


# Non-Dispersive Infrared Analyzer

- Factory Mutual  Approved CI, DII, Groups BCD-with Approved Purge
- Microprocessor-Controlled
- Routine Adjustments made from Front Panel Keypad
- Luft Detector Technology
- Front Panel Push-button Calibration
- Standard Linearizer Field Adjustable
- Optional Auto Zero/Span
- Field Changeable Configurations
- Optional Remote Range Change and ID
- LCD Display with Backlighting
- Adjustable Speed of Response

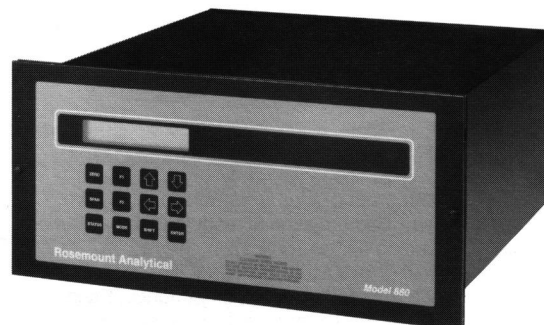
The Rosemount Analytical Model 880A is a microprocessor-controlled infrared analyzer designed to cover a wide range of process, stack and automotive applications. Time-proven Luft detector technology, microprocessor operation, user-friendly software and many other features make the Model 880A an industry benchmark. Ease of operation and calibration, programmable linearizing coefficients, field retrofitable configurations, selectable speed of response and proven reliability are just a few of the many standard features you expect from a worldwide leader in non-dispersive infrared technology.

## FEATURES

The Model 880A, the first all microprocessor-controlled infrared analyzer, offers the convenience of complete setup and operation from the front panel keypad. The component of interest, range span, linearizing coefficients and zero/span parameters are all set with these keys. A calibration gas control option allows two solenoids to be remotely actuated from the front panel, enabling one-person calibrations without leaving the analyzer. An automatic zero/span option is also available for unattended calibration of all three ranges.

Calibration is made even easier with the addition of two new features—calibration error messages and single key calibration. The calibration messages alert the user that preset limits or adjustment have been reached during zero or span operations, and that maintenance, such as cleaning the cells, is required. The single key calibration for either zero or span automatically calibrates the analyzer to programmed values with the push of a button.

The microprocessor offers a choice of readout units. The analyzer can be set up and calibrated to read percent of fullscale, or by actuating the linearizer, can be set to read engineering units. An additional advantage offered by the microprocessor is analyzer diagnostic functions. By pressing the front panel mode key, the user can quickly check the status of four operational parameters without interrupting the continuous operation of the analyzer. The pre-programmed diagnostic function checks the oscillator tuning, source current, detector signal and power supply voltages.



Four user-programmable function keys are available to enable the frequent checking of a single diagnostic point or set point modification. Once programmed, a simple push of the key will instantly access the specific diagnostic data or allow for changes in the range setting, alarm setpoint, current output scaling, time constant or any other preset function.

The flexibility of the Model 880A is further increased by the ability to reconfigure the analyzer in the field. For instance, ranges may be changed or the analyzer's linearizer can be adjusted for specific user gas values. The individual target gas can also be changed, for appropriate cell lengths, by simply changing the detector and the analyzer setup.

The operation of the Model 880A can be enhanced with the choice of several options. In addition to the zero/span options already mentioned, current output with zero suppression is also new. In normal use, the 0/4 to 20 mA current output is set to represent 100% of scale.

In the suppressed range mode selected from the front panel, the current output represents any suppressed range with at least a 25% span, such as 0% to 25%, 20% to 80% or 75% to 100% of scale. User-set dual alarms are available with configurable HI/LO designations and deadband. Also available is an optional remote range change and ID with keypad-selectable decimal or binary codes.

In vehicle emissions measurements where small deviations may determine the course of development programs, or in process applications, where yield is related to precision, an accurate analyzer with precise measurement capabilities is essential.

Precision is a key feature of the superior performance of the Model 880A. High sensitivity, coupled with optical path length selection, permit measurements from parts per million to 100% concentrations. With precision to 1% of fullscale, measurement deviation is minimized on even the most sensitive ranges.

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The completely enclosed beam chopper provides high stability and freedom from atmospheric interferences in the testing location. Glass sample and reference cells improve stability by eliminating zero drift, typically caused by cell corrosion, and provide superior light-energy transmittance creating high detector signals with inherently low noise levels.

The improved IR sources with their constant current source driver and the chopper motor controlled by a quartz crystal enhance detector-signal stability, provide drift-free performance and completely eliminate changes due to power line frequency variations.

In addition, the analyzer utilizes the Luft detector principle which has high sensitivity and high interference rejection capability.

Speed of response is field-selectable from 0.5 seconds for high speed monitoring to 20 seconds for closed loop process or emission control. Speed of response can be set independently for each range.

The Model 880A is a relay rack-mounted design, but is also suitable for panel or table mount. Materials in contact with the sample include 316 stainless steel fittings, gold-plated glass cells and Teflon<sup>+</sup> tubing. The analyzer is constructed with a slide-out chassis to allow convenient access to all internal components.

## PRINCIPLE OF OPERATION

The Model 880A Analyzer produces infrared radiation from two separate energy sources. This radiation is modulated by a chopper into 5 Hz pulses. Depending on the application, the radiation may then pass through optical or gas filters to reduce background interference from other infrared-absorbing components. Each infrared beam passes through a separate cell. One cell contains a continuous flowing sample while the other cell is either sealed or contains a continuous flowing reference gas.

During operation, a portion of the infrared radiation is absorbed by the component of interest in the sample, with the quantity of infrared radiation absorbed being proportional to the component concentration. The detector is a "gas microphone" based on the Luft principle. It converts the difference in energy between sample and reference cells to a change in capacitance. This capacitance change, equivalent to component concentration, is amplified and indicated on the display and, if desired, transmitted to a data acquisition device and/or controller.

## APPLICATIONS<sup>++</sup>

The Model 880A Analyzer is designed for a variety of process and automotive applications where a particular component in a gaseous stream must be continuously monitored. Typical measurements include:

### Chemical and Petroleum

Carbon Dioxide: Ethylene Oxide Manufacture, Phthalic Anhydride Manufacture, Ammonia Manufacture, Producer Gas Monitor, Nitrogen Generation  
Carbon Monoxide: Stacking Monitoring

Methane: Ammonia Manufacture  
Acetylene: Acetylene Manufacture, Acrylonitrile Manufacture, Vinyl Chloride Manufacture  
Sulfur Dioxide: Sulfuric Acid Stack Gas

### Food and Agriculture

Carbon Dioxide & Water Vapor: Blanketing of Perishables, Fermentation Processes, Photosynthesis Studies, Personnel Protection

### Aerospace and Oceanography

Carbon Dioxide, Carbon Monoxide & Water Vapor: Diving and Space Chambers

### Metals and Ceramics

Carbon Dioxide: Producer Gas Monitor, Steel Converting, Cement Manufacture, Soaking Pit, Heat Treating  
Carbon Monoxide: Inert Gas Generation, Producer Gas Monitor, Rotary Kiln Roasting, Tin Plant Annealing, Steel Converting, Aluminum Powder Processing, Porcelain Kilns, Tunnels  
Water Vapor: Heat Treating, Hydrogen Brazing, Nickel and Chrome Plating  
Sulfur Dioxide: Flash Smelting  
Ammonia: Ammonia Dissociation

## SPECIFICATIONS

<b>Precision:</b>	1% of fullscale
<b>Noise:</b>	1% of fullscale
<b>Zero Drift:</b>	± 1% of fullscale per 24 hours/± 2% of FS/week at constant temperature
<b>Span Drift:</b>	± 1% of fullscale per 24 hours/± 2% of FS/week at constant temperature
<b>Ambient Temperature Effect:</b>	< ± 1% of fullscale over any 10°C interval for rate of change no greater than 10°C/hr. (application dependent)
<b>Response Time (Electronic):</b>	Variable, 90% of fullscale in 0.5 sec. to 20 sec., field selectable
<b>Sensitivity:</b>	100 ppm fullscale carbon monoxide at atmospheric pressure 50 ppm fullscale carbon dioxide at atmospheric pressure
<b>Sample Cell Length:</b>	0.04 inches (1mm) to 15.0 inches (381mm)
<b>Materials in Contact with Sample:</b>	Windows: Sapphire, quartz, Irtan <sup>1</sup>

### TYPICAL CONFIGURATIONS

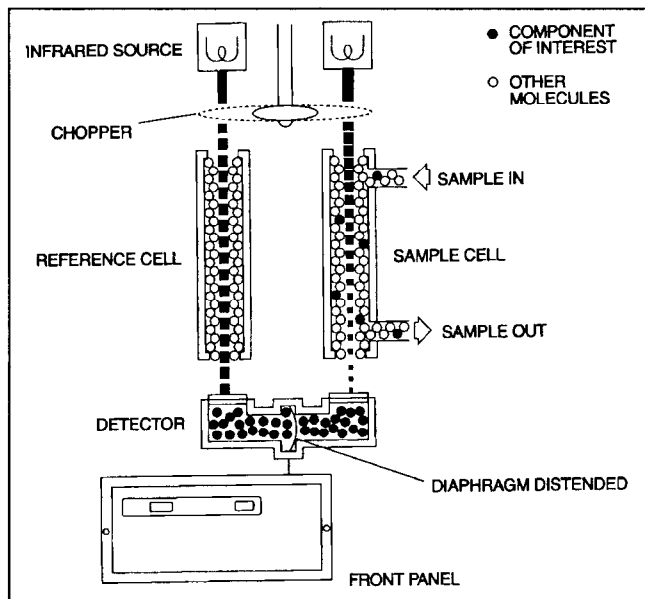
NO.	APPLICATION	NO.	APPLICATION
10	0-1 > 5% CO	27	0-10 > 100 ppm CO <sub>2</sub>
11	0-1000 > 5000 ppm CO	32	0-2 > 10% CH <sub>4</sub> **
12	0-1 > 5% CO	36	0-500 > 5000 ppm CO <sub>2</sub>
14	0-100 > 1000 ppm CO	38	0-2% > 6% CO <sub>2</sub>
16	0-200 > 1000 ppm CO	46	0-10 > 100 ppm CO <sub>2</sub>
18	0-2 > 10% CO	66	0-200 > 1000 PPM SO <sub>2</sub>
22	0-1/2 > 2 1/2% CO <sub>2</sub>	74	0-5% H <sub>2</sub> O
23	0-5 > 20% CO <sub>2</sub>	85	0-300 > 1500 ppm NH <sub>3</sub>

+ Teflon is a registered trademark of E.I. DuPont de Nemours & Co., Inc.

++ Analyzers sampling flammable gases must be protected by a continuous dilution purge system in accordance with standard ANSI/NFPA 496-1993, Chapter 6. Consult factory for recommendations.

1 Irtan is a registered trademark of Eastman Kodak Co.

2 Pyrex is a registered trademark of Corning Glass Works.

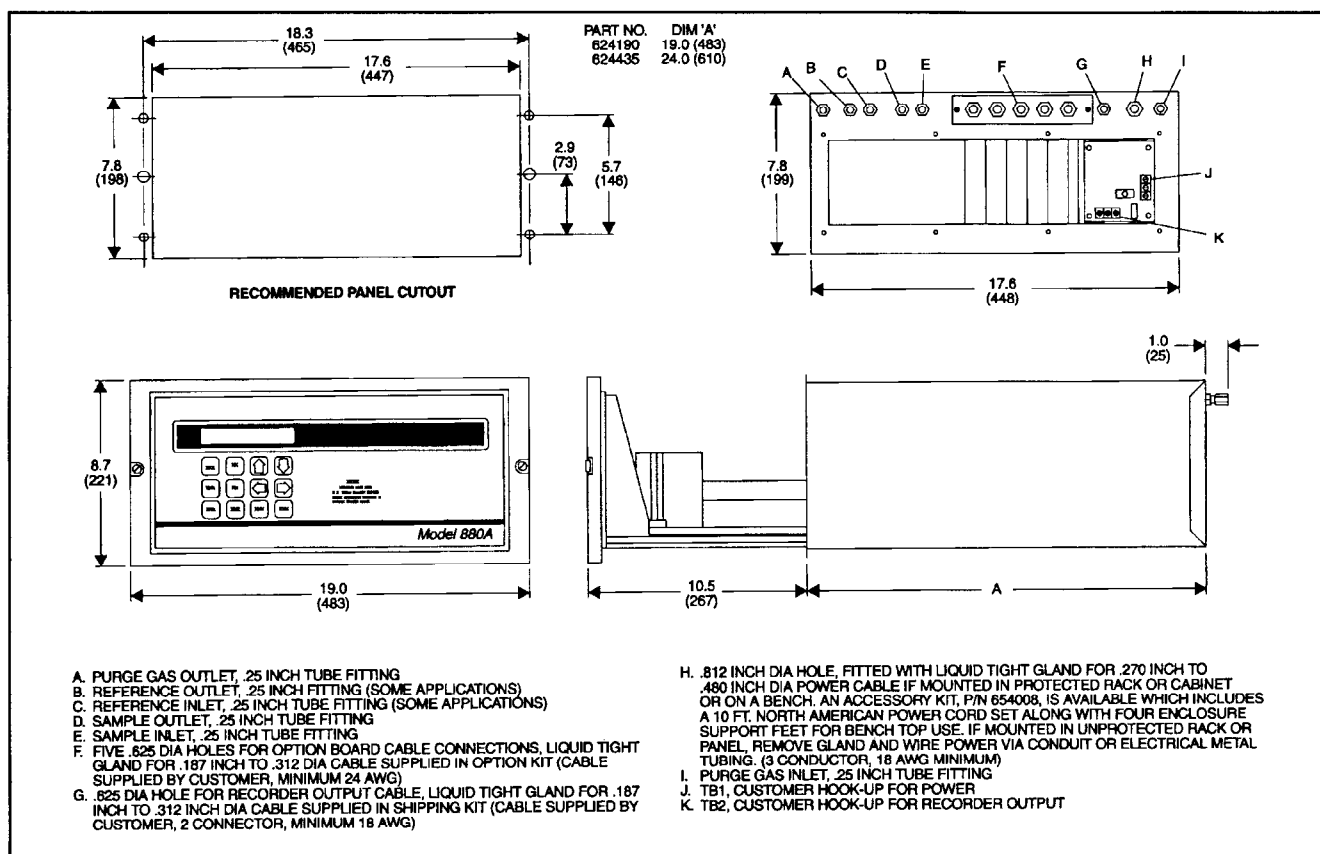


Cells:	Gold-plated Pyrex <sup>2</sup> or stainless steel
Tubing:	FEP Teflon
Fittings:	316 stainless steel
O-Rings:	Viton-A <sup>1</sup>
<b>Sample Flow Rate:</b>	Nominal 500 to 1,000 cc/min.
<b>Sample Pressure:</b>	Max. 10 psig (higher pressures used in pressurized cell applications)
<b>Ambient Temperature Range:</b>	59°F to 95°F (15°C to 35°C), 32°F to 113°F (0°C to 45°C) with optional case heater
<b>Analog Output:</b>	Standard (Potentiometric): 0 to 5VDC Optional (Current) 0/4 to 20 mA
<b>Linearization:</b>	Keypad entered coefficients for linearizing 1, 2, or all 3 ranges
<b>Power Requirements:</b>	115 volts AC/230 volts AC $\pm$ 10%, 50/60 Hz $\pm$ 3Hz, 150 W (300 W with optional case heater)
<b>Alarm Option:</b>	Two single-point, field programmable high or low, deadband up to 20% of fullscale
<b>Alarm Relay Outputs:</b>	Two form C contacts rated 3 A (125/250 VAC) or 5 A (30 VDC) (resistive)
<b>Calibration Gas Control Option:</b>	Two front panel actuated contact closures
<b>Calibration Gas Control Outputs:</b>	Two form C contacts rated 3 A (125/250 VAC) or 5 A (30 VDC) (resistive)

<sup>1</sup> Viton is a registered trademark of E.I. duPont de Nemours & Co., Inc.

<b>Auto Zero/Span Output:</b>	Four contact closures, field-programmable frequency and duration of closure; two contact closures for indication of insufficient zero and span adjustment
<b>Auto Zero/Span Relay Outputs:</b>	Four form C contacts rated 3 A (125/250 VAC) or 5 A (30 VDC) (resistive) Two form A contacts rated at (resistive load): Max. switching power: 10W Max. switching voltage: 30 VDC Max. switching current: 0.5 A
<b>Remote Range Change &amp; ID Option:</b>	Three remotely changeable ranges with positive identification. Binary or decimal code, field-selectable.
<b>Remote Range Change Relay Output:</b>	Eight form A contacts rated at (resistive load): Max. switching power: 10W Max. switching voltage: 30 VDC Max. switching current: 0.5 A
<b>Enclosure:</b>	General purpose for installation in weather-protected area
<b>Overall Dimensions:</b>	8-11/16 inches (220 mm) H 19 inches (483 mm) W 19 inches (483 mm) L, standard case 24 inches (610 mm) L, extended case
<b>Instrument Weight:</b>	56 pounds (25 kg), standard case 68 pounds (31 kg), extended case

Specifications subject to change without notice.



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## ORDERING INFORMATION

8803	MODEL 880A INFRARED ANALYZER, 19-INCH CASE, P/N 191811
8804	MODEL 880A INFRARED ANALYZER, 24-INCH CASE, P/N 191812

### APPLICATION SELECTION (Choose One)

For 19-inch Case: 07, 08, 10, 11, 12, 13, 18, 20, 21, 22, 23, 26, 29, 30, 31, 32, 33, 34, 35, 36, 38, 39, 41, 42, 43, 54, 55, 56, 63, 64, 65, 67, 71, 72, 73, 74, 76, 81, 82, 83, 84, 99

For 24-inch Case: 06, 14, 15, 16, 19, 24, 25, 27, 28, 37, 44, 45, 46, 56, 66, 75, 85, 86, 87, 99

CODE	RANGE
0	Standard -Ranges with Calibration Curves
1	One Non-Standard Range with Calibration Curve
2	Two Non-Standard Ranges with Calibration Curves
3	Three Non-Standard Ranges with Calibration Curves
9	Special

CODE	LINEARIZATION
0	None
1	One Standard Range (Range 3)
2	Two Standard Ranges (Range 1 & 3)
3	Two Standard Ranges & One Non-Standard Range
4	One Non-Standard Range
5	Two Non-Standard Ranges
6	Three Non-Standard Ranges
9	Special

CODE	TEMPERATURE CONTROL
0	None (See Note 1)
1	Case Heater/Controller
2	EMC Kit with out Heater/Controller
3	EMC Kit with Heater/Controller
9	Special

### ACCESSORIES

PART NUMBER	DESCRIPTION
748250	Additional Instruction Manual
624446	Type Z Air Purge Kit
654008	Kit, Power Cord/Enclosure Supports (10Ft. North American Powercord Set Plus 4 Enclosure Supports for Bench Mounting)
634958	Kit, Enclosure Supports (4) only for Bench Mounting

CODE	OUTPUT OPTIONS
00	None (Standard 0 to 5 VDC)
01	Option Board Mounting Kit (See Note 2)
10*	Isolated Current Output
11*	Dual Alarms
12*	Isolated Remote Range Control
20*	Current Output plus Dual Alarms
21*	Current Output plus Remote Range Control
22*	Dual Alarms plus Remote Range Control
30*	Current Output plus Dual Alarms plus Remote Range Change
41	Off Range Alarm Contact (include. current & remote control)
42	Fail Safe Alarm
43	Off Range Alarm and Fail Safe (include. current & remote control)
99*	Special

CODE	CALIBRATION INTERFACE
0	None
1	Manual Zero & Span (Selection in output positions above cannot be 00-Standard 5 VDC output)
2	Automatic Zero & Span (Selection in output positions above cannot be 00-Standard 5 VDC output)
9	Special

8803	12	0	2	0	01	1	(EXAMPLE)
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NOTE 1: Case Heater/Controller may be required for ambient temperature ranges outside of 15 to 35°C for some applications.

NOTE 2: This kit is necessary if customer is not ordering options with instrument, but will order in future for field installation.

ACCESSORY: Air Purge Kit - Part Number 624446, Per Type Z, ANSI/NFPA 496-1993, Chapter 6. When installed with user-supplied components, meets requirements for Class I, Division 2 locations per National Electrical Code (ANSI/NFPA 70) for analyzers sampling non flammable gases. Analyzers sampling flammable gases must be protected by a continuous dilution purge system in accordance with Standard ANSI/NFPA 496-1993, Chapter 6. Consult factory for recommendations.

\* Options include mounting kit.

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# ROSEMOUNT ANALYTICAL

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