



Operation Manual

CI21

Transmitter for NH₃



Content

	Page
For your Safety	3
General Description	3
Detection Principle	4
Operational Hints	4
Design	4
Mounting Position	5
Mounting	6
Installation of Electrical Connections	6
Putting into Operation	7
Check of Electrical Zeropoint	7
Check of Sensitivity	7
Service	8
Maintenance and Inspection	9
Trouble Shooting	9
Spare Parts	9
Accessories	9
Connection Diagram CI 21 Built-in Sensor	10
Connection Diagram CI 21 External Sensor	11
Technical Data	12

For your Safety

According to § 3 of the law about technical working media, this manual points out the proper use of the product and serves to prevent dangers. As any piece of complex equipment, the GfG transmitter CI 21 will do the job designed to do, only, if it is used and serviced in accordance with the manufacturer's instructions. Please protect yourself and your employees by following them. This manual must be carefully read by all individuals who have or will have the responsibility for using and servicing this product. The warranties made by GfG Gesellschaft für Gerätebau with respect to the product are voided, if the adjustment of functions or parameters is changed without GfG Gesellschaft für Gerätebau's permission. They are also voided, if the product is not used and serviced in accordance with the instructions in this manual. Failures or false alarms caused by interfering gases or electrical signals, are not part of the warranty obligation. The above does not alter statements regarding GfG Gesellschaft für Gerätebau's warranties and conditions of sale and delivery.

General Description

A fixed gas monitoring system consists of the transmitter (MWG) and a controller (GMA), which are connected by means of cable. The transmitter converts the unit for the gas concentration into an electrical signal and transmits it over the cable to the controller.

Fixed Gas Detection System

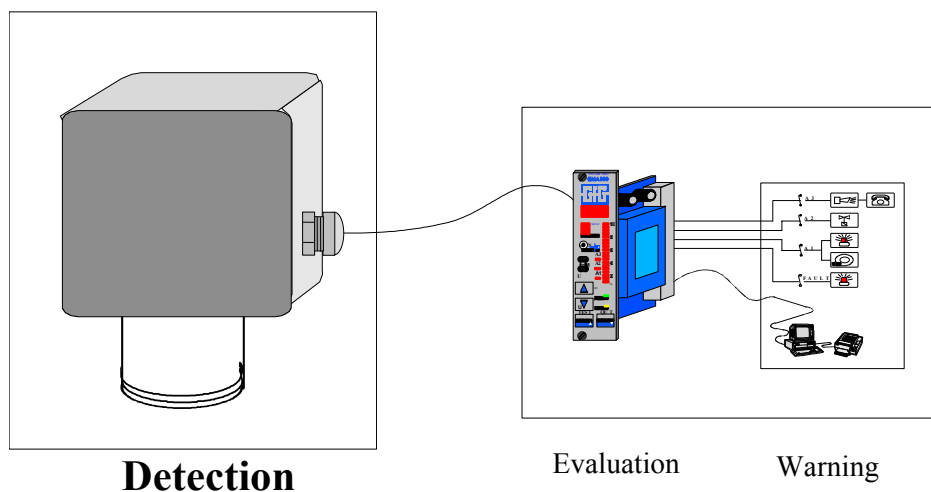


Fig. 1

The CI 21 is an "intelligent" transmitter. The comprehensive electronics allows easy operation and maintenance and also increases the operational safety and accuracy. The CI 21 is characterized by the following features:

- Easy calibration at site.
- Compensation of temperature effects.
- Long sensor life.

Detection Principle

The CI 21 is operated with a Charge Carrier Injection sensor. As long as there is no gas in the ambient air, the internal resistance of the sensor is rather high. As soon as NH_3 (Ammonia) is adsorbed at the sensor surface, the internal resistance is reduced. The change in resistance is the measure for the gas concentration and is converted into a standardized current signal (0.2 .. 1 mA or 4 .. 20 mA) by the integrated electronics. The Charge Carrier Injection sensor has proven a good long-term stability and, because of the sensor design, a good selectivity.

Operational Hints

According to national regulations gas warning devices have to be checked by a specialist for function after installation but before being brought into service (putting into operation). For Germany § 56(2) "UVV Gase" (BGV B6 - formerly VBG 61) is applicable.

Before shipment, the CI 21 passes a function and display test, being calibrated with suitable test gases. **This does not, however, overrule the obligation of putting into operation with test gas after installation.**

Design

The design of the CI 21 is shown in fig. 2. The sensor is mounted in the sensor support (pos. 5). The gas enters the sensor chamber through the diffusion inlet (pos. 6). The casing (pos. 2) includes a resin encapsulated p.c.board with electronic components. The electronics convert the measurement signal into the output of 0.2 .. 1 mA or 4 .. 20 mA, which is supplied to the controller by means of cable.

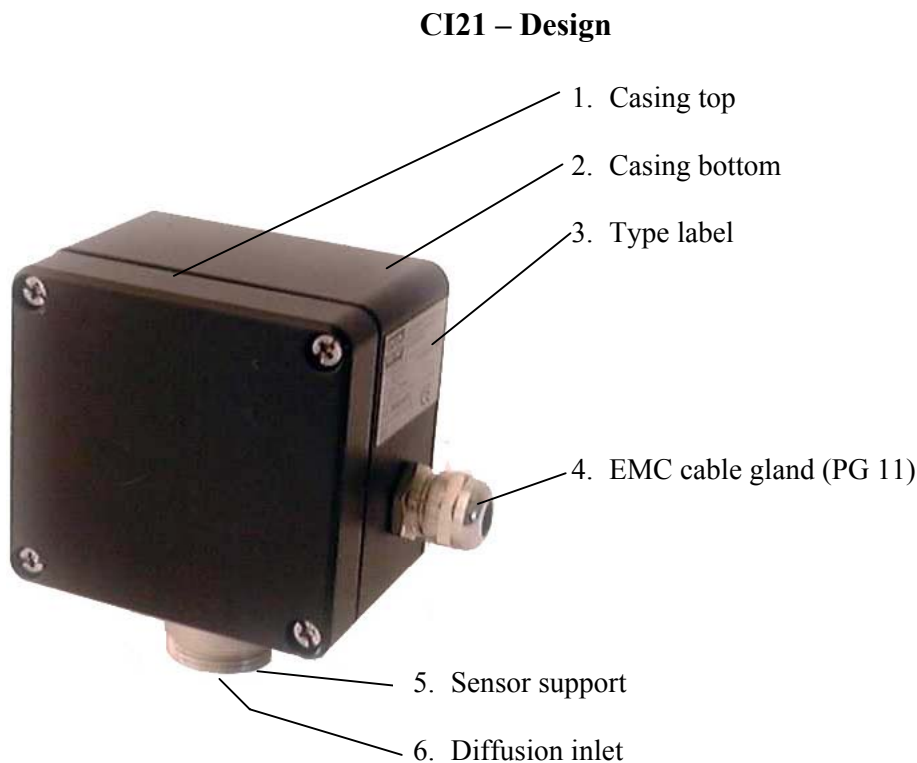


Fig. 2

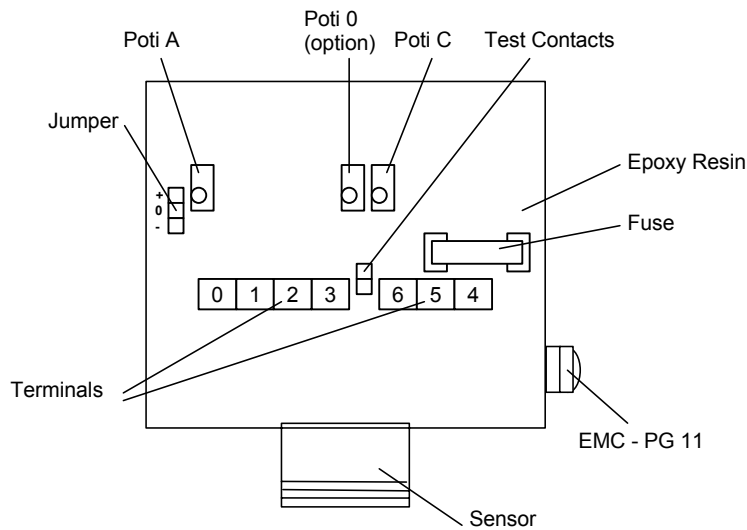


Fig. 3 / Schematic

Mounting Position

It is essential to exactly know the ambient conditions, which have to be taken into consideration before deciding on the mounting position. To achieve representative measurement results, take care of:

- the **room ventilation**,
- the **gas density**, and
- the **danger highlights**.

Install the CI 21 at a place where the gases pass the sensor even in case of bad ventilation. If necessary, use a smoke cartridge to check.

Furthermore, take the following into consideration as well:

- **Ambient temperature**,
- **Rain water, hose water, dripping water, condensation** and
- **Dust** in the atmosphere.

The CI 21 is to a great extent protected against the entering of water and dust (IP 54). Special accessories are available to provide additional protection for very difficult conditions. Please contact GfG for detailed information.



Warranty may be voided, if the transmitter is exposed to ambient conditions which were unknown to GfG during planning, production or delivery.

When deciding on the position for the transmitter, make sure that it is always accessible for service and maintenance. It is recommended to mount the CI 21 with the sensor facing down to the floor. A different mounting position, however, does not affect the sensor accuracy.

Mounting

For connecting the CI 21 refer to the connection diagram (also refer to the terminal diagram of your GMA controller). For mounting the transmitter remove the four lock screws and lift the casing top off. Fix the casing by means of two screws through the relevant borings. The printed circuit board with electronic components inside the casing is potted in epoxy resin. The optional potentiometer **0** is factory-set and **MUST NOT** be turned.



The CI 21 is not certified for use in hazardous areas

Installation of Electrical Connections

Procurement of cable and electrical connections must be done by a specialist only, obeying the applicable regulations. A shielded 3-core cable has to be used (e.g. LIYCY 3 x 1.5 mm²). The cross section of the cable depends on the cable length. For short distances (max. 200 m) it may be sufficient to use 0.75 mm² instead of 1.5 mm².

Note: Shielding is effected over the EMC cable screwing.

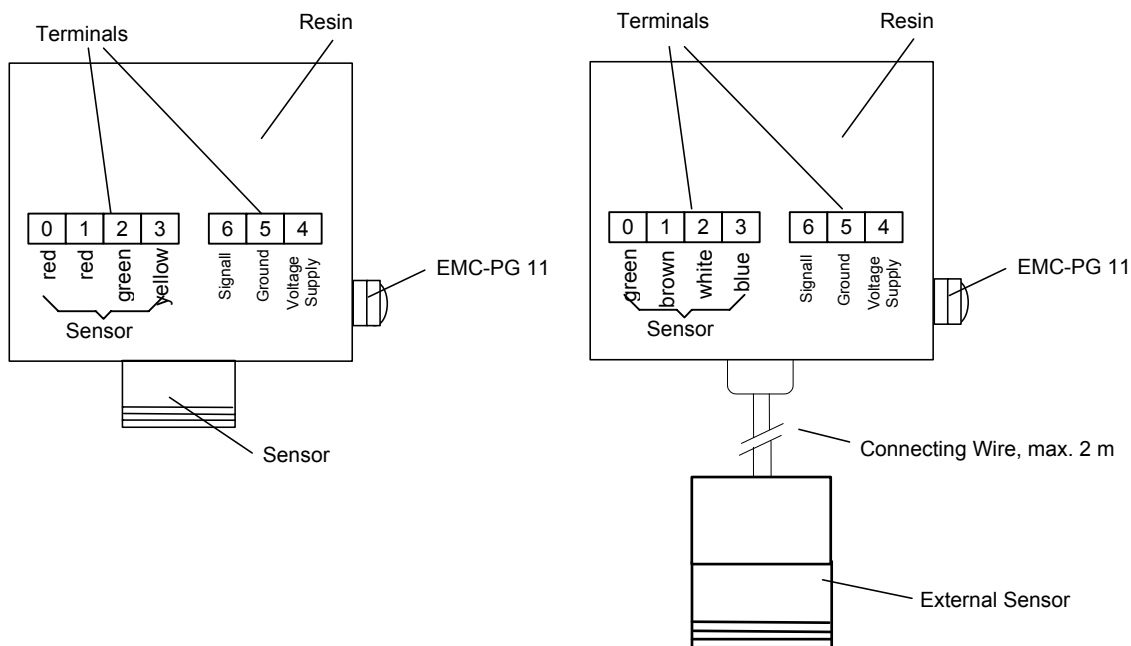


Fig. 4

The supply voltage for the transmitter (terminal 4) is 10 .. 32 V DC.
Once the installation is completed, close the casing top and fix it with the screws.

Putting into Operation

Once the CI 21 is installed, a skilled person can put it into operation. Before shipment, the CI 21 has been calibrated and tested after a specific warm-up time for several days. When connecting to a controller (power supply) you should allow approx. 15 - 30 minutes to warm-up the Charge Carrier Injection sensor before checking the sensitivity. Should you notice that a re-calibration is required, allow an extended warm up period of about 4 hours. **In case you replace the sensor, adjust the jumper of the transmitter according to the specification on the new sensor.**

Check of Electrical Zeropoint

The CI 21 is calibrated and tested before shipment. Certain deviations, however, are possible due to transport, mounting and ambient conditions. According to "UVV Gase" only experts are permitted to do the testing.

Inside the CI 21 there are two test contacts (fig. 3) to check the electrical output signal. The voltage at the test contacts can be measured by means of a voltmeter.

After the warm-up time of approx. 30 minutes, the signal must be approx. 200mV for zero gas *. This corresponds to an output current of 0.2 mA (0.2 .. 1 mA interface) respectively 4 mA (4 .. 20 mA interface). In case of deviation it is possible to re-adjust the value by turning potentiometer A.

Alternatively, for example when using a GMA controller, you can check the transmitter signal at the controller. After the warm-up time of approx. 30 minutes, you can read the zeropoint voltage at the controller resp. check with a voltmeter (please read the operation manual of your GMA controller). In case of deviation you can correct it at the controller.

Check of Sensitivity

To check the sensitivity of the CI 21 fix a calibration adapter to the diffusion inlet of the transmitter. Then select a suitable test gas, taking into consideration, which gas has been used for initial calibration of the transmitter. You can see this information from the test report. The test gas concentration should be at least 20 % above the second alarm threshold. The basic adjustment can be seen from the test report.

Use a multimeter to check the output signal by measuring the voltage at the test contacts. The voltage is proportional to the output current. 200mV correspond to an output current of 0.2 mA (0.2 .. 1 mA interface) resp. 4 mA (4 .. 20 mA interface). 1000mV correspond to an output current of 1 mA (0.2 .. 1 mA interface) resp. 20 mA (4 .. 20 mA interface).

In case of deviation you can correct the value by turning potentiometer C.

Alternatively, for example when using a GMA controller, you can check the transmitter signal at the GMA. After the warm-up time of approx. 30 minutes you can read the signal voltage at the controller or check it with a voltmeter (please read the operation manual of your GMA). Should you notice a deviation, you can correct it at the GMA.



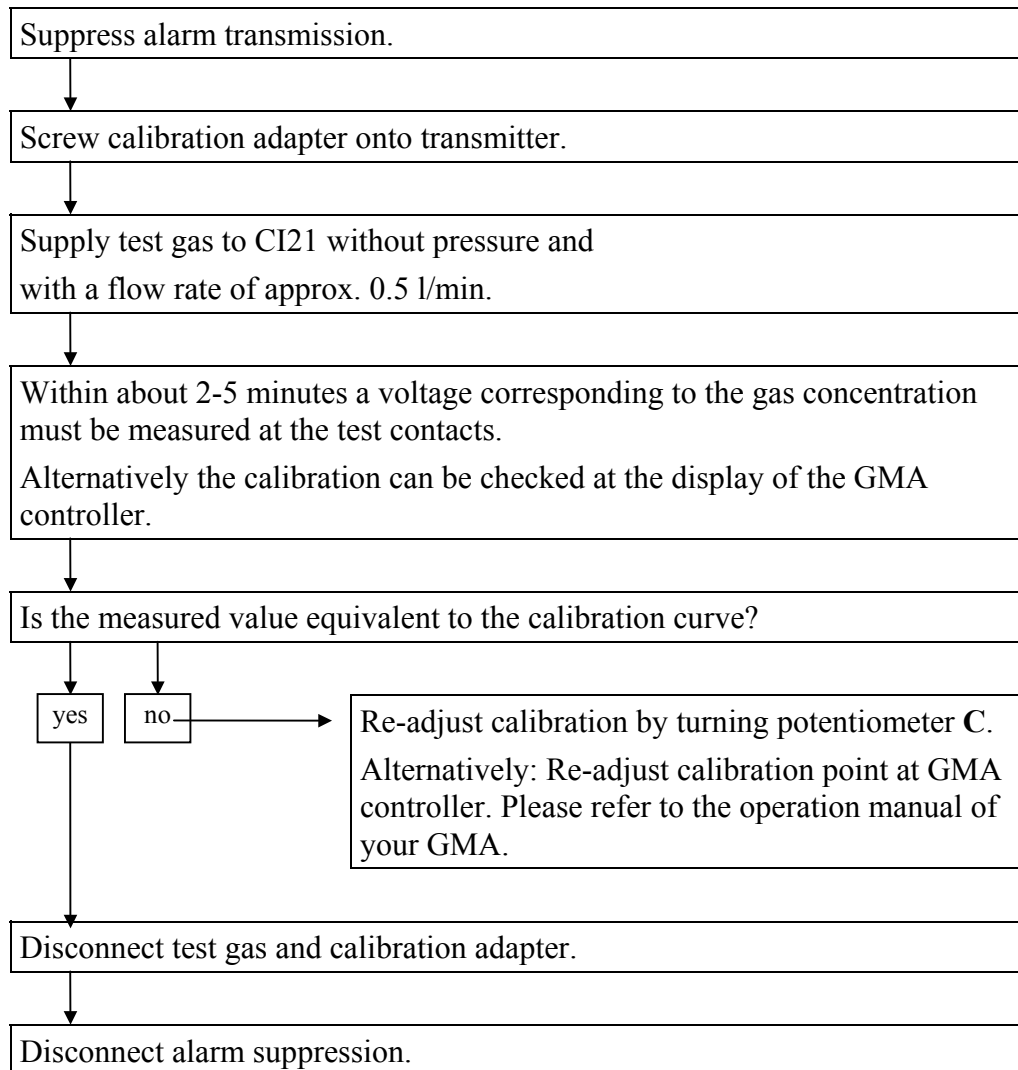
Do not use a test gas with a balance of nitrogen.

* In this case, zero gas is not fresh air but test gas with 30 ppm NH₃ in air

For measurement accuracy it is important to set the calibration point for the second alarm threshold accurately.

When using dry test gas a slower response time of the sensor has to be taken into account.

Adhere to the following procedure to check the sensitivity:



Service

According to the German "Regulation for Explosion Protection", "UVV-Gase" and DIN 31051, service stands for maintenance, inspection and repair of gas warning equipment. Regulation T023 of "BG Chemie" describes the relating measures, among others requesting a regular function check. This function check means:

- Check with alarm gas concentration
- Check of zeropoint and sensitivity (calibration)
- Check of response time
- Check of gas sampling and gas processing system (if any)
- Check of alarm signal activation
- Check of failure alarm

The check must be done by an expert, who has to report the result in written form. Generally the function check intervals should not exceed 16 weeks. The function check shall be done before putting the system into operation, and it should be repeated at least once a year.

Maintenance and Inspection

With maintenance and inspection the proper and planned status of the gas detection system is controlled. The CI 21 does not require special maintenance, nevertheless a few points should be obeyed.

Depending on the ambient conditions, gas detection systems may show a different behaviour. Therefore, it is important to perform a visual check every day, particularly during the first few days after putting into operation (see T023).

- Check of pump assembly and gas processing system (if any).
- Check of gas supply for soiling (for correct measurement the gas supply to the sensor must not be blocked).
- Sensors are subject to ageing and exhausting processes. Depending on their type and on their exposure to gas they are more or less used. A sensitivity check can only be done with a suitable test gas after certain periods of time. The sensitivity calibration is an expert calibration and is usually performed by GfG service or by authorized persons.

Trouble Shooting

Failure	Reason	Solution
Zeropoint cannot be adjusted	Faulty sensor	Replace sensor
Full scale value cannot be set	Faulty sensor	Replace sensor
Output current has fallen to 0 mA	Blown fuse	Replace fuse
	Defective electronics	Replace p.c.board
	Cable cut	Re-fix connection

Spare Parts

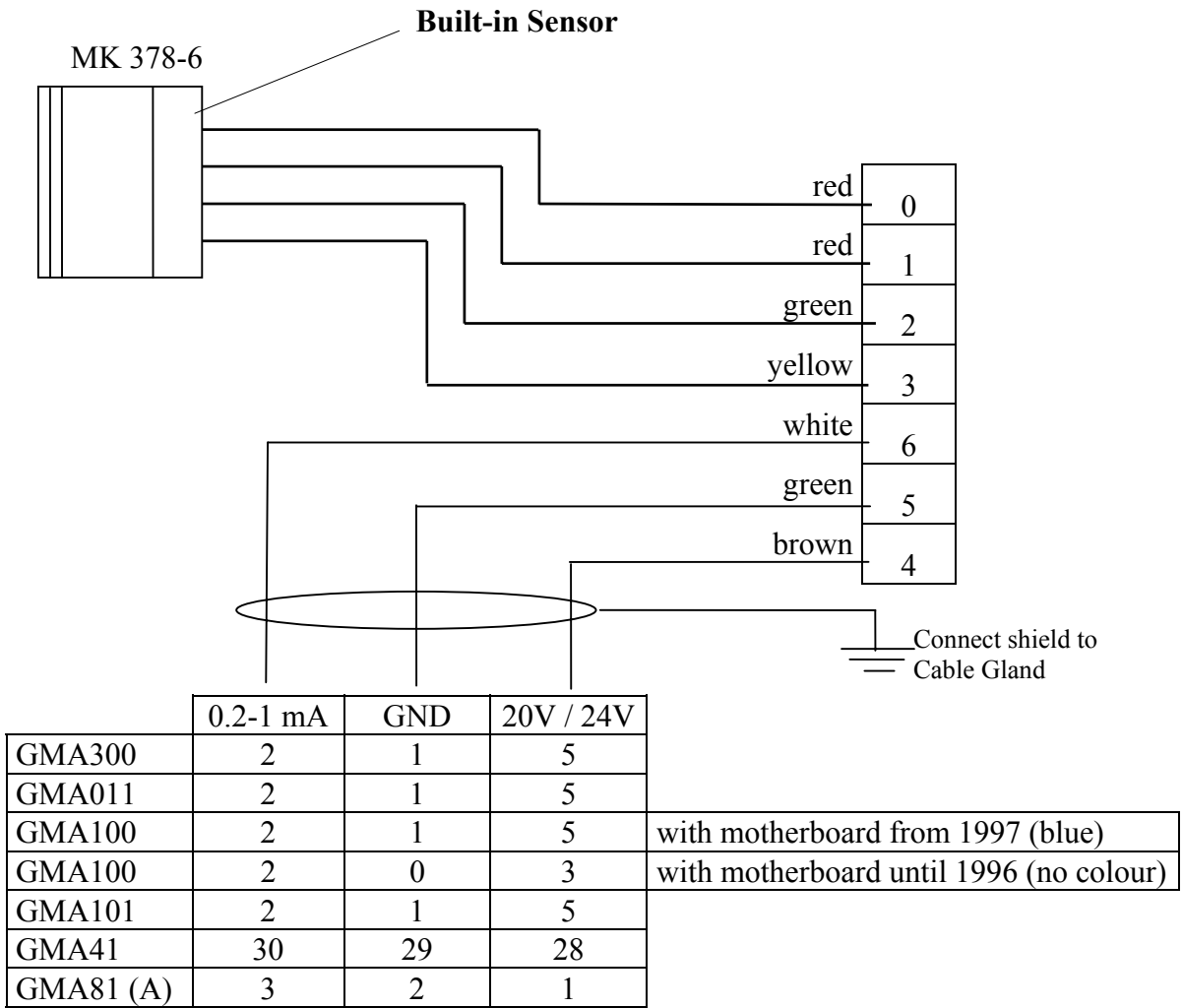
	Part No.
Casing Top	2211301
Spare Sensor/built-in	2211401
Spare Sensor/external	2212401

In case you replace the sensor, adjust the jumper inside the transmitter according to the specification on the new sensor.

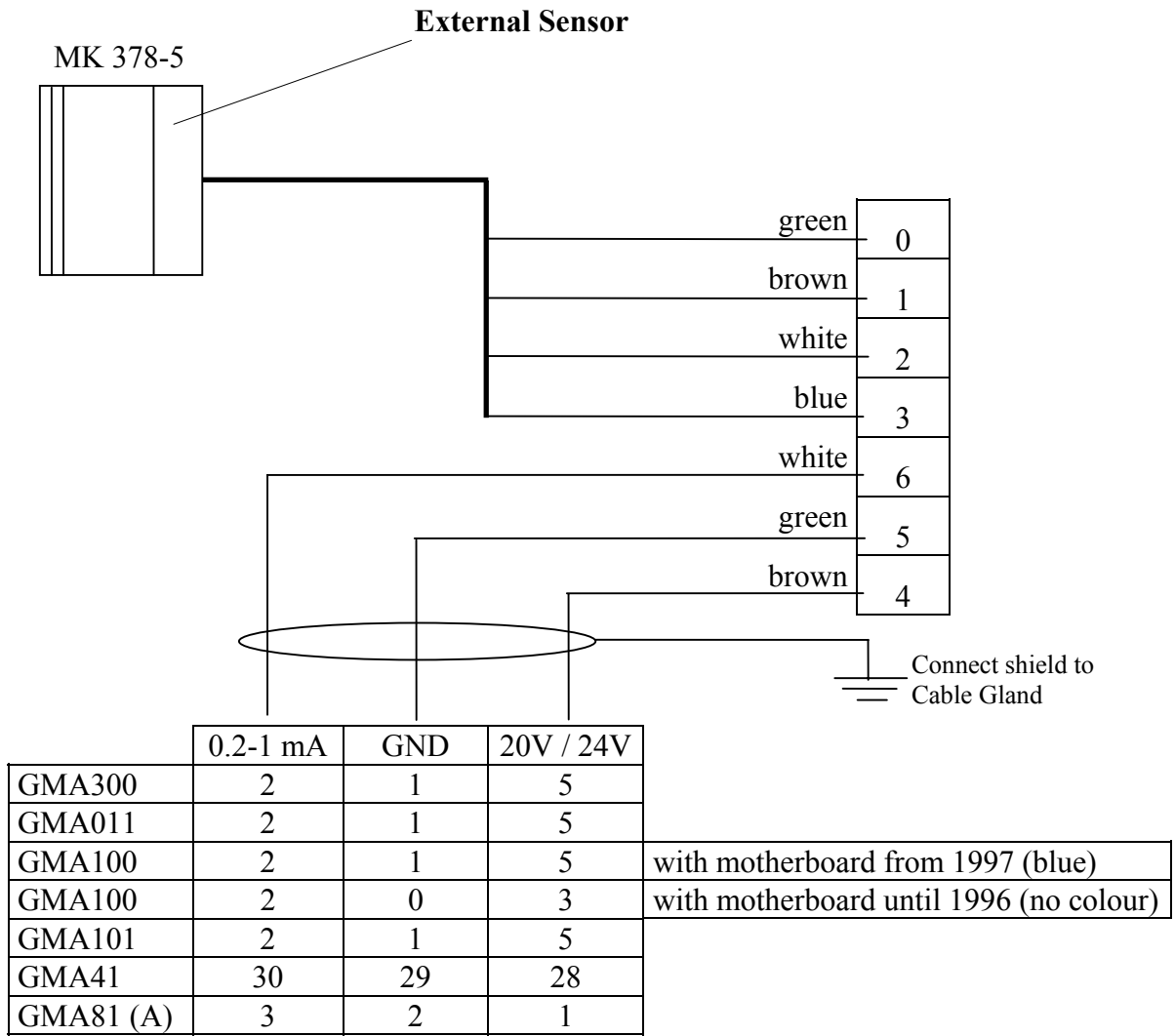
Accessories

	Part No.
Calibration Adapter	2000209

Connection Diagram CI 21 Built-in Sensor



Connection Diagram CI 21 External Sensor



Technical Data

Transmitter CI21

Type: CI21
Sensor Type: MK 378-5 (external) or MK 378-6 (built-in)
Gas: Ammonia, NH₃
Standard range: 200ppm, 1,000ppm or 10,000ppm
Gas Supply: Diffusion
Detection Principle: Charge Carrier Injection (CI)
Supply Voltage: 10 ... 32 V DC
Output Current: 0.2 ... 1mA (4k Ω) or 4 ...20mA (200 Ω)
Response Time t_A: < 8 s
Typical Sensor Life: > 2 years

Climate Conditions

Temperature: -30 ... +55 °C
Humidity: 0 ... 99 % r. h., non condensing
Pressure: 920 ... 1100 hPa

Casing

Material: Aluminium
Protection: IP 54
Cable Gland: PG 11, for cable size 3 x 1.5 mm²
Transmitter Cable: 3 core shielded cable
e.g. LiYCY 3 x 1.5 mm²
Dimensions: 100 x 100 x 57 mm (WxHxD)
Weight: approx. 370 g

**Worldwide Supplier of Gas
Detection Solutions**



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Für die Erzeugnisse

Transmitter
CI 21
CS 21

wird hiermit bestätigt, dass sie den wesentlichen Schutzanforderungen, die in der Richtlinie des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit (89/336/EWG) festgelegt sind, entsprechen.

Die Übereinstimmung der Richtlinie wird durch die Einhaltung folgender Normen nachgewiesen:

Störaussendung

EN 50270:1999
Störfeldstärkemessung nach EN 55022, Grenzwertklasse B wird eingehalten.

Störfestigkeit

EN 50270:1999
Schnelle Störgrößen (Burst) nach EN 61000-4-4, Bewertungskriterium B wird eingehalten.
Entladung stat. Elekt. (ESD) nach EN 61000-4-2, Bewertungskriterium A wird eingehalten.
Hochfreq. induz. Störgrößen nach EN 61000-4-6, Bewertungskriterium A wird eingehalten.
Spannungsunterbrechungen nach EN 61000-4-11, Bewertungskriterium A wird eingehalten.
Stoßspannungen (Surge) nach EN 61000-4-5, Bewertungskriterium B/A wird eingehalten.
Elektromagnetische Felder nach EN 61000-4-3, Bewertungskriterium A wird eingehalten.
Elektromagnetische Felder nach ENV 50204, Bewertungskriterium A wird eingehalten.

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Klönnestraße 99
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Dortmund, den 29.10.2001

.....
Dipl.-Kfm. H.J. Hübner
Geschäftsführer

Diese Herstellererklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.