

IR 29 i/Di

Innovative Transmitter for Combustible Gases



IR 29 Di *

IR 29 i **

IR 29 i/Di Transmitter

- First intrinsically safe infrared transmitter for explosion protection
- ATEX II 1G Ex ia IIC T4 Ga C₀₁₅₈ can also be used in Ex zone 0
- Temperature, moisture and pressure compensation
- Patented infrared technology (NDIR)
- The energized IR sensor head can be replaced in Ex areas
- Maintenance and service-friendly

* IR 29 Di - Intrinsically safe transmitter for hydrocarbons (LEL) with graphical display

** IR 29 i - Intrinsically safe transmitter for hydrocarbons (LEL)

GfG Instrumentation

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The First Intrinsically Safe Infrared (IR) Transmitter for Zone 0

Measuring Principle

IR transmitters have become recognized as reliable gas warning systems for explosion protection.

They are used to detect individual combustible gases or a wide range of gases. This involves sending an IR beam with a certain light intensity through a measuring space and then capturing it with a detector. Parts of this beam are absorbed by, amongst other things, hydrocarbon molecules.

The reduced light intensity of the beam is registered by beam detectors and converted into a signal as the existing % LEL gas concentration.

Benefits

A special feature of our IR technology is its ability to also measure combustible gases above the lower explosion limit. Moreover, the measurement does not require oxygen.

With this technology there is basically no risk of contaminating the sensor, through silicone vapors or hydrogen sulfide, when using catalytic combustion sensors.

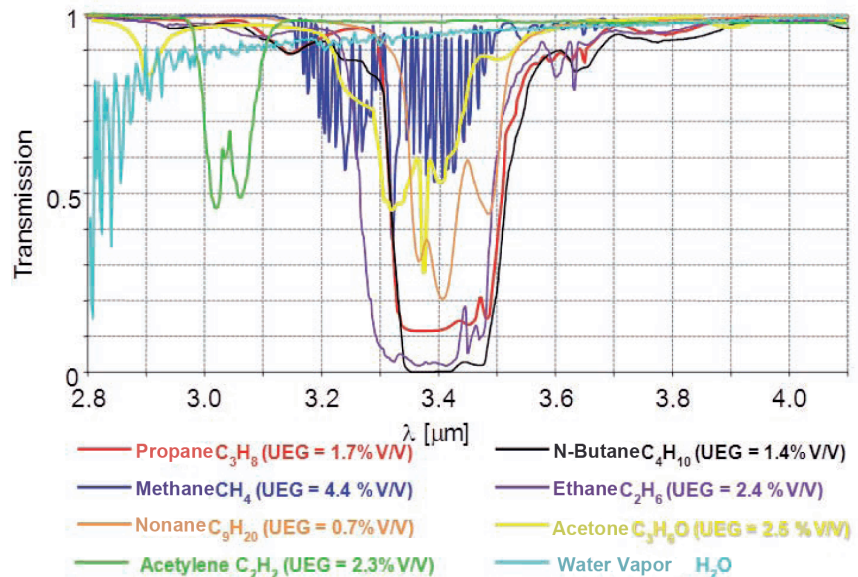
Operation

IR transmitters are usually used with 2 wavelengths, a so-called reference wavelength and just one measuring wavelength. Strict limits are applied to these systems. The absorption spectra of many hydrocarbons are located in the wavelength range of 3.3 μm and overlap to a large extent.

This means that gases with overlapping spectra and just one measuring wavelength can no longer be clearly distinguished. Some hydrocarbons, e.g. the frequently used welding gas acetylene, are non-absorbing in the wavelength range of 3.3 μm , but absorb instead in neighboring wavelength ranges.

In many practical applications, it is not essentially important which gas is responsible for the explosion risk. Therefore, early warnings through the broadband measurement of hydrocarbons in order to monitor the lower explosion limit (LEL) must be guaranteed. False alarms with uncritical concentrations of individual gases or solvents are thus absolutely unacceptable.

These requirements are problems for systems with 2 wavelengths.

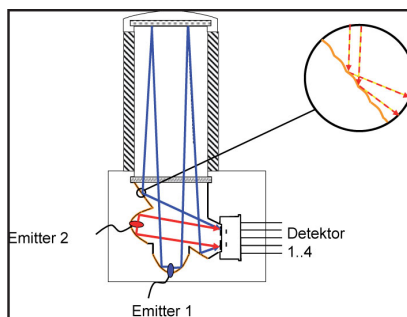


Infrared Ranges Using Selected Gases

Patented GfG Technology

The internationally patented technology of the IR 29 has been developed to solve these problems. The gold-plated mirror optics of the sensor contains 2 radiators and up to 4 detector elements with different optical filters. The precisely calculated, microstructured and pure gold coated mirror optics of the IR 29 are supplied for the first time without beam splitters.

This helps to cut signal losses by 50 % and to completely avoid the physically-related disadvantages of a beam splitter. The measured values from two additional wavelengths (4 wavelengths in total) ensure improved detection of individual gases and thus enhanced selectivity. This results in the prevention of false alarms. Only a 4 wavelength system always guarantees early warnings and the simultaneous prevention of false alarms.



Patented 4-beam 4-wavelength technology

New Technology

The IR 29 is the first and only intrinsically safe IR gas transmitter with patented 4-beam 4-wavelength technology.

The ignition protection class "intrinsically safe", which is so essential for industrial plants and the mining industry, is achieved by the additional use of the SB1 safety barrier and its internationally patented and innovative design.

Complete Safety Even In Zone 0

The IR 29 is the first IR gas transmitter that can also be used in Ex zone 0 and which enables maintenance as well as replacement of the sensor head without additional expense when energized.



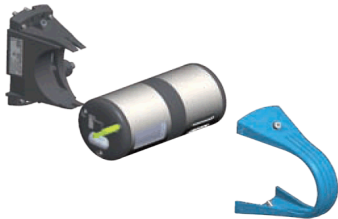
SB1 D Safety Barrier

IR 29 i/Di Decisive Safety Advantage

Universal Application

The IR 29 with its robust V4A stainless steel housing has been designed to withstand the harshest environmental conditions.

The application areas of the dust and water-protected structure range from production and storage areas to disposal sites, biogas plants, mines and oil rigs.



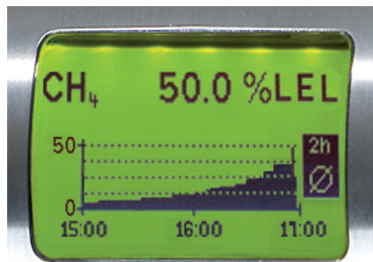
IR 29: Replacing the sensor head

Internal Data Logger

A standard built-in data logger records all the measuring data, minimum / maximum values, average values and alarm events of the last 24 hours in a ring buffer.

The recording can also be shown on the display as a 2 and 8 hour trend indicator.

The histogram mode can be selected as a permanent display of the measured values. These values are continuously updated.



Histogram mode 2h

Graphical Display

Measured values are shown on the high-contrast graphical display. The display can be rotated 180° depending on the installation of the IR 29.



Display rotated 180°

Self Diagnosis

Processor-based signal processing enables the systematic compensation of temperature dependencies, aging influences and soiling effects. Safety-relevant functions are monitored permanently via self-diagnosis procedures and a possibly required service is indicated automatically. Daily interfering factors, such as dust and dirt accumulation, are almost completely eliminated by the innovative design.

Pressure Sensor, Moisture and Temperature Compensation

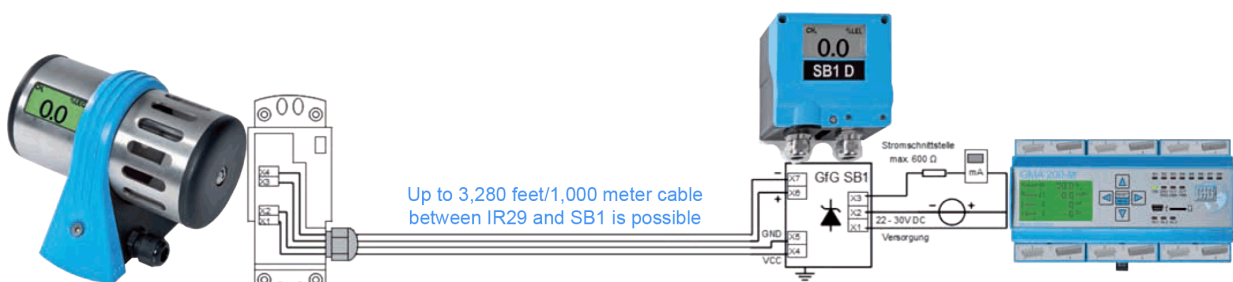
The measuring accuracy of IR sensors depends on partial pressure and thus also air pressure. Climatic fluctuations or barometric high pressure therefore influence the measuring result. Furthermore, the absorption spectrum of water almost completely covers that of hydrocarbon absorption in the 2.7 to 3.3 µm range. Air humidity therefore initially generates a measuring signal the same as the actual measuring gas. This cross-sensitivity is of particular importance in warm areas with high relative humidity. An increase in the absolute water absorption capacity of air is not linear with the temperature, i.e. three times as much water can be absorbed at 40 °C than at 20 °C. This influence can only be compensated if the current moisture content of the air is known. The IR 29 can be optionally equipped with a pressure and moisture sensor for compensation.

Maximum Safety

The innovative display enables the realization of completely safe warning concepts.

Local displays and signals directly at the device can be used to provide an early warning of potential risks.

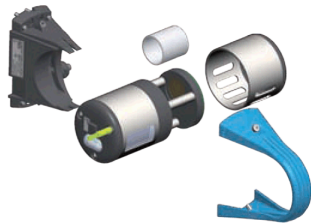
The display at the upstream safety barrier SB1 D enables the detection of risks outside the danger zone being monitored. This allows immediate on-site action before really hazardous situations occur.



Dust Protection

A gas permeable, water-repellent diaphragm protects the absorption space of the transmitter against dust. The additional impact protection made from robust V4A stainless steel prevents mechanical damage to the optical components.

The diaphragm can be cleaned or replaced in a matter of minutes.



IR 29: Changing the diaphragm

The Innovations at a Glance

- Suitability for zone 0
- The energized transmitter can be replaced in zone 0
- Patented 4-beam 4-wavelength technology
- Graphical display
- Permanent local status and functional display

Remote Controls

The IR 29 transmitter does not feature control elements for setting or servicing tasks. This helps to prevent accidental or unauthorized manipulation.

Service work at the IR 29 transmitter is carried out using the RC 2 remote control.



33 feet / 10 meter

IR 29 with the RC2 Remote Control

Specifications

IR 29 i/Di Transmitter

Metrological Characteristics:

Measuring Gases

Hydrocarbons, such as:
Methane, propane, butane, acetylene, etc.

Ranges

0 .. 100 % LEL

Measuring Method

Non-dispersive IR infrared (NDIR)

Gas Supply

Diffusion

Response Time

$t_{90} \approx 35 - 50$ seconds

Electrical Characteristics:

Supply Circuit

15 .. 30 Volt DC, 0.6 W

Signal Circuit

0.6 W

Interfaces

4 .. 20 mA

Power Consumption

I max. = 50 mA total
for 24 V = 1.2 W

Operation:

Display

1.3 x 2.1 inches / 33 x 53 mm
LCD graphical display
Normal mode or histogram mode

Remote Control

Wired Remote Control RC2:

4.9 x 2.4 x 1.5 inches / 125 x 60 x 38 mm
Range: 33 feet / 10m
with display, with 3 buttons
Ex approval: II 2G EEx ia IIC T4

Wireless IR Remote Control RC3:

2.4 x 1.8 x .5 inches / 60 x 45 x 13 mm
Range: 19.6 inches / 0.5 m
without display, with 3 buttons
Ex approval: II 2G Ex ia IIC T6

Data Storage

Ring buffer and data
(not for intrinsically safe version)
Min., Max. or average values for the last 2,
8 or 24 hours

Environmental Conditions:

Temperature

Operating: -4 °F .. 131 °F / -20 °C .. +55 °C
Storage: -13 °F .. 131 °F / -25 °C .. +55 °C

Humidity

0 .. 99% relative humidity
0 .. 95% relative humidity non-condensing

Ambient Pressure

750 .. 1200 hPa, optionally compensated

Housing:

Housing Material

V4A stainless steel (housing)
Polycarbonate (display, front and end cap,
foot and bracket)

Dimensions

3.9 x 3.8 x 1.9 inches /
98 x 96 x 48 mm (L x W x H)

Cable Connection

Shielded measuring cable
18/4 gauge up to 1,640 feet /
4 x 0.75 mm² up to 500 m
16/4 gauge up to 1,640 feet /
4 x 1.5 mm² from 500 m
M16 * 11

Protection Class

IP67
IP56 with rotatable display

Expected Average Sensor Life

>5 years

Approvals:

ATEX certification

 II 1G Ex ia IIC T4 Ga  0158

Specifications subject to change without notification

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GfG Instrumentation

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