Transmitter
for toxic gases and vapors

Ex-proof and EMC tested

One-man calibration on-site

Output 0.2 .. 1 mA or 4 .. 20 mA

Worldwide Supplier of Gas Detection Solutions
Protection from toxic gases
Toxic gases are sometimes used as production or work media, or as a by-product of certain processes. Many of such gases can be difficult to store or ship. Most toxic gases are imperceptible to human senses, but even the lowest concentrations can cause poisoning or health hazards in the long term. The values fixed as TLV (Threshold Limit Value) and TRK (Technical Guideline Concentration, Germany) give an indication for the peak concentrations people may be exposed to at their workplaces. Not only legal regulations and inspections, but also your own responsibility for employee safety and production efficiency require continuous monitoring of the ambient air for toxic gases. GfG’s fixed gas warning systems allow an early recognition of gas hazards to ensure that countermeasures are taken in time. A fixed gas monitoring system consists of one or more transmitters connected by cable to a controller such as the GMA 100 or GMA 300.

Transmitter
The transmitter is the key component of a gas monitoring system. It is installed wherever toxic gases might be present and cause health hazards. Even very low gas concentrations are converted into an electrical signal that is proportional to the actual gas concentration. The signals are then transmitted to a central controller.

Four detection principles are used to monitor toxic gases, depending on different measurement requirements:

- Charge Carrier Injection (CI)
- Chemosorption sensors (CS)
- Electrochemical sensors (EC)
- Infrared sensors (IR)

All GfG transmitters offer integrated electronic circuits for voltage stabilization, signal transmission and temperature compensation. This results in stable measurement signals, even in case of considerable temperature changes.

The transmitters are produced by GfG and are subject to a 100% quality control. Installation is easy; since the transmitters are calibrated before shipment, the service engineer does a quick readjustment when putting them into operation.
**EC 25 Ex**
Transmitter with electrochemical cell for measurement of toxic gases and vapours (see gas list).

- EX-proof (intrinsically safe) according to CENELEC standard
- Digital display
- Sensors with long-term stability
- Highly selective
- Easy handling
- 0.2 .. 1 mA or 4 .. 20 mA output signal
- Service lid for:
  - Measurement of output signal
  - Service switch for output signal suppression allows maintenance without alarm activation
  - Simple one-man calibration on-site
- Plug-in sensor cell in stainless steel sleeve, replaceable without opening the casing

The transmitter EC 25 EX is particularly used in places where an EX-proof unit with a high selectivity is needed. It can be operated as a stand-alone unit or in combination with any GfG controller.

**EC 24**
Transmitter with electrochemical cell for measurement of toxic gases and vapours (see gas list).

- For use in non-hazardous areas
- Sensors with long-term stability
- Highly selective
- Easy handling
- 0.2 .. 1 mA or 4 .. 20 mA output signal
- Service lid for:
  - Measurement of output signal
  - Simple one-man calibration on-site
- Solid aluminium casing, IP 54 (optionally IP 68 for up to 10 m water column)
- Plug-in sensor cell in stainless steel sleeve, replaceable without opening the casing

The most important features of the EC 24 are its easy handling and long life.

**CS 24 EX**
Transmitter with chemosorption cell for measurement of toxic gases and vapours (see gas list).

- EX-proof according to CENELEC standard
- Fast response time
- Easy installation
- Almost maintenance-free
- High sensitivity
- Easy handling
- Long-life sensors
- 0.2 .. 1 mA or 4 .. 20 mA output signal
- Service lid for:
  - Measurement of output signal
  - Service switch for output signal suppression allows for maintenance without alarm activation
  - Simple one-man calibration on-site
- Solid aluminium casing, IP 54 (optionally IP 68 for up to 10 m water column)
- Plug-in sensor cell in stainless steel sleeve, replaceable without opening the casing
CI 21
Transmitter with special sensor for measuring of ammonia.

- Stable measurement values even at temperature changes by using a thermostatic sensor
- Measurement in dry air and at 99% humidity
- No false alarms for hydrogen, natural gas, carbon monoxide, oil vapours, solvents
- Wide dynamic detection range, starting from a few ppm, up to Vol. %

CS 21
Monitoring of toxic gases and vapours.

- Fast response time and high sensitivity
- Wide detection range
- Affordable
- Long-life sensors
- Minimum follow-up costs

IR 24
Transmitter with infrared cell for measurement of carbon dioxide (CO₂).

- Almost maintenance-free
- Easy handling
- Long-life sensors
- Low follow-up costs
- Wide detection range

Accessories
GfG offers a wide range of accessories for regular functional checks and for difficult measurement tasks.

Measurement cable
The connection between transmitter and controller is effected by means of a shielded three-core cable.

Sampling system
The sampling system supplies gases to the transmitter from inaccessible areas. There are special filters available to protect the transmitter from dust, condensation and corrosive compounds. The EX-proof model of the sampling system can also be used for explosive gas mixtures.

Calibration adapter - flow adapter
During periodic sensitivity checks, the transmitters are exposed to certain test gases. The calibration adapter, which is screwed on the transmitter, allows for a reliable and steady gas supply.

Weather protection
Transmitters that are mounted outdoors, can, in version IP 68, be further protected from dirt, temperature extremes or rain, by means of a protective casing.
### Gas list – Toxic gases

#### Gas list for EC 25 EX and EC 24

<table>
<thead>
<tr>
<th>Gas</th>
<th>Chemical formula</th>
<th>TLV (TRK)</th>
<th>Minimum range ppm</th>
<th>Maximum range ppm</th>
<th>Resolution ppm</th>
<th>Alarm threshold ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ppm</td>
<td>mg/m³</td>
<td></td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>Ammonia</td>
<td>NH₃</td>
<td>0.59</td>
<td>50</td>
<td>14</td>
<td>0..50</td>
<td>0..200</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Cl₂</td>
<td>2.45</td>
<td>0.5</td>
<td>1.5</td>
<td>0..5</td>
<td>0..20</td>
</tr>
<tr>
<td>Hydrogen chloride</td>
<td>HCl</td>
<td>1.26</td>
<td>5</td>
<td>7</td>
<td>0..10</td>
<td>0..50</td>
</tr>
<tr>
<td>Hydrogen cyanide</td>
<td>HCN</td>
<td>0.93</td>
<td>10</td>
<td>11</td>
<td>0..20</td>
<td>0..50</td>
</tr>
<tr>
<td>Ethylene oxide</td>
<td>C₂H₄O</td>
<td>1.52</td>
<td>(1*)</td>
<td>(2*)</td>
<td>0..20</td>
<td>0..100</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>CO</td>
<td>0.97</td>
<td>30</td>
<td>33</td>
<td>0..100</td>
<td>0..4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### Gas list for CS 24 EX, CS 21 and CI 21**

<table>
<thead>
<tr>
<th>Gas</th>
<th>Chemical formula</th>
<th>TLV (TRK)</th>
<th>Minimum range ppm</th>
<th>Maximum range ppm</th>
<th>Resolution ppm</th>
<th>Alarm threshold ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ppm</td>
<td>mg/m³</td>
<td></td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>Acetone</td>
<td>C₃H₆O</td>
<td>2.00</td>
<td>500</td>
<td>1200</td>
<td>(0)20..500</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Ammonia</td>
<td>NH₃</td>
<td>0.59</td>
<td>20</td>
<td>14</td>
<td>0..30</td>
<td>0..1000</td>
</tr>
<tr>
<td>Butyl acetate</td>
<td>C₆H₁₂O₂</td>
<td>4.01</td>
<td>200</td>
<td>950</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Dimethylether</td>
<td>C₂H₄O</td>
<td>1.63</td>
<td>1000</td>
<td>1910</td>
<td>(0)20..1000</td>
<td>(0)50..5000</td>
</tr>
<tr>
<td>Ethanol</td>
<td>C₂H₆O</td>
<td>1.59</td>
<td>1000</td>
<td>1900</td>
<td>(0)20..500</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Ether acetate</td>
<td>C₆H₁₂O₂</td>
<td>3.04</td>
<td>400</td>
<td>1400</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Frigen R 22</td>
<td>CHClF₂</td>
<td>2.98</td>
<td>500</td>
<td>1800</td>
<td>(0)30..1000</td>
<td>(0)50..5000</td>
</tr>
<tr>
<td>n-Butane</td>
<td>C₄H₁₀</td>
<td>2.05</td>
<td>1000</td>
<td>2350</td>
<td>(0)20..500</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>n-Hexane</td>
<td>C₆H₁₄</td>
<td>2.79</td>
<td>50</td>
<td>180</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>n-Pentane</td>
<td>C₅H₁₂</td>
<td>2.49</td>
<td>1000</td>
<td>2950</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Propane</td>
<td>C₃H₈</td>
<td>1.56</td>
<td>1000</td>
<td>1800</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
<tr>
<td>Solkane/ Frigen R 134a</td>
<td>CH₂F-CF₃</td>
<td>3.45</td>
<td>1000</td>
<td>(0)20..500</td>
<td>(0)50..5000</td>
<td>500</td>
</tr>
<tr>
<td>Toluene</td>
<td>C₇H₈</td>
<td>3.18</td>
<td>50</td>
<td>380</td>
<td>(0)20..1000</td>
<td>(0)50..10000</td>
</tr>
</tbody>
</table>

#### Gas list for IR 24

<table>
<thead>
<tr>
<th>Gas</th>
<th>Chemical formula</th>
<th>TLV (TRK)</th>
<th>Minimum range ppm</th>
<th>Maximum range ppm</th>
<th>Resolution ppm</th>
<th>Alarm threshold ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ppm</td>
<td>mg/m³</td>
<td></td>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>CO₂</td>
<td>1.52</td>
<td>5000</td>
<td>9000</td>
<td>0..10000</td>
<td>0..5..1000</td>
</tr>
</tbody>
</table>

Excerpt taken from GfG Gas list. Transmitters for other gases and ranges are available. For combustible gases, oxygen and gas mixtures further transmitters are available. Please ask for special catalogues.

* TLV (Threshold Limit Value) TRK (Technical Guideline Concentration, Germany)

** CI 21 for ammonia only
## Transmitter

### Technical Data

#### General

<table>
<thead>
<tr>
<th>Gas</th>
<th>Toxic gases (see gas list)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>ppm range (see gas list)</td>
</tr>
<tr>
<td>Gas supply</td>
<td>Diffusion or flow adapter</td>
</tr>
<tr>
<td>Humidity</td>
<td>20 .. 95 % r.h.</td>
</tr>
<tr>
<td>Pressure</td>
<td>900 .. 1100 hPa</td>
</tr>
<tr>
<td>Cable gland</td>
<td>PG9</td>
</tr>
<tr>
<td>Casing protection</td>
<td>IP 54 / IP 68 (option)</td>
</tr>
<tr>
<td>Cable length to controller</td>
<td>&lt;300 m (3 x 0.75 mm² cable)</td>
</tr>
<tr>
<td></td>
<td>&gt;300 m (3 x 1.5 mm² cable)</td>
</tr>
</tbody>
</table>

#### EC 25 EX

**Response time**

T<sub>90</sub> 10 – 300 seconds (depending on gas)

**Output signal**

0.2 .. 1 mA or 4 .. 20 mA

**Supply voltage**

12 .. 24 V

**Ambient temperature**

-35 to +40°C

**Expected lifetime**

2 .. 4 years (depending on sensor)

**Dimensions**

120 x 122 x 95 mm (WxHxD)

**Weight**

1500 g

**EX-approval**

EE Ex ia IIC T6 (with Ex-barrier)

**Type certificate**

DMT-BVS-No. 91C2033

Type: MWG 2400

#### CS 24

**Response time**

T<sub>90</sub> < 5 seconds (depending on gas)

**Output signal**

0.2 .. 1 mA or 4 .. 20 mA

**Supply voltage**

18 .. 24 V (max. 26V), 300 mA

**Ambient temperature**

-40 to +60°C, -20 .. +40°C tested

(-40 to +140°F, -4 .. +104°F tested)

**Expected lifetime**

Approx. 5 years

**Dimensions**

80 x 125 x 57 mm (WxHxD)

**Weight**

980 g

**EX-approval**

EE Ex dem [ib] IIC T6, Ex s IIC

Ex s IIC T6

BVS-No. 94.C.20714 / 94Y60034

Type: MWG 2400

#### CI 21

**Gas**

Ammonia, NH<sub>3</sub>

**Detection range**

0 .. 200 / 0 .. 1000 /0 .. 10000 ppm

**Humidity**

0.1 .. 99 % r.h.

**Ambient temperature**

-35 to +55°C

(-31 to 131°F)

**Response time**

T<sub>50</sub> < 5 seconds (depending on gas)

**Output signal**

0.2 .. 1 mA or 4 .. 20 mA

**Supply voltage**

10 .. 32 V, 300 mA

**Ambient temperature**

-30 .. +55°C

(-22 to +131°F)

**Expected lifetime**

Approx. 5 years

**Dimensions**

100 x 100 x 57 mm (WxHxD)

**Weight**

780 g

**EX-approval**

EEx dem [ib] IIC T6, Ex s IIC

Ex s IIC T6

BVS-No. 94.C.20714 / 94Y60034

Type: MWG 2400

#### IR 24

**Response time**

T<sub>50</sub> < 5 seconds

**Output signal**

0.2 .. 1 mA or 4 .. 20 mA

**Supply voltage**

18 .. 24 V, 300 mA

**Ambient temperature**

-40 to +45°C

(-4 to +113°F)

**Expected lifetime**

Approx. 5 years

**Dimensions**

80 x 125 x 57 mm (WxHxD)

**Weight**

370 g

**EX-approval**

EEx dem [ib] IIC T6, Ex s IIC

Ex s IIC T6

BVS-No. 94.C.20714 / 94Y60034

Type: MWG 2400

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We reserve the right of modification

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**GfG Service**
A thought-out system of service performance ensures the reliability of your portable and fixed gas monitoring equipment. Quick and skilled support by GfG’s experts guarantees the safety for operation and maintenance of your detectors.

**GfG Competence**
For over 40 years GfG engineers have proved to be the specialists for all gas-induced problems. The mining industry with its particularly harsh environment has been a good master. A strong team of R&D engineers use state-of-the-art technologies to make GfG gas detectors even more capable and user-friendly.

**GfG Worldwide**
GfG is represented all over the world by its distribution network. Moreover GfG has subsidiaries in the U.S.A., South Africa, Switzerland and Singapore.