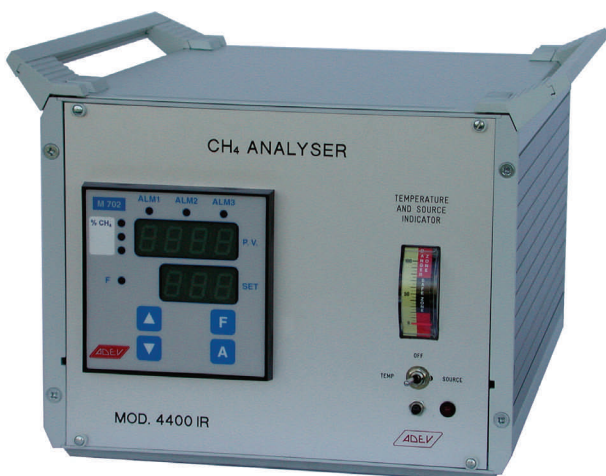




## Gas Analysers & Integrated Systems for Process Gas Analysis

### Infrared Analyser

# 4400 IR



### Main Applications

- Iron and steel industry
- Biogas and landfill gas
- Heat treatments (furnace atmosphere, carburizing, nitriding)
- Blast furnaces and combustion processes
- Laboratories
- Gas production industry (gas purity)
- Sulphuric acid production
- .... in general, selective measurement of every gas with infrared absorption spectrum

### Features

- Up to 3 IR components measurable
- Accuracy better than 1% of full scale
- Unique source-emission control allows up to 20% windows fouling without effect on accuracy.
- Precision optical filters minimize effects of background gases
- No choppers or other moving parts
- Fast response time and excellent stability thanks to single beam source and elimination of gas filled cells
- Diagnostics, radiation losses from the IR source and temperature control.
- It can be integrated with filters, pumps, etc... making it such as a compact analysis system
- It can be combined with others analysers of the 4000 series to have a multi gas analyser.
- Parts contacted by gas in selected materials to resist the attack of aggressive substances
- Powerful microprocessor based control unit integrated

## Sensing Unit

### The Measure

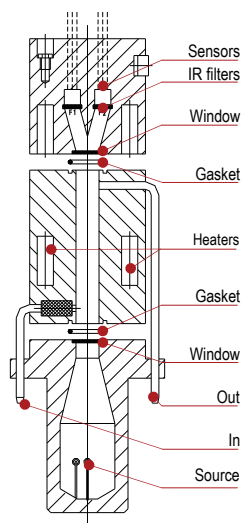
The 4400 IR infrared analyzer allows a selective and extremely accurate measure of every gas with infrared absorption spectrum. The analyser can perform up to 3 IR components measure.

### High Accuracy

The 4400 IR is an high accuracy analyzer (class of accuracy better than 1%). For this reason the inner sensing unit is temperature controlled in order to be completely insensitive to ambient temperature variations.

### Combo Versions

The model 4400 IR can be combined with every other analyser of the 4400 and G line due to obtain a multi gas analyser equivalent to a real analysis system.



### Great Versatility

The model 4400 IR is an extremely all rounded instrument. It can be provided in transportable version (with different types of handle) or for rack mounting (every standard). It's the ideal solution for laboratory use, when it's necessary to move the instrument in different steps of the process or (in case of rack solution) to install it into a cabinet.

The instrument can integrate sampling components like filters, pumps, flow meters, pressure reducers, electro valves, etc... being configured as a compact as analysis system and can be used for continuous measurements where process conditions are nor extremely severe (in this case a proper external sample and conditioning system is required).

### Cell Assembly

The heart of the model 4400 IR Infrared Analyser is the cell assembly, which consists of two helically-wound Nichrome wires which provide the I.R. source, a temperature-controlled sample cell in which the sample circulates and a detector assembly with: one measuring detector with an interference filter focused on the selected IR absorption band for the gas to be analyzed; and one reference detector with an interference filter with a band able to compensate ageing effects, dirty built-up on the optical path and background gas variations.

A very particular innovative technique allows a perfect system balance that eliminates drifts and the automatic restore of the sensitivity by controlling the energy that reaches the detector. This design can be expanded up to 3 gas variables.

## Specifications...

### ...Performance

#### Accuracy:

± 1% of span (output signal).

#### Repeatability:

± 0.3% of span (short term).

#### Reproducibility:

24 hours: ± 1% of span.

#### Response Time (max. 1000 cc/min flow rate)

Initial, less than 1 sec.

90% of step-change: 6 sec.

#### Drift:

Zero: max. ± 2% of span per week

Span: max ± 1% of span per week (without autocalibration).

#### Ambient Temperature Influence:

± 0.05% of span per °C

#### Atmospheric Pressure Influence:

± 0.1 ÷ 0.18% of reading per hPa

#### Sample Flow Rate Influence:

less than 0.5% of span over flow range of 250 to 2000 cc/min.

#### Line Voltage Influence:

max. 0.02% of span, for each 1% change of power voltage.

#### Gas Interference:

Depending on gas. Typically less than 2% of span

#### Measurable components:

CO, CO<sub>2</sub>, CH<sub>4</sub>, H<sub>2</sub>O, SO<sub>2</sub>, NH<sub>3</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>O, NO, VCM, HC, Solvents, Freon and every gas with infrared absorption spectrum

### ...Operative

#### Sample Requirements

Sample Flow Rate: 250 ÷ 2000 cc/min.

Sample Pressure: 3000 Pa minimum (with filter and flow meter).

#### Linearization:

within 1% of span

#### Range:

see suffix C on the ordering information

#### Ambient Requirements

Relative Humidity: 90% maximum.

Operation Temperature: -10 to +50 °C

Temperature controlled: at 50°C

Storage Temperature: 70° C max.

#### Power Requirements:

220 / 110 Vac; 50/60 Hz; 40 VA

#### Pneumatic Connections:

In / Out 1/8" NPT-F

#### Wiring Connections:

Power and customer terminal board on back panel

### ...Physical

#### Material Contacting Sample Gas:

AISI 316, Buna-N, Teflon, Viton, Calcium Fluoride, Quartz, Gold.

Weight: about 9 Kg.

#### Dimensions:

177 x 320 x 237 mm (without accessories)

Protection: IP 43

### ...Control Unit

#### Inputs

Input signals: 3 adjustable and linearizable from 10 mV with accuracy better than 1:10000

Scanning time: 0,5 seconds

Conversion type: double ramp

Resolution: 1/20000

Input impedance: 100 Mohm typical

Isolation between channels: none

#### Alarms

Contact rating: N.O./N.C. 1 A @ 250 Vac (define the alarm contact condition -soldering type- at order. Refer to suffix E).

Set: programmable on 100% of range

Relay status: normally triggered / not triggered

Number of alarms: 2 on concentration. Wrong calibration and fault alarms available.

Threshold: high or low to be selected at order; field adjustable by soldering jumpers.

#### Serial interface

Standard: RS 232 C. Check lines: CTS

Speed: 9600, 4800, 2400, 1200. 600, 300 baud/sec.

Parity: even, odd, none. Isolation: 1500 V

#### Analogical output

Output: 4-20 mA isolated proportional to 100% of range on maximum load of 500 Ω

Total Range (over range): 3.6 - 24 mA

Resolution: 1/3800. Isolation: 1500 V

Uploading time: 1 second

#### Printing messages

Periodical printing: programmable in h., min.

Alarm printing: automatic printing

Printing message: year, month, day, hour, minutes,

% (Ch1), temperature (Ch2, Ch3), alarm 1 status, alarm 2 status

# Integrated M702 Control Unit

## Description

Powerful microprocessor-based system (keyboard configurable) allowing selection of range, type of alarms, set point and it can receive 3 analogical input signals (2 of them can be used for cross sensitivity compensation or special functions).

On request, a system to perform zero and/or full scale autocalibration can be provided.

Isolated current output is standard. Optional RS232C output can directly drive a printer with selectable timing and baud rate.

## Single or dual alarm

A single alarm (high or low) or dual alarms (1 high and 1 low, 2 high or 2 low) can be provided as option.

Each alarm consists of: 1) a keyboard configurable alarm threshold; 2) a LED, which is lit when an alarm is detected; 3) a relay contact that can be used to actuate an external signal or to start a shutdown process device.

## Auxiliary functions

Other options with diagnostic and calibration fault contacts are available.

## Display

It provides a continuous readout indication of the requested variable in engineering units (e.g. %), of alarms set point and alarms condition.

## Other versions

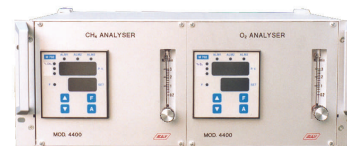
The model 4400 IR can be provided for rack 19" mounting or process version with split sensing and control units and the possibility to configure the analyser for installation in hazardous area Zone 1 (ATEX).



Process version model 8869

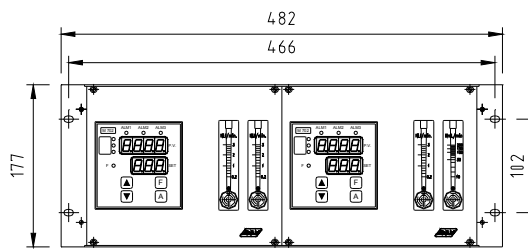
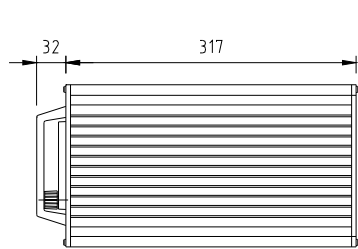


Rack 19" version



Multi gas analyser in rack 19" housing with mounting brackets

# Dimensional Specifications

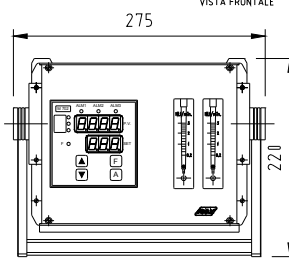
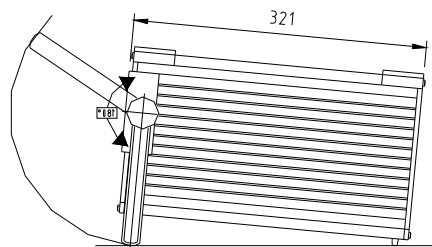


### Rack 19" 4U version with brackets for cabinet mounting

Possibility to integrate several sensing units in a unique case to have a multi-gas analyser.

Also available versions with:

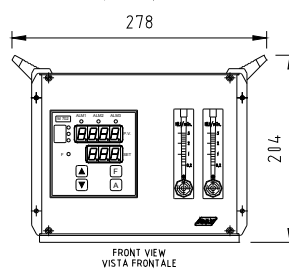
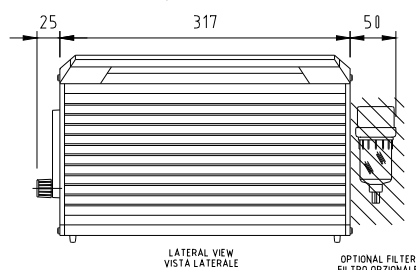
- Floating handle
- Upper handles
- No mounting accessories



### Transportable version with floating handle

Also available versions with:

- Mounting brackets for 1/2 rack 19" mounting
- Upper handles
- No mounting accessories



### Transportable version with upper handles

Also available versions with:

- Mounting brackets for 1/2 rack 19" mounting
- Floating handle
- No mounting accessories

# Ordering 4400 IR

A - B - C - D1 - D2 - E - F - G - H - I - I

## Suffix A - Line voltage

- 1 230 V 50/60 Hz
- 2 115 V 50/60 Hz

## Suffix B - Stream composition

- 01 CO<sub>2</sub>
- 02 CO
- 03 CH<sub>4</sub>
- 04 SO<sub>2</sub>
- 05 H<sub>2</sub>O <sup>a)</sup>
- 06 C<sub>2</sub>H<sub>4</sub>
- 07 C<sub>2</sub>H<sub>6</sub>O
- 08 NH<sub>3</sub>
- 09 NO
- 10 VCM
- 99 On specification

## Suffix C - Range <sup>b)</sup>

- 500 0-500 ppm <sup>c)</sup>
- 100 0-1000 ppm <sup>c)</sup>
- 005 0-0,5%
- 007 0-7,5%
- 010 0-1%
- 015 0-1,5%
- 020 0-20%
- 025 0-2,5%
- 050 0-5%
- 615 0-6% ÷ 0-15%
- 163 0-16% ÷ 0-30%
- 311 0-31% ÷ 0-100%
- 992 Double range
- 999 On specification

## Suffix D1 - Alarm threshold

- 0 None
- 1 1 low alarm
- 2 1 high alarm
- 3 1 high alarm + 1 low alarm
- 4 2 low alarms
- 5 2 high alarms
- 9 On specification

## Suffix D2 - Wrong calibration and fault alarms

- 0 None
- 1 Wrong calibration alarm shared with an alarm threshold
- 2 Fault alarm shared with an alarm threshold
- 3 Wrong calibration alarm on dedicated relay
- 4 Fault alarm on dedicated relay
- 5 Wrong calibration alarm shared with fault alarm
- 9 On specification

## Suffix E - Alarm contacts

- 0 None
- 1 Closed in alarm condition
- 2 Open in alarm condition

## Suffix F - Serial output

- 0 NO
- 1 RS 232 C + internal clock

## Suffix G - Mounting

- 00 Bench version without accessories
- 01 Transportable version with floating handle
- 02 Half-rack 19" version with brackets
- 03 Transportable version with upper handles
- 04 Rack 19" 4U version with brackets for cabinet mounting
- 99 On specification

## Suffix H - Autocalibration

- 0 NO
- 1 Autocalibration
- 2 Autocalibration + autocalibration start inlet free contact
- 3 Autocalibration + autocalibration start inlet free contact with calibration in progress free contact
- 4 Calibration in progress free contact (for manual calibration)

## Suffix I - Options

- 00 None
- 01 External printer + battery charger <sup>d)</sup>
- 02 Integrated printer <sup>d)</sup>
- 03 Inner pump
- 04 Pump with AISI external head on back panel
- 05 Inner piping in AISI 316 for explosive / toxic gases <sup>e)</sup>
- 06 In line AISI filter with interchangeable cartridge
- 07 External filter on rear panel
- 08 Troubleshooting
- 99 On specification

## Notes:

- <sup>a)</sup> Contact technical office
- <sup>b)</sup> Minimum range depends on gas and background
- <sup>c)</sup> Range not available for some IR components
- <sup>d)</sup> Option selectable only combined with RS232 C (Suff. F = 1)
- <sup>e)</sup> Mandatory option in case of toxic and/or explosive gases (above LEL)

## Conformity to European Normative

In accordance to Low Voltage directive 2006/95/EC

In accordance to EMC directive 2004/108/EC:

- EN 61000-6-2
- EN 61000-6-3
- EN 50270



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