in high temperature flue gas applications such as fired heaters and furnaces, but are equally at home on boilers and other lower temperature applications. These analyzers are suitable for gas streams up to 704°C using the standard 316SS probe/filter assembly. Flue gas temperatures up to 1648°C can be measured using optional high temperature probes. For corrosive gas streams, sample wetted parts in Hastelloy® or Inconel® are available. The analyzers can be provided with separate control unit (Series 2000) or integral on-board electronics (Smart Sensors) and are offered in a range of mounting styles. Optional combustibles and methane detectors are available for optimal control of the combustion process.



ATEX II 3 G MODELS

SERIES 2000 BASED

WDG-IV Oxygen

WDG-IVC Oxygen and Combustibles

WDG-IVCM Oxygen, Combustibles & Methane

SMART SENSOR VERSIONS

WDG IV/IQ Oxygen

WDG IVC/IQ Oxygen and Combustibles

WDG IVM/IQ Oxygen and Methane

WDG IVCM/IQ Oxygen, Combustibles & Methane

SENSOR SECTION

Principle of Operation: Zirconium oxide for net oxygen measurement and hot-wire type catalytic detectors for both combustibles and methane.

Output Range:

Oxygen: From 0-1 to 0-100%

Combustibles: From 0-2,000 ppm to 0-10,000 ppm or from 0-2% to 0-5%

Methane: 0-2% to 0-5%

Accuracy:

Oxygen: $\pm 0.75\%$ of measured value or $\pm 0.05\% \text{ O}_2$, whichever is greater

Combustibles: $\pm 2\%$ of full scale output range

Methane: $\pm 5\%$ of full scale output range

Response:

Oxygen: 90% of a step change < 30 secs.

Aspirator Air Requirements: 4.72 to 9.4 L/min. at 1.05 to 7.04 kg/cm²

Max. Flue Gas Temp. / Probe Material / Lengths:

704°C / 316 SS / 91 cm - 274 cm

1024°C / 310 SS / 91 cm - 274 cm

1648°C / Hexoloy® / 60 cm - 182 cm

Max. Sample Dewpoint: 200°C

Sample Pressure: Subatmospheric

Purge Flow During Rapid Exchange Period: 340 L/min.

Purge Flow During Normal Operation: 30.2 L/min.

Environment:

Ambient Temp.: -20°C to 60°C

Relative Humidity: 10% to 90%, non-condensing

Enclosure: NEMA 4X (IP56) hinged stainless steel wall mount; optional floor mount.

Calibration Gas Requirements: Use calibration gases at 0.70 kg/cm², 0.7 L/min.

O_2 Span Gas: Air or from 1.0% to 100% O_2 , balance N_2

O_2 , Comb. & CH_4 Zero Gases: From 0.1 to 10% O_2 (2% recommended), balance N_2

Comb. Span Gas: 800 ppm CO , 800 ppm H_2 , 2 to 4% O_2 , balance N_2 (for a 0 - 2000 ppm combustibles range)

CH_4 Span Gas: 2% CH_4 , 8% to 10% O_2 , balance N_2

SYSTEM COMPLIANCE:

EMC Compliance: 2004/108/EC

Electronics Safety Compliance: 73/23/EEC

ATEX Directive 94/9/EC

TYPE APPROVAL (LCIE 05 ATEX 6140 X and LCIE 05 ATEX 6140 X / 01)

Hand Held IQ Link	Ⓔ II 3 G EEx nL IIC T4	-20°C ≤ Ta ≤ 70°C
Wall Mount IQ Link	Ⓔ II 3 G EEx nA IIC T4	-20°C ≤ Ta ≤ 70°C
Series 2000 Control Unit	Ⓔ II 3 G EEx nA IIC T3	-10°C ≤ Ta ≤ 50°C
WDG...	Ⓔ II 3 G EEx nZ IIC T3	-20°C ≤ Ta ≤ 60°C

INTERFACE OPTIONS

The choice of smart sensors or discrete sensor and control unit combinations offers flexibility to suit application and site requirements.

IQ analyzers incorporate all the necessary intelligence for operation and to provide analog outputs and alarms directly from the sensor. User access is via a handheld or wall mount IQ Link™ communicator. For installations where a separate control unit is preferred, the Series 2000 can be located up to 304m from the sensor.

SERIES 2000 CONTROL UNIT

Display: Four-line x 20-character vacuum fluorescent.

Analog Output: Two isolated linear current outputs. One additional output each for combustibles and methane (options).

Alarms: Two independent oxygen alarms, each high or low selectable. Two high combustibles alarms (optional). Two high methane alarms (optional). One loss of purge alarm (on sensor).

Environment:

Ambient Temp.: -10°C to 50°C

Humidity: 10% to 80%, non-condensing

Communications: RS-485, 2-way addressable.

Enclosure: Weatherproof NEMA 4 (IP 56). NEMA 4X (IP 56) stainless steel available as option.

COMMON FEATURES

Display: Selectable displays with password protection, programmable pressure compensation and context-sensitive help.

Alarms: One alarm can be assigned as oxygen, in calibrate or in verify. Set relays to energize or de-energize on alarm. SPST type. Contact rating 1 A, 30V max. non inductive load, AC or DC.

Calibration: Oxygen cell lifetime extender. Calibrate or verify calibration. Store last calibration and verification



Handheld IQ Link and Wall Mount IQ Link

NEMA 4X
Stainless Steel



Series 2000 Control Unit

data. Selectable calibration gas run time and process recovery time.

Diagnostics: Watchdog timer and service alarms. System test for A/D, RAM, EEPROM, and keypad. Display line 4 reserved for full text error and diagnostic messages. Twenty-entry event log.

Analog Output: Each output can be 4-20 mA or 0-20 mA and is fully scalable. Hold or track during calibration and select degree of damping.

IQ VERSIONS

Handheld or dedicated wall mount IQ Links provide a local interface to the Thermox line of Smart Sensors using RS-232 communications. The IQ links are used to set up and display system parameters, initiate calibrations, and perform system tests and troubleshooting. The handheld link can be plugged into any Thermox IQ Analyzer. The dedicated wall mount version is hard wired to a specific analyzer but can be easily rewired depending on plant

needs. With optional HART® protocol, a universal controller can be used in lieu of or in addition to the IQ Links. Device descriptions are registered with the HART foundation.

Interface:

Handheld: RS-232 plug in 213 cm cable, general purpose enclosure.

Wall Mount: RS-232, max. distance 1524 cm, NEMA 4X (IP56) enclosure.

Environment:

Operating Temp.: -20°C to 70°C

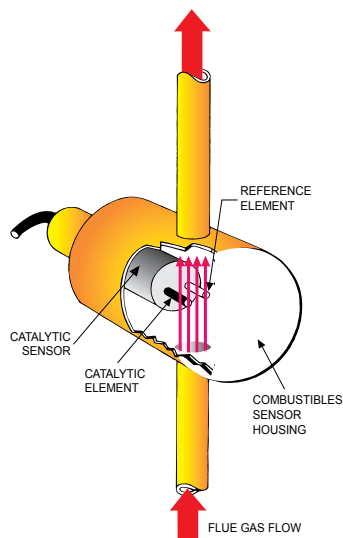
Humidity: 5% to 80% (non-condensing)

Display: Four-line by 20-character LCD

Analog Output: One isolated linear output. One additional output for combustibles and one for methane. Max. load 1000 ohms.

Alarms: One dry contact alarm. One additional alarm for combustibles and one for methane (options). One loss of purge alarm (on sensor).

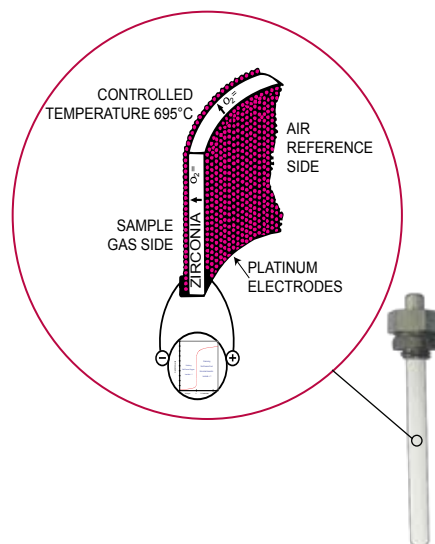
Communications: RS-485, 2-way addressable or HART.



Catalytic Detector

RELIABLE AND EASY TO SERVICE

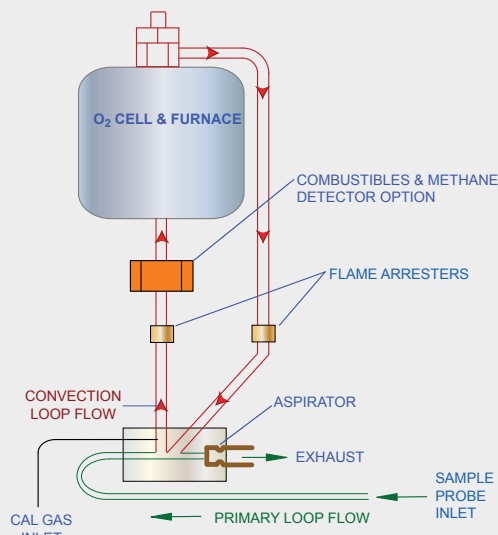
All models use zirconium oxide for net oxygen measurement and catalytic detectors for combustibles or methane. The sample path is through large internal diameter tubing with no restrictions allowing unobstructed sample flow through the analyzer. The oxygen cell and catalytic detectors are designed for long life in demanding applications. All parts are easy to reach and can be replaced using standard tools without having to remove the analyzer from the flange.



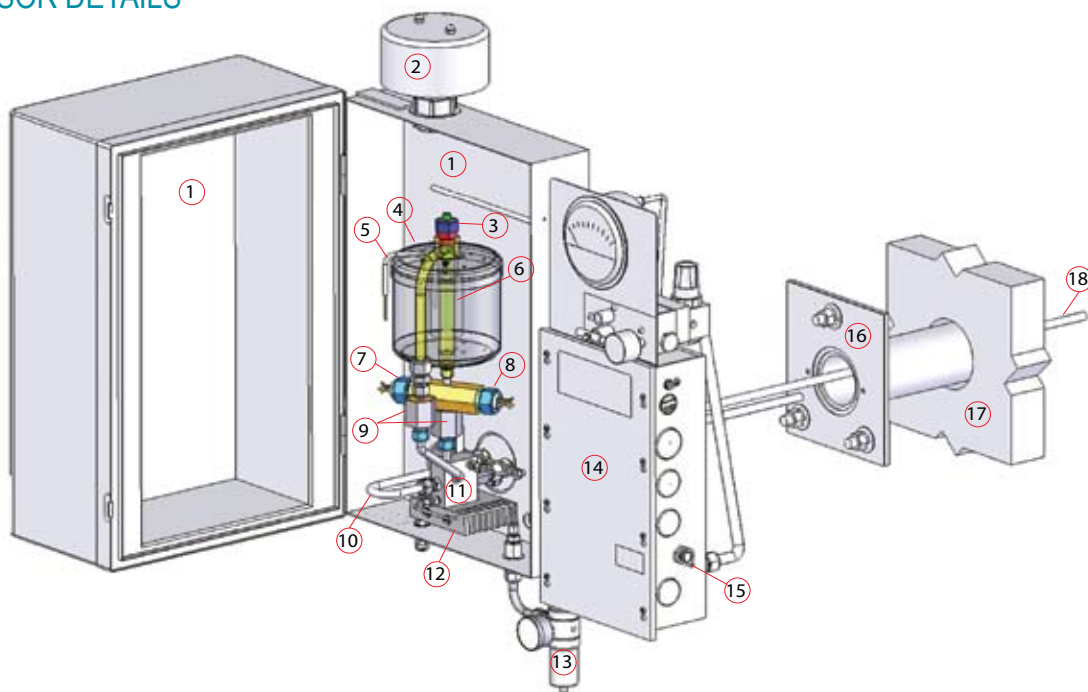
Zirconium Oxide Cell

CLOSE-COUPLED ASPIRATED TECHNIQUE

Case heaters maintain the internal sample wetted parts above the acid dew point of the flue gas. A sample is drawn into the analyzer by means of an air or nitrogen operated aspirator and returned immediately to the process. This is the primary or fast loop. A convection loop containing the zirconium oxide oxygen cell is mounted at right angles to the primary loop. Due to the natural convection generated by the temperature difference between the cell location (695°C) and the return leg (approximately 215°C), a portion of the sample rises into the convection loop, past the detectors and oxygen cell then back to the primary loop. The controlled conditions of the convection loop are ideally suited to catalytic combustibles and methane detectors which benefit from a constant temperature and constant flow environment.



SENSOR DETAILS



- 1 Insulated SS Enclosure
- 2 Vent
- 3 Oxygen Cell (zirconia)
- 4 Furnace (cell heater)
- 5 Thermocouple
- 6 Cell Housing

- 7 Combustibles Detector (option)
- 8 Methane Detector (option)
- 9 Flame Arresters
- 10 Inlet Hook
- 11 Aspirator Block
- 12 Case Heater

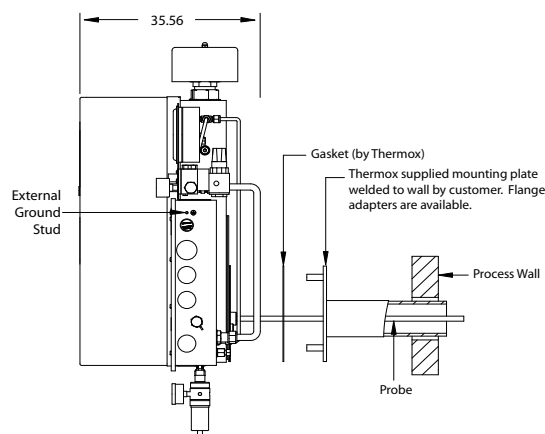
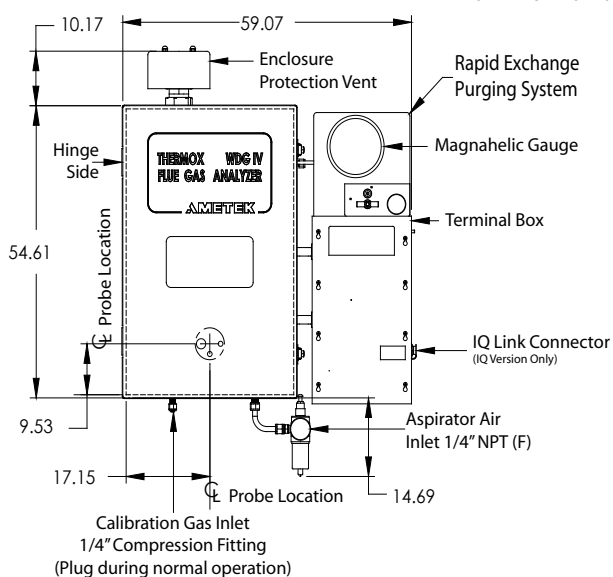
- 13 Aspirator Air Regulator & Gauge
- 14 Purge Enclosure and Terminal Box
- 15 Plug-in Connector (IQ only)
- 16 Flange or Mounting Plate
- 17 Process Wall
- 18 Sample Probe

ATEX II 3 G WDG-IV SERIES

WALL MOUNT SENSOR (STANDARD MOUNT)

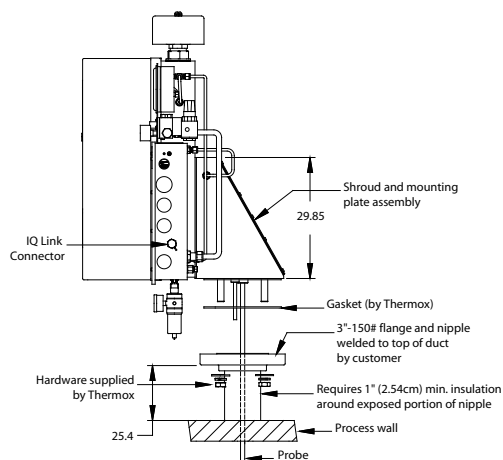
APPROX WEIGHT: 31.75 KG

DIMENSIONS IN CENTIMETERS



FLOOR MOUNT SENSOR

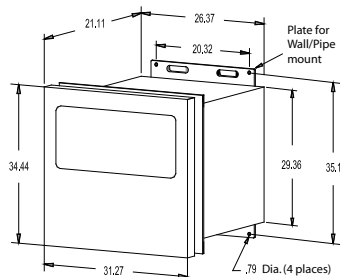
APPROX. WEIGHT: 43.09 KG



SERIES 2000 CONTROL UNIT

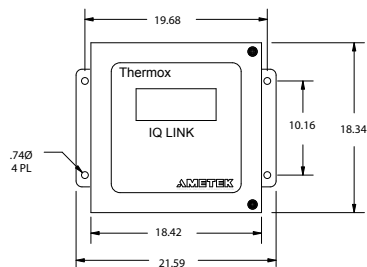
NEMA 4 / NEMA 4X (CUTOUT: 31.18 cm H X 27.31 cm W)

APPROX WEIGHT: 12.7 KG



WALL MOUNT IQ LINK

APPROX WEIGHT: 4.53 KG



MODEL	POWER REQUIREMENTS
WDG-IV, WDG-IVC, WDG-IVCM	104-127 / 207-253 Vac, 700 / 1950 VA
WDG-IV, WDG-IVC, WDG-IVCM (Floor Mount)	104-127 / 207-253 Vac, 750 / 2000 VA
WDG IV/IQ, WDG IVC/IQ, WDG IVM/IQ, WDG IVCM/IQ	104-127 / 207-253 Vac, 740 / 1990 VA
WDG IV/IQ, WDG IVC/IQ, WDG IVM/IQ, WDG IVCM/IQ (Floor Mount)	104-127 / 207-253 Vac, 790 / 2040 VA
Hand-Held IQ Link	9 - 15 Vdc, 0.1 A
Wall Mount IQ Link	104 - 253 Vac, 8 VA
Series 2000 Control Unit	104 - 253 Vac, 30 VA

NOTE:

1. All static performance characteristics are with operating variables constant.
2. System accuracy referenced to 0.1 to 10% calibrated range.
3. Response is to calibration gas.

SALES AND MANUFACTURING:

USA - Delaware
455 Corporate Blvd., Newark DE 19702 • Tel: +1-302-456-4400, Fax: +1-302-456-4444

USA - Oklahoma
2001 N. Indianwood Ave., Broken Arrow OK 74012 • Tel: +1-918-250-7200, Fax: +1-918-459-0165

CANADA - Alberta
2876 Sunridge Way N.E., Calgary, AB T1Y 7H9 • Tel: +1-403-235-8400, Fax: +1-403-248-3550

WORLDWIDE SALES AND SERVICE LOCATIONS:

USA - Texas
Tel: +1-713-466-4900, Fax: +1-713-849-1924

CHINA
Beijing / Tel: 86 10 8526 2111, Fax: 86 10 8526 2141
Chengdu / Tel: 86 28 8675 8111, Fax: 86 28-8675 8141
Shanghai / Tel: 86 21 6426 8111, Fax: 86 21 6426 7818

FRANCE
Tel: 33 1 30 68 89 00, Fax: 33 1 30 68 89 99

GERMANY
Tel: 49 21 59 91 36 0, Fax: 49 21 59 91 36 80

MIDDLE EAST - Dubai
Tel: 971 4 881 2052, Fax: 971 4 881 2053

SINGAPORE
Tel: 65 6484 2388, Fax: 65 6481 6588

AMETEK®

PROCESS INSTRUMENTS

150 Freeport Road, Pittsburgh, PA 15238
Ph. +1-412-828-9040, Fax +1-412-826-0399
www.ametekpi.com



© 2007, by AMETEK, Inc.
All rights reserved. Printed in the U.S.A.
P700 (3/08)

One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
Specifications subject to change without notice.

THE THERMOX®