GAS DETECTORS | DGT

Installation manual



PUBLISHER

Detector Oy, Telekatu 8, 20360 Turku

Tel: +358 (0)207 756 480, detector@detector.fi

© Detector Oy 2026

Even partial copying of this document is prohibited and may not be disclosed to a third party without the written consent of Detector Oy.

Detector Oy has made every effort to ensure the accuracy of the information contained in this document. However, Detector Oy is not responsible for defects or errors caused by non-compliance with these instructions. The installation manual is subject to change without notice. The right to make structural changes to the equipment is reserved.

CONTENTS

1. INSTALLATION 4

1.1. Gas detectors 4

1.2. Cabling 6

2. CHARACTERISTICS OF GAS DETECTORS 12

2.1. DGTeex gas detector 12

2.2. DGTk2-ex gas detector 14

2.3. DGTt2-ex gas detector 16

2.4. DGTec2-ex gas detector 20

2.5. DGTi2-ex gas detector 24

2.6. DGTi2 gas detector 26

3. MAINTENANCE AND RECYCLING 28

1. INSTALLATION

Detector Oy offers installation, connection and cabling of gas monitoring equipment on a turnkey basis cost-effectively and with fast service response all over Finland.

1.1. Gas detectors

When choosing a place to install gas detectors, it should be considered that gas detectors require regular maintenance. If the location is high or difficult to access, any necessary work platforms should be built that allow for maintenance of the detectors. Gas detectors should not be installed, for example, next to a strong source of thermal radiation or in steam clouds.

The gas detection device is calibrated via the infrared link of the IRC3 calibration tool. Therefore, the gas detection device must be positioned so that the infrared lens is clearly visible and unobstructed.

The weight of the monitored gas determines the installation height at which the gas detector will be installed. If the potential location of the gas leak is known, gas detectors should be placed close to the leak site to ensure a quick response. The directions of airflow prevailing at the site shall be considered.

- When monitoring gases heavier than air, gas detectors must be placed close to the floor line, at a height of approx. 30–50 cm, leaving the necessary cleaning and maintenance space under the unit. If the location is prone to mechanical collisions, the device must be protected with collision protection.
- When monitoring lighter-than-air gases, gas detectors should be placed on the ceiling or ceiling line.
- With gases of similar weight as that of the air, installation is usually carried out at breathing height.
- When the gas detector is exposed to e.g. water or various splashes, this must be protected with a separate splash protection casing (see page 10).
- Depending on the location and model of the gas detector, the correct operation of the gas detector may require a separate heated protective housing (e.g. to reduce humidity or achieve the correct temperature).

When switching on gas detectors and changing connections, the monitoring system shall be de-energized in order to avoid possible equipment damage. Installations should take place at the final stage of the construction project, however, before gases or liquids are taken into use at the plant. Late installation is important to avoid damage to the system, for example, due to welding and painting work carried out in the area.

The sensor, sensor cover, and electronics inside the housing change depending on the model and features of the product. The gas detector housing is installed so that the sensor part is facing down. This prevents dirt and moisture from accumulating in the detector. The wiring is brought standard from the side or below depending on detector type, only in forced cases from above. When the wiring comes from above, the cable gland should be carefully sealed. The nameplate on the housing must not be removed.

The enclosure body of ATEX detectors must be connected to the equipotential bonding system at the installation site. The equipotential bonding conductor must have a cross-sectional area of at least 4 mm^2 (max. 1 ohm). When reinstalling the cover of the DGTeex detector enclosure onto the base, the cover locking screw must be tightened and the proper operation of the locking mechanism must be verified.

The settling time required for gas detectors shall be considered before testing and commissioning. The settling time is 2-4 days or more, depending on the type of detector and the temperature of the target environment. During the settling time of the gas detector, alarms must be bypassed, i.e. switched off.

The electrochemical sensors used in gas detectors also deteriorate when the detector is not energized. For this reason, this type of equipment is not recommended to be stored unused. The lifespan of the sensors is no more than ~6 months if they are unused, after which they may no longer be usable. Gas detectors with electrochemical cells stored for a long time (more than 3 months) require recalibration.

To ensure the correct functionality of the gas detector, the detectors require regular maintenance and testing. Calibration of gas detectors should be carried out at least once a year and more often in demanding applications, for example 2–4 times a year. The most common certified test gases and equipment required for testing are available from Detector Oy. Detector Oy's experts are happy to advise you on the procedures for performing functional tests.

Only certified test gas, the concentration of which should not exceed the measurement range of the gas detector, and 50% of the LEL value of the gas, shall be used for calibration and testing of gas detectors. A value of 100 %LEL refers to the concentration of a gas in ambient air (e.g. 100 %LEL for methane corresponds to 5 % concentration (ISO standard) and 50 %LEL corresponds to 2.5 % concentration) at which it is possible for it to ignite due to an external factor such as a spark. Too high a gas concentration may damage the measuring element. Whenever the detector has been exposed to high concentrations, it is recommended that the detector function be verified and, if necessary, recalibrated. Ensure that the certified test gas can flow out of the test gas adapter and that no pressure is applied to the measuring element. The atmospheric pressure of the test gas shall not deviate by more than 10 % from normal atmospheric pressure. The test gas flow rate shall not exceed 2 l/min.

1.2. Cabling

Gas detectors are cabled to gas controllers as separate loops, e.g. JAMAK HF 2x(2+1)x0.5 mm^2 or equivalent cable can be used. The cabling of ATEX areas shall be carried out in accordance with the instructions of EN 60079-14. The number of wires is determined by the gas detector used. If there are risks of vandalism or mechanical stress on the cabling route, an armoured cable can be used.

The protective sheath of signal cables is grounded at one end only to prevent the formation of ground loops. If the housing body of the gas detector is not grounded, e.g. A separate insulation plate is connected to the bottom part of the gas detector, and the protective cabling sheath must also be connected to the connector inside the gas detector housing. When using old cabling, flawless operation of the equipment cannot be guaranteed.

The maximum length of cabling is determined by the type of gas detector used, the supply voltage and the cross-sectional area of the cable. For cabling distances of more than 300 metres, it is recommended that a formula be applied to calculate the maximum cable length. The formula applies to gas detectors manufactured by Detector Oy when the cross-sectional area of the conductor, the maximum permissible voltage drop, the specific resistance of the conductor material used, and the current consumption of the detector are known.

$$\text{Cable [m]} = \frac{\text{Conductor area [mm}^2\text{] * Voltage drop [V]}}{\text{2 * Detector current [A] * Electrical resistivity [}\frac{\Omega}{\boldsymbol{m}}\text{ * mm}^2\text{]}}$$

Voltage drop: Subtract from the supply voltage the minimum operating voltage required by the gas detector, obtaining the maximum permissible voltage drop remaining in the cable.

Detector current: The device plate, calibration certificate or installation manual will indicate the power consumption in amperes.

Conductor area: Cable conductor area in square millimetres.

Electrical resistivity: The specific resistance of a conductor material equal to 0.0172 Ω/m*mm2 for copper.

The unit of cable length is formed to the meter. For example, with a voltage drop of 10 V, a cable with a cross-sectional area of 0.8 mm2 and a detector load of 205 mA, the maximum cabling length is approximately 1100 metres.

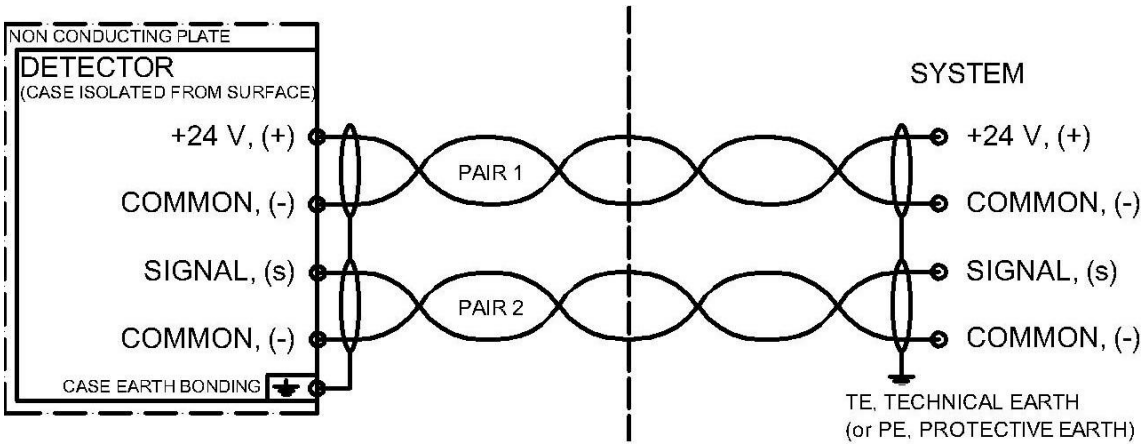


Figure 1. DGTi2 gas detector wiring example, 3-wire connection.

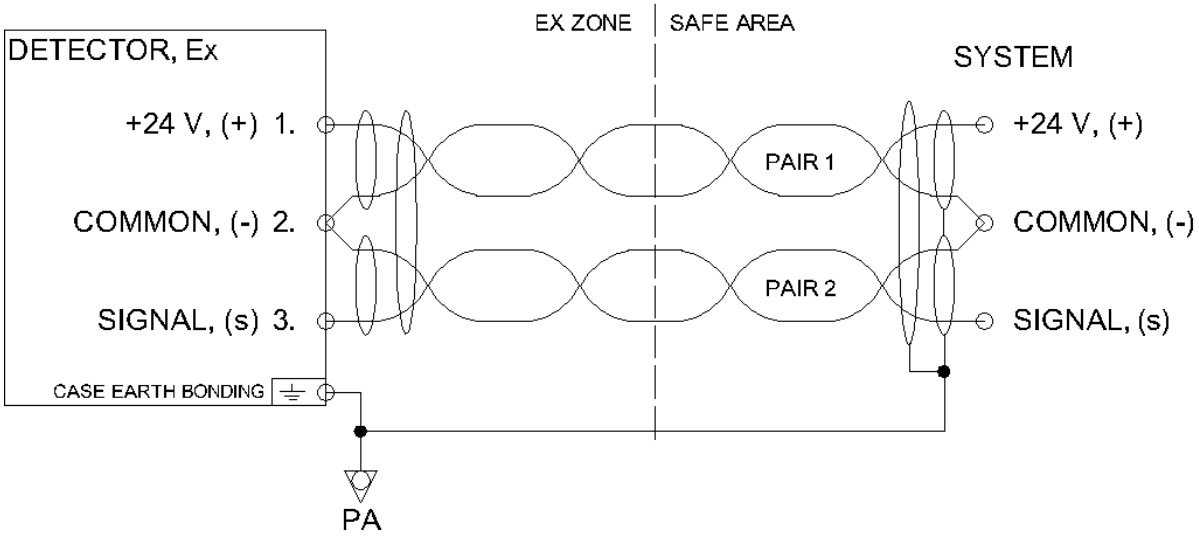


Figure 2. DGTeex gas detector wiring example, 3-wire connection.

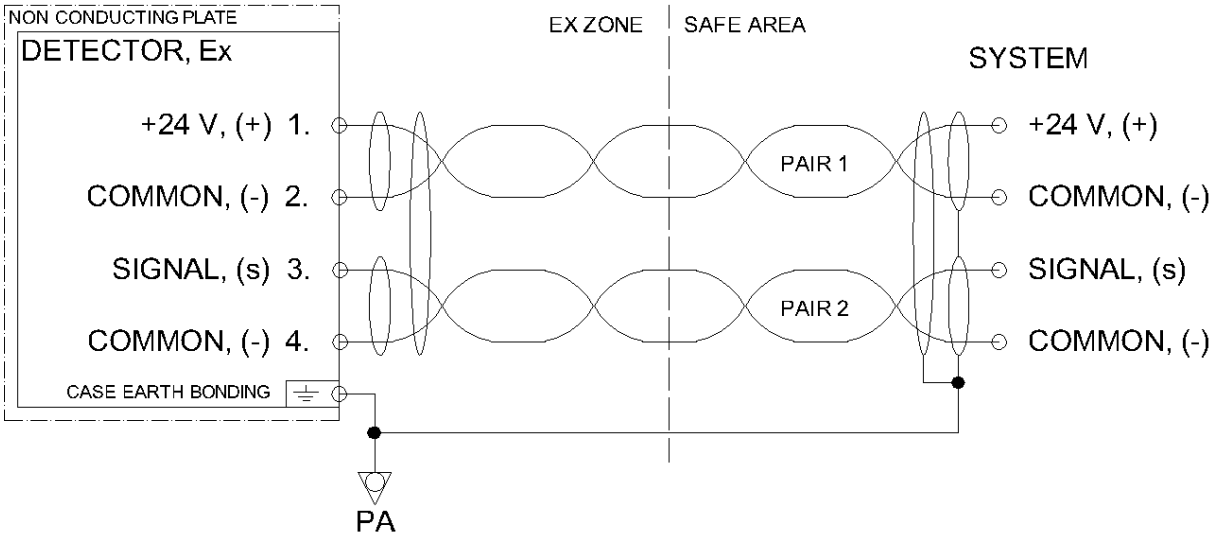


Figure 3. Wiring example for DGTi2-ex, DGTk2-ex, and DGTt2-ex series gas detectors (3 G), 3-wire connection.

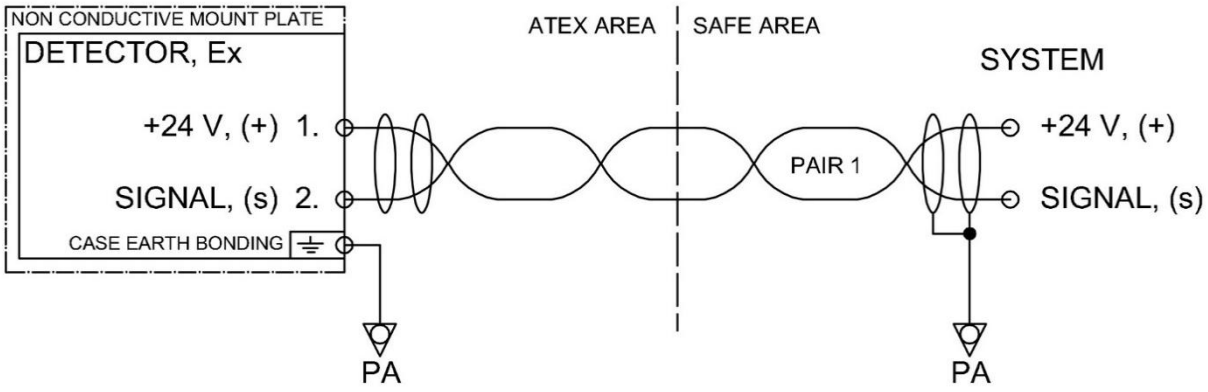


Figure 4. DGTec2-ex gas detector wiring example, 2-wire connection.

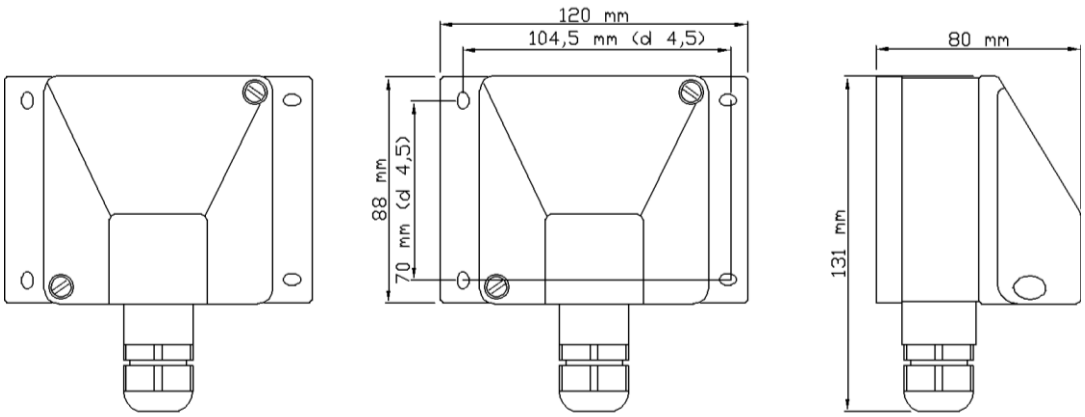


Figure 5. Gas detector casing dimensions and attachment holes.

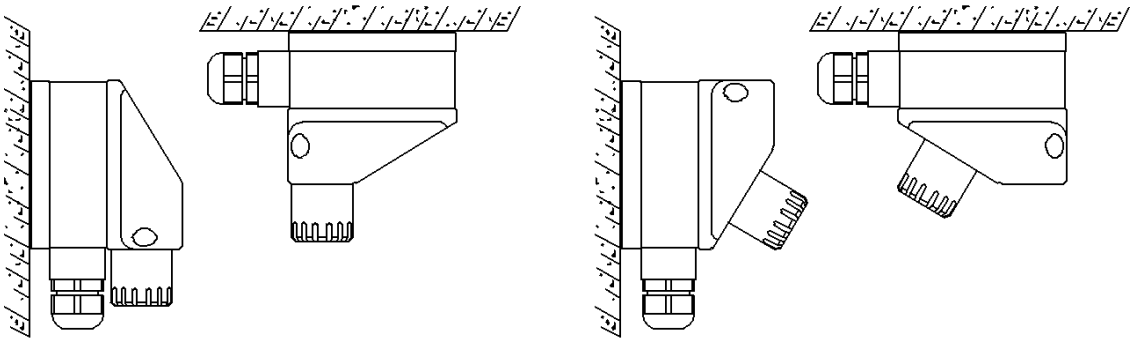


Figure 6. Installation position for ceiling and wall mounted versions. Sensor cover is pointing downwards.

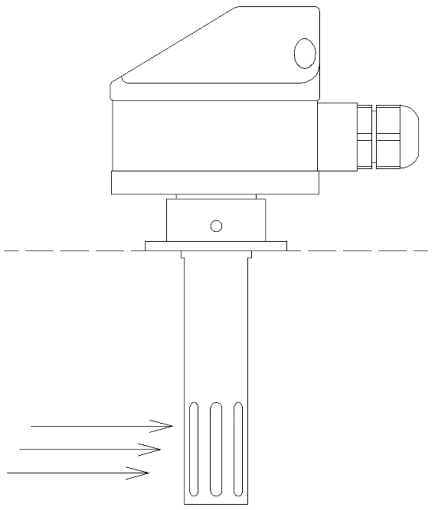


Figure 7. Duct mounted version includes 132 mm long probe and mounting ring.

Stainless steel protective housing is also available for gas detectors (figure 8). The protective housing can protect against rain/snow, prevent splashes from reaching the detector and protect the device from mechanical damage. Stainless steel protective housings are available in two sizes; small (H255 x W168 x D149 mm) for DGT-ex gas detectors and a large (H370 x W200 x D257 mm) for the DGTeex gas detector. As an accessory, it is also possible to purchase a pipe mounting kit that allows fastening of the protective housing to a pipe (50–120 mm diameter).



Figure 8. Large stainless steel protective housing (H370 x W200 x D257 mm).

When using a gas detector in an ATEX-classified area, at least the following standards must be taken into account. Any applicable national and local regulations must also be observed:

- EN 60079-0, Equipment – General requirements
- EN 60079-14, Electrical installations design, selection and erection
- EN 60079-17, Electrical installations inspections and maintenance
- EN 60079-19, Equipment repair, overhaul and reclamation
- EN 60079-29-1 and -2, Gas detectors

2. CHARACTERISTICS OF GAS DETECTORS

2.1. DGTeex gas detector

EX marking:	**II 2 G Ex d IIC T6** VTT 09 ATEX 063X **For Zone 21 and 22:** **II 2 G Ex d IIC T6** **II 2 D Ex tD A21 T 85 °C IP 65** VTT 09 ATEX 063X
Sensor element:	Electrochemical
Output signal:	4... 20 mA, linear response
Operating voltage:	24 VDC ±20%, regulated
Power consumption:	120 mA (Max)
Cabling:	3-wire connection Cable selection according to EN 60079-14 standard
T90 response time (typical):	Dependent on sensor type
Temperature ranges:	Dependent on sensor type
Ambient humidity:	With O_2 sensor 5…95% RH, for other sensors 15…90% RH, non-condensing
Protection class:	IP65
Weight:	< 2.5 kg
Please note:	Certificate special condition (X): Operating temperature range -40 to +80 °C. Note: The exact operating temperature depends on the sensor element.

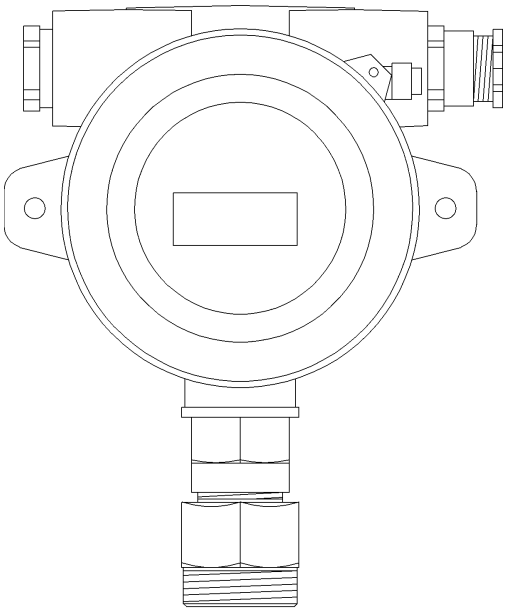


Figure 9. General view of the DGTeex gas detector.

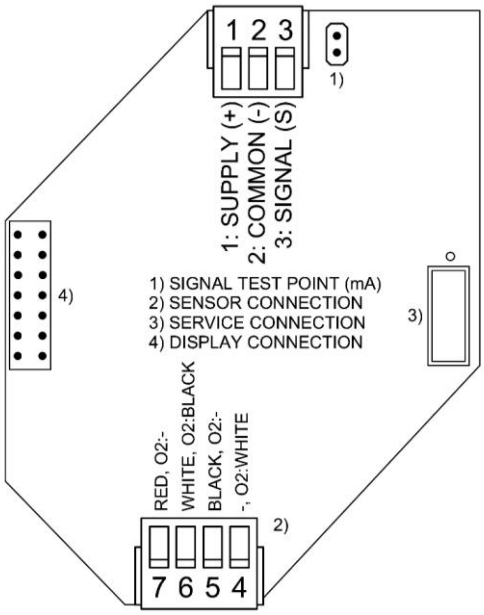


Figure 10. Terminal blocks of the DGTeex gas detector and their location on the circuit board.

WARNING! ENSURE THAT NO EXPLOSIVE ATMOSPHERE IS PRESENT.

Before carrying out any electrical connections, verify the atmosphere in the work area using a portable gas detector approved for the applicable hazardous-area classification.

2.2. DGTk2-ex gas detector

EX marking:	**II 3 G Ex ec II C T4 Gc**
Sensor Type:	Catalytic
Output Signal:	4…20 mA, linear response DGTk2r-ex includes a relay 24 V / 1 A for resistive load and a buzzer. The relay delay is programmable; refer to the inspection report for the configured value.
Operating Voltage:	24 VDC ±20 %, regulated
Max. Power Consumption:	4.0 W
Cabling:	3-wire connection Cable selection according to EN 60079-14 standard
Typical Sensor Life in clean air:	5 years
Typical T90 Response:	according to IEC 60079-29-1
Operating Temperature:	-40…+65 °C
Operating Humidity:	0…95 % RH, non-condensing
Degree of Protection:	IP54
Weight:	600 g
LED indications:	Green: normal operating mode Yellow: sensor failure Red: alarm limit exceeded

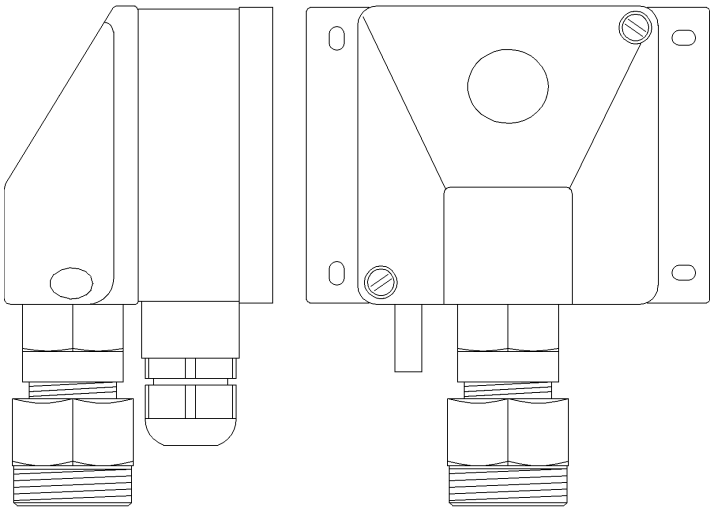


Figure 11. General view of the DGTk2(r)-ex gas detector.

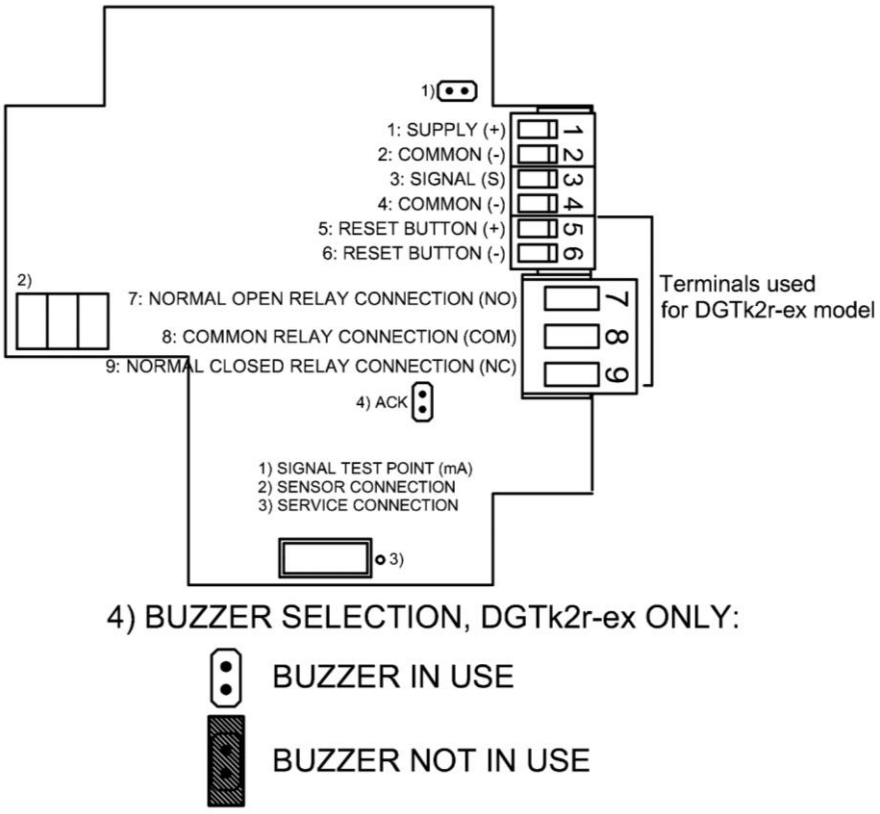


Figure 12. Terminal blocks of the DGTk2(r) gas detector and their location on the circuit board.

WARNING! ENSURE THAT NO EXPLOSIVE ATMOSPHERE IS PRESENT.

Before carrying out any electrical connections, verify the atmosphere in the work area using a portable gas detector approved for the applicable hazardous-area classification.

2.3. DGTt2-ex gas detector

EX marking:	**II 3 G Ex ec II C T4 Gc**
Sensor Type:	Semiconductor
Output Signal:	4…20 mA or (0)2…10V, linear response DGTt2r-ex includes a relay 24 V / 1 A for resistive load and a buzzer.
Operating Voltage:	24 VDC ±20 %, regulated
Max. Power Consumption:	4.0 W
Cabling:	3-wire connection Cable selection according to EN 60079-14 standard
Typical Sensor Life in clean air:	3 years
Operating Temperature:	Ammonia**:** -30…+40 °C Other gases: -20…+40 °C (with reduced sensitivity -30…+40 °C)
Operating Humidity:	15…90% RH, non-condensing
Degree of Protection:	IP54
Weight:	410 g
LED indications:	Green: normal operating mode Yellow: sensor failure Red: alarm limit exceeded

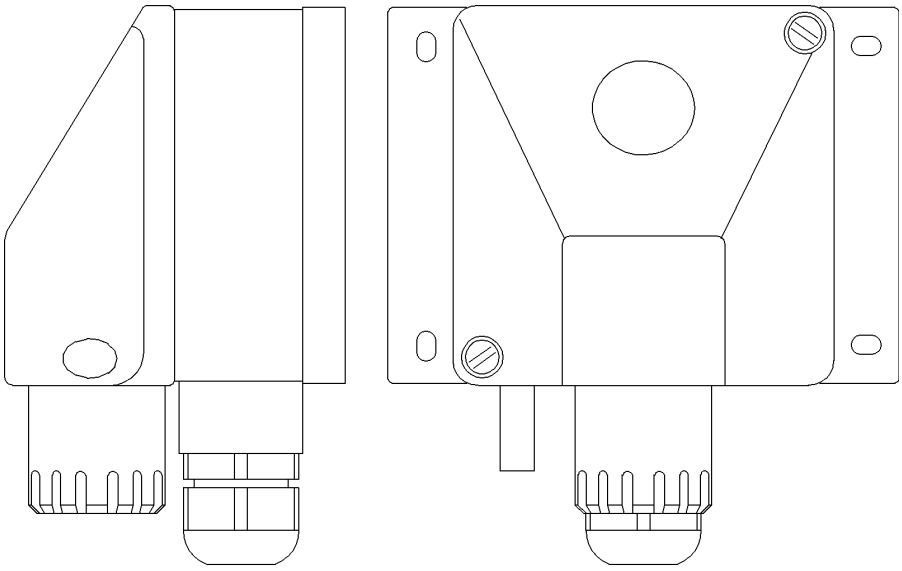


Figure 2. General view of the DGTt2(r)-ex gas detector.

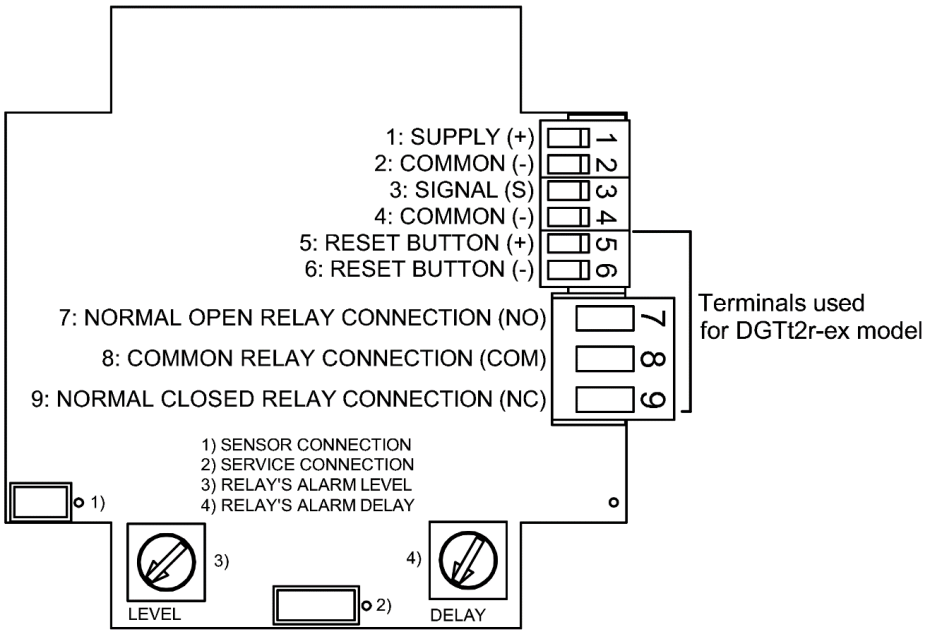


Figure 3. Terminal blocks of the DGTt2(r)-ex gas detector and their location on the circuit board. The device is available in two different versions, which differ in the operating principle of the relay contacts:

Version 1: 7: NO, 8: COM, 9: NC. The relay changes state in the event of an alarm.

Version 2: 7: NC, 8: COM, 9: NO. The relay is energized in the normal state and changes state in the event of an alarm or loss of power.

DGTt2r-ex DETECTOR ALARM AND DELAY SETTINGS	
ALARM LEVEL (% OF SIGNAL)	DELAY
1 = 10%	1 = 1 s
2 = 20%	2 = 3 s
3 = 30%	3 = 5 s
4 = 40%	4 = 10 s
5 = 50%	5 = 15 s
6 = 60%	6 = 30 s
7 = 70%	7 = 45 s
8 = 80%	8 = 60 s
9 = 90%	9 = 120 s
10 = 100%	10 = 180 s
11 = 110%	11 = 240 s

Figure 4. Alarm and delay settings of the DGTt2(r)-ex gas detector.

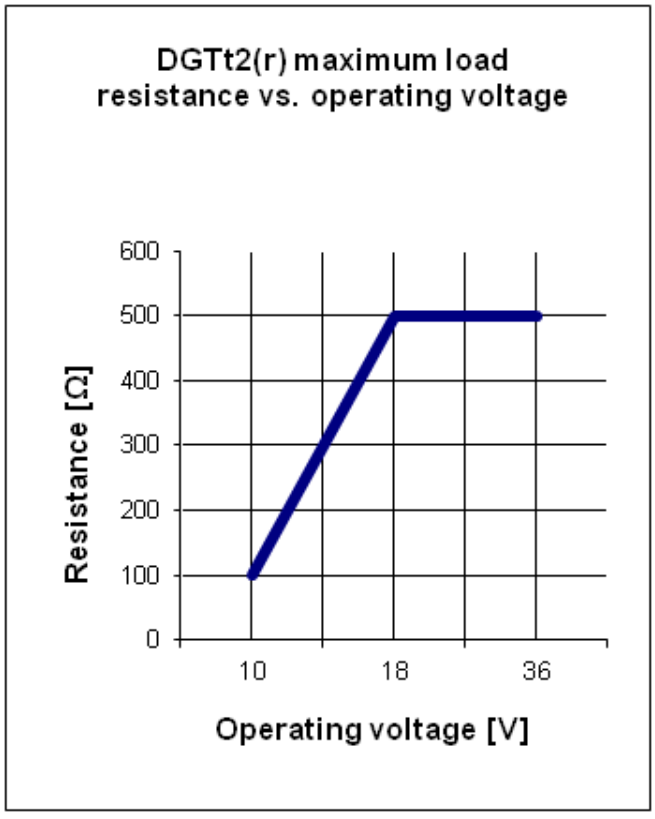
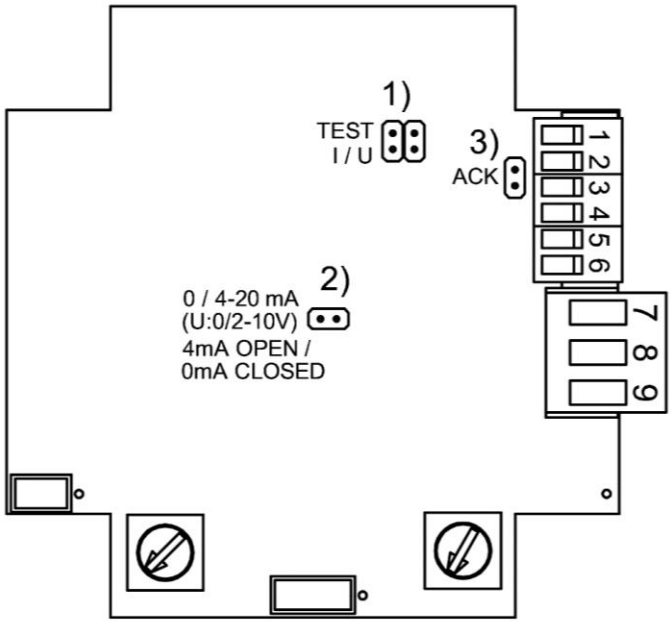


Figure 16. Load resistance of the DGTt2(r)-ex gas detector.



1) CURRENT OR VOLTAGE SIGNALS:

CURRENT SIGNAL

VOLTAGE SIGNAL

SIGNAL TEST POINT (mA)

2) CURRENT OR VOLTAGE SIGNAL MODE:

CURRENT SIGNAL: 4-20mA
VOLTAGE SIGNAL: 2-10V

CURRENT SIGNAL: 0-20mA
VOLTAGE SIGNAL: 0-10V

3) BUZZER SELECTION, DGTt2r ONLY:

BUZZER IN USE

BUZZER NOT IN USE

Figure 17. Plug-in connectors located on the circuit board of the DGTt2(r)-ex gas detector.

WARNING! ENSURE THAT NO EXPLOSIVE ATMOSPHERE IS PRESENT.

Before carrying out any electrical connections, verify the atmosphere in the work area using a portable gas detector approved for the applicable hazardous-area classification.

2.4. DGTec2-ex gas detector

EX marking:	**II 3 G Ex ec II C T4 Gc**
Sensor element:	Electrochemical
Output signal:	4... 20 mA, linear response
Operating Voltage:	See figure 21, regulated
Max. Power Consumption:	0.9 W
Cabling:	2-wire connection Cable selection according to EN 60079-14 standard
Typical Sensor Life in clean air:	Dependent on sensor type, 1…3 years
Typical T90 Response:	Dependent on sensor type
Operating Temperature:	Dependent on sensor type
Operating Humidity:	With O_2 sensor 5…95% RH, for other sensors 15…90% RH, non-condensing
Degree of Protection:	IP54
Weight:	390 g

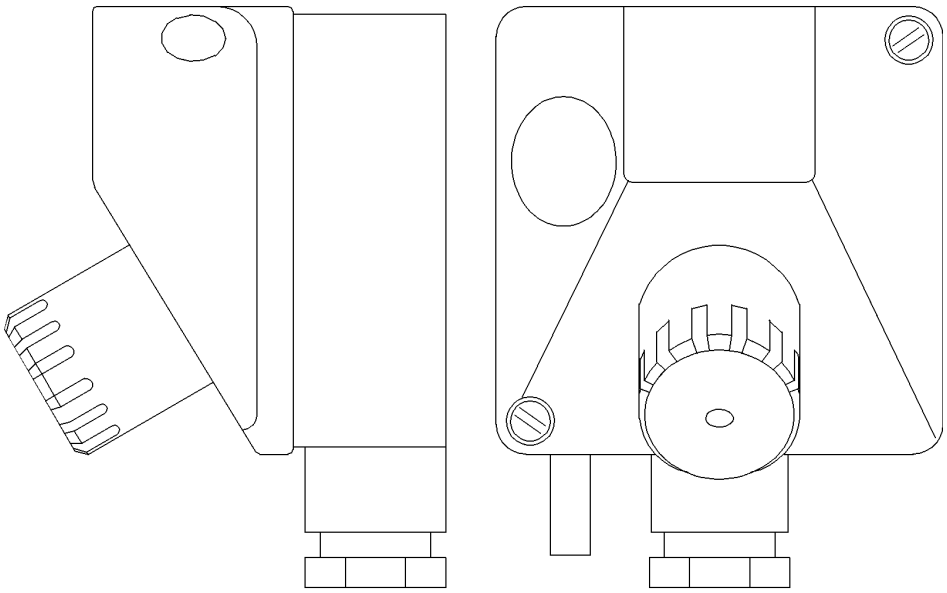


Figure 18. General view of the DGTec2-ex gas detector.

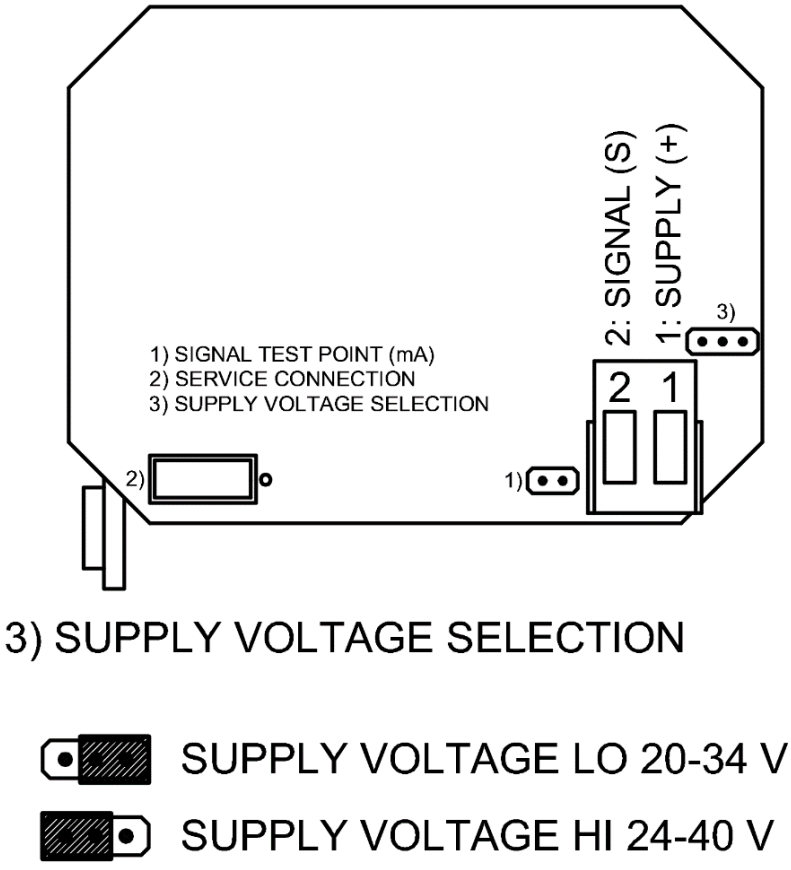
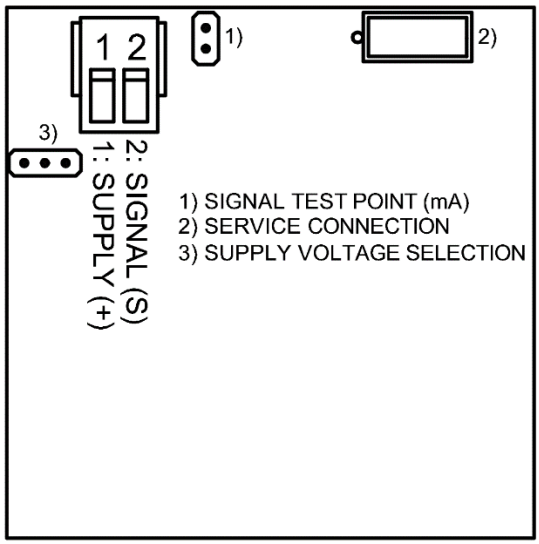


Figure 19. Terminal blocks of the DGTec2-ex gas detector and their location on the circuit board.



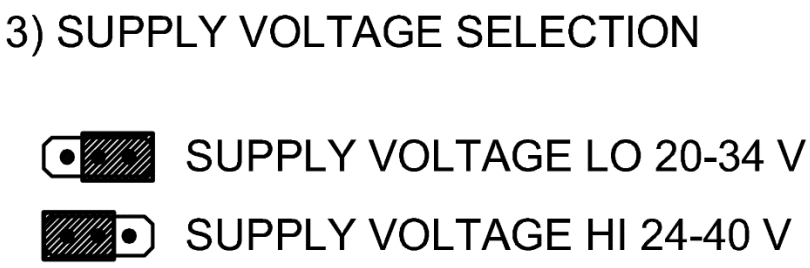


Figure 20. Terminal blocks of the DGTec2-ex oxygen (O_2) gas detector and their location on the circuit board.

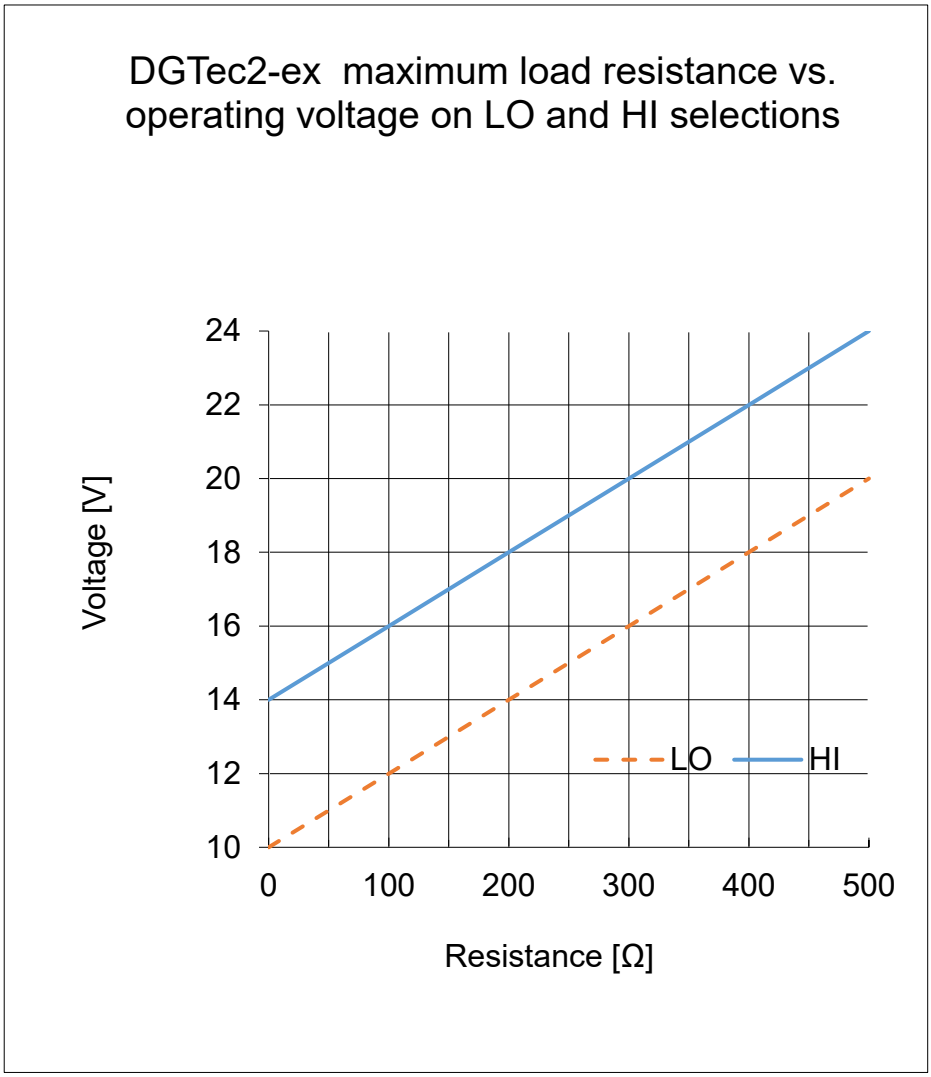


Figure 21. Supply voltage and load resistor of the DGTec2-ex gas detector.

WARNING! ENSURE THAT NO EXPLOSIVE ATMOSPHERE IS PRESENT.

Before carrying out any electrical connections, verify the atmosphere in the work area using a portable gas detector approved for the applicable hazardous-area classification.

2.5. DGTi2-ex gas detector

EX marking:	**II 3 G Ex ec II C T4 Gc**
Sensor Type:	NDIR infrared
Output Signal:	4... 20 mA, linear response
Operating Voltage:	24 VDC ±20 %, regulated
Max. Power Consumption:	3.0 W
Cabling:	3-wire connection Cable selection according to EN 60079-14 standard
Typical Sensor Life in clean air:	5 years
Typical T90 Response:	< 60 seconds
Operating Temperature:	+18…+25 °C
Operating Humidity:	0…95% RH, non-condensing
Degree of Protection:	IP54
Weight:	420 g
LED indications:	Green: normal operating mode Yellow: sensor failure Red: alarm limit exceeded

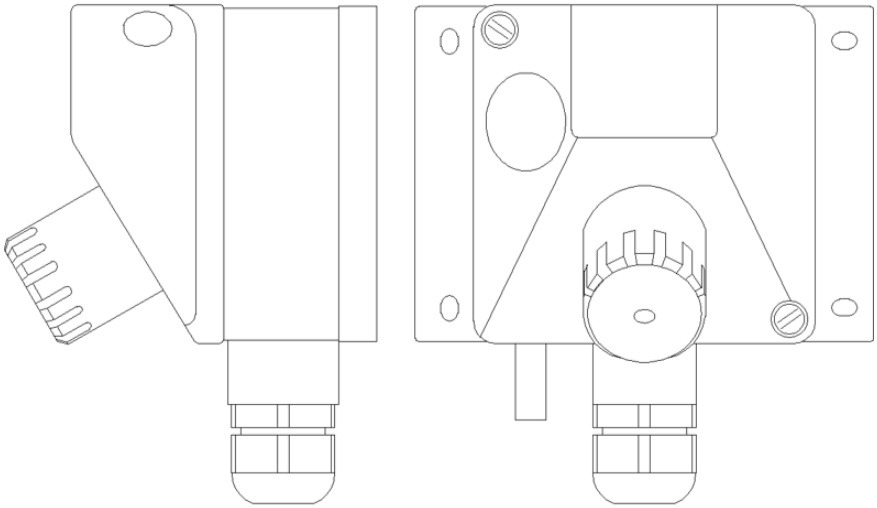


Figure 22. General view of the DGTi2-ex gas detector.

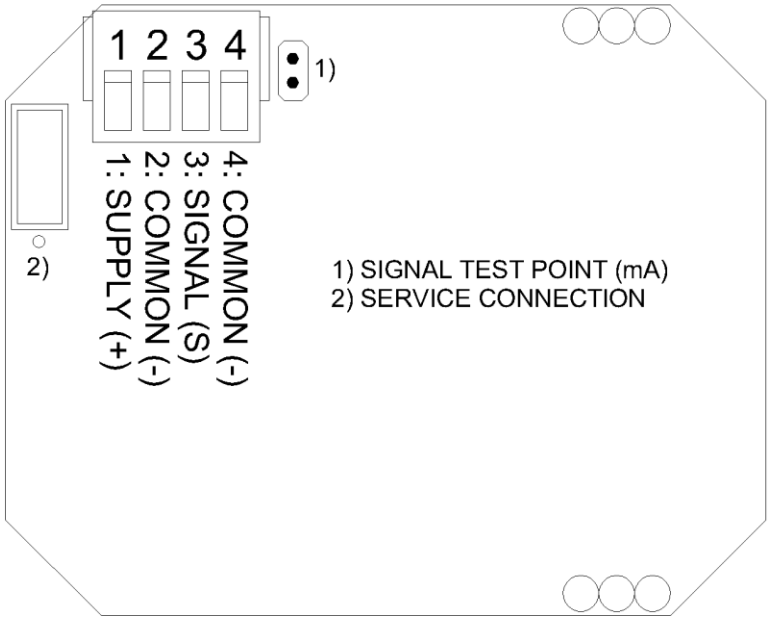


Figure 23. Terminal blocks of the DGTi2-ex gas detector and their location on the circuit board. The circuit board type depends on the gas being monitored.

WARNING! ENSURE THAT NO EXPLOSIVE ATMOSPHERE IS PRESENT.

Before carrying out any electrical connections, verify the atmosphere in the work area using a portable gas detector approved for the applicable hazardous-area classification.

2.6. DGTi2 gas detector

Sensor Type:	NDIR infrared
Output Signal:	4... 20 mA, linear response DGTi2r includes a relay 24 V / 0,3 A for resistive load and a buzzer.
Operating Voltage:	24 VDC ±20 %, regulated
Max. Power Consumption:	3.0 W
Cabling:	3-wire connection e.g. JAMAK HF 2x(2+1)x0,5 mm^2
Typical Sensor Life in clean air:	5 years
Typical T90 Response:	< 60 seconds
Operating Temperature:	+18…+25 °C
Operating Humidity:	0…95% RH, non-condensing
Degree of Protection:	IP54
Weight:	420 g
LED indications:	Green: normal operating mode Yellow: sensor failure Red: alarm limit exceeded

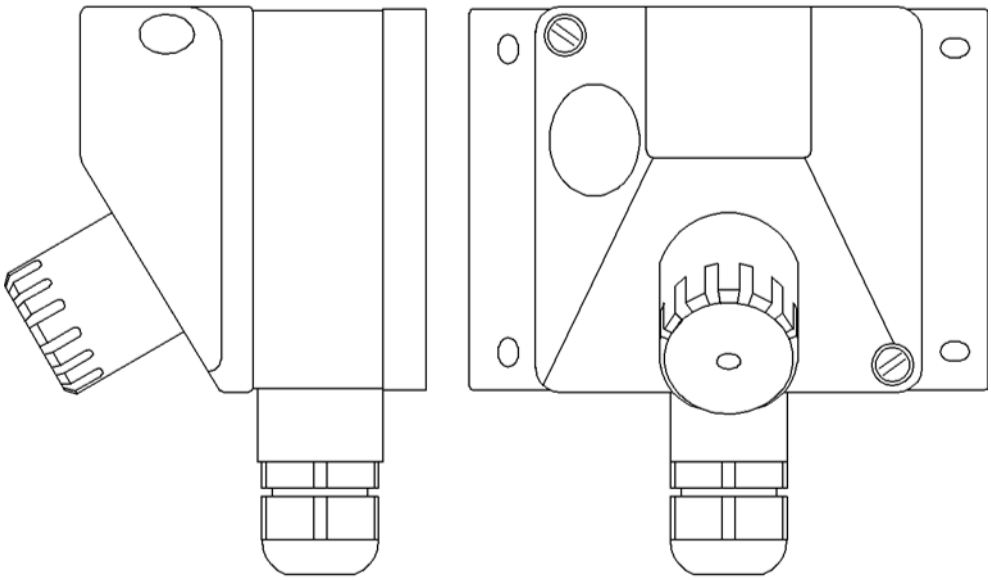


Figure 24. General view of the DGTi2 gas detector.

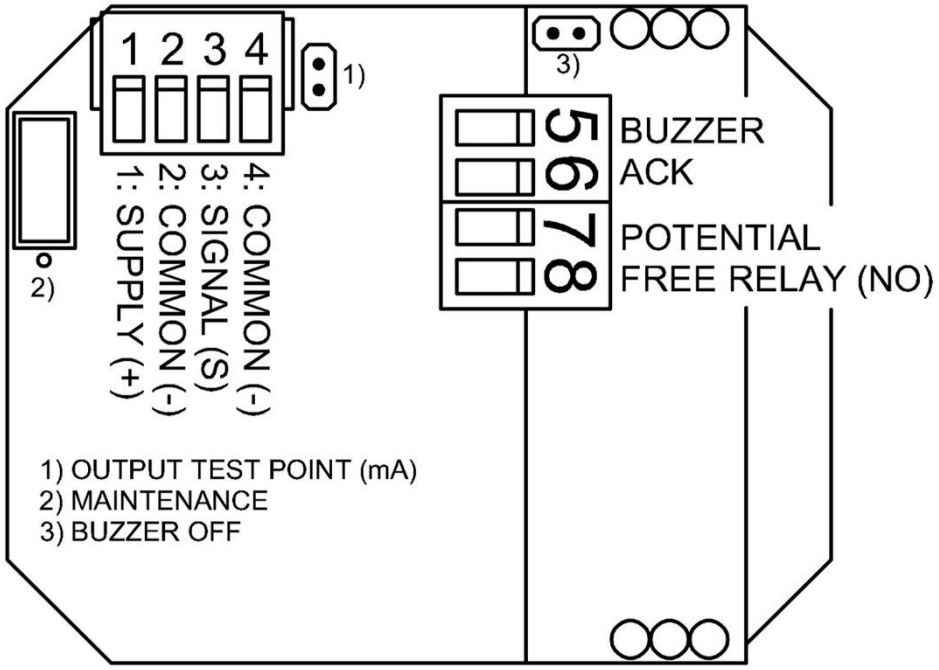


Figure 25. Terminal blocks of the DGTi2 gas detector and their location on the circuit board. The DGTi2r model is equipped with a buzzer and a relay.

3. MAINTENANCE AND RECYCLING

The gas detectors have been calibrated by Detector Oy before delivery. In addition to the installation instructions, the new equipment comes with inspection documents / calibration certificates.

To ensure a safe operating environment, continuously measuring gas detectors require, regardless of the manufacturer, regular maintenance and servicing to operate reliably. At the installation stage, it is a good idea to plan how the maintenance of the equipment will be arranged in the future.

Detector Ltd. maintenance serves in all matters related to the commissioning and maintenance of gas monitoring equipment. Carefully planned commissioning can ensure the proper functioning of gas monitoring equipment. Commissioning always includes user training on the use of gas monitoring equipment, functional inspection, reporting of results and observations, and a jointly prepared maintenance plan.

During the service visit, the gas monitoring system is inspected, calibrated and wear parts are replaced. As part of the system as a whole, the follow-up control of alarms will also be investigated and, if possible, their functionality will be tested. During the visit, the hazards and possible deficiencies in gas monitoring at the customer site are mapped out, and the observations are carefully reviewed with the customer. Finally, device-specific inspection documents are submitted, and recommendations are given for possible upgrade needs.

An end-of-life detector can be recycled with waste electrical and electronic equipment (WEEE). Do not dispose of detectors with household waste. Decommissioned gas monitoring equipment may also be delivered to the manufacturer for recycling. Detector Oy's experts are happy to tell you more about the maintenance and recycling of gas monitoring systems.

Detector Telekatu 8 FI-20360 TURKU FINLAND www.detector.fi	**Customer service:** detector@detector.fi Puh. +358 207 756 480
	Technical support: helpdesk@detector.fi Puh. +358 40 129 35 11