

ExDetector HC 150
ExDetector HC 150-K



**Operating and
Installation Instructions**

Gas Detection and Warning Systems

Gas Detector

ExDetector HC 150 / HC 150-K

Operating and Installation Instructions

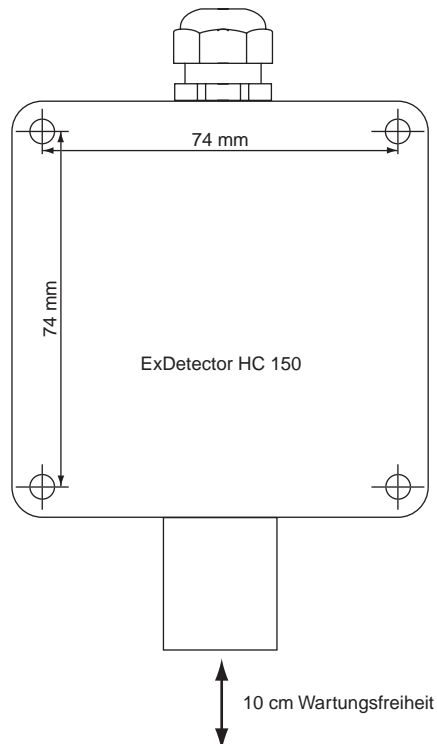
Important Instructions

Prerequisites for safe operation of the system:

- Appropriate transport and handling
- Appropriate installation and commissioning by suitably qualified personnel (e.g. a qualified electrician)
- Observance of the data sheet, the operating instructions and relevant safety regulations, e.g.:
 - Explosion Protection Regulation (ExVo)
 - Explosion Protection Rules (BGR 104)
 - BGV B 6 Gases
- Use only in areas where there is a potential explosion hazard and an oxygen concentration of not more than 20.9 vol. %

Installation

- Avoid external influences such as waves of water, oil etc., and exposure to causes of mechanical damage.
- Observe the air flow situation! Always place the sensor head in an air flow between a potential release or collection point and a possible ignition source.
- Consider the density of the gas! For gases with a lower density than air, for example methane, the detector must be located above a possible leakage point, or at the highest point at which the gas can collect. When monitoring gases and vapours that have a higher density than air, the detector must, accordingly, be positioned at the lowest point, or near a potential leakage point.
- Install the detector in a location where there is low vibration, and where the temperature is as stable as possible.
- Ensure that there is adequate space for maintenance of the detector.



Installation Notes

Follow the prescribed specifications for cables and connections. It is important that the cable does not pass close to a source of electromagnetic interference. Compliance with the limits specified in standards relevant for the CE-symbol is only assured with proper use and electromagnetically-compatible installation of the system.

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Connections

Important Instructions

Never open the ExDetector housing in the presence of an explosive atmosphere.

Terminal Assignment

- Max. lead length: 1000 m
- Max. lead resistance: 12 ohm per conductor

**Determining the
conductor resistance
of a copper conductor**

$$R = \frac{L}{56 \times A}$$

R= conductor resistance in Ohm
L= conductor length in m
A= conductor cross-section in mm²

- Max. outside diameter of cable: 10 mm
- Three-core cable with screen
- Terminal assignment
KL 1 power supply +24VDC SELV/PELV
KL 2 output 4 ... 20 mA

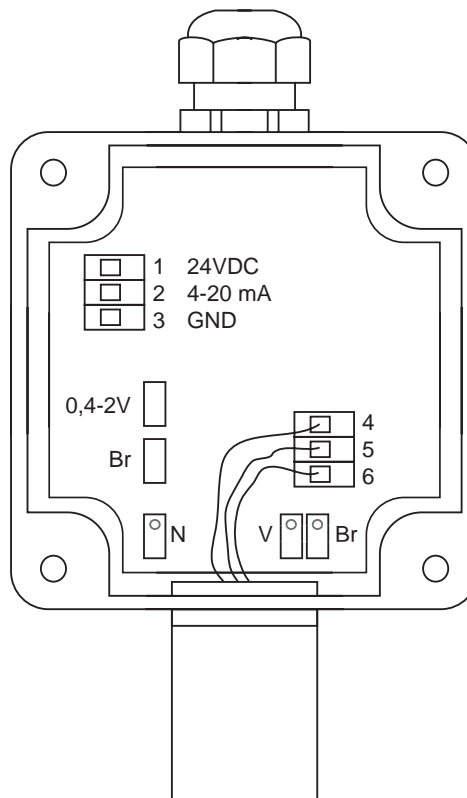
KL 3 GND

KL 4 Sensor

KL 5 Sensor

KL 6 Sensor

Please note (when used without a Bieler + Lang evaluator):
the power supply at KL 1 must be within the safe limits and have a 100 mA/T series fuse.



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Connections

Example: Connection to GMC8022



Potential Equalisation

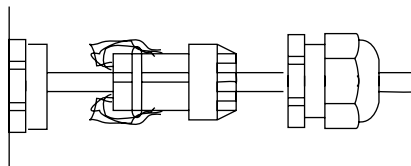
The detector housing must be connected to the equipotential bonding of the explosion hazard zone.

In addition, valid national installation regulations must be observed. The following regulations were valid in Germany at the time of going to press:

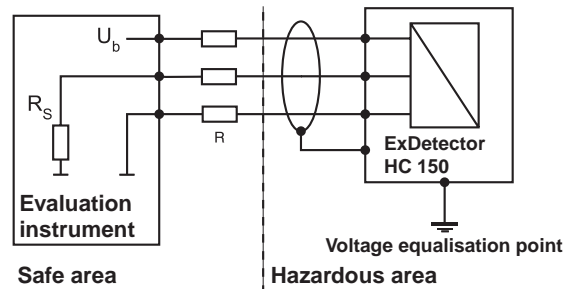
- **ElexV** Regulations covering electrical installations in areas where there is an explosion hazard
- **DIN VDE 0165 / 2.91** Installation of electrical apparatus in areas where there is an explosion hazard
- **Ex-RL** Rules for avoiding dangers from a potentially explosive atmosphere with a collection of examples - Explosion Protection Rules

Screening

The screen is to be connected to the detector housing by means of the cable gland. Connect the screen as shown in the diagram.



- The screen conductor must be connected to the equipotential bonding of the area where there is an explosion hazard.



Commissioning

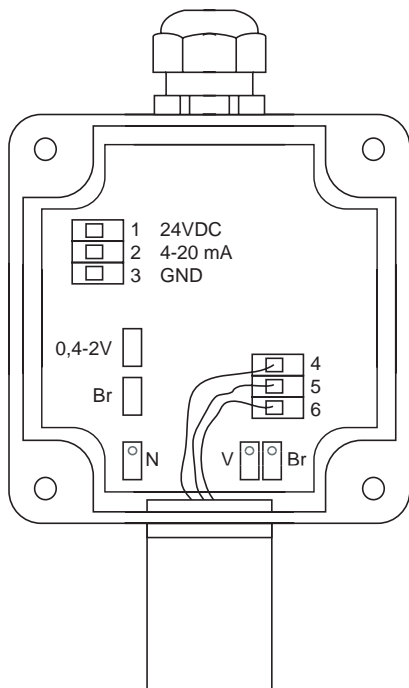
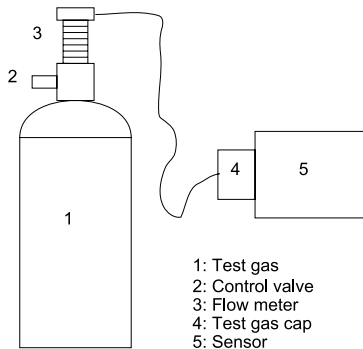
- Switch on the evaluation unit (power supply).
- After 30 minutes warm-up time, check operation of the detector / evaluator combination with test gas.

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Adjustment



Important note!

The relevant regulations for work in areas where there is an explosion hazard must be observed without fail.

The following accessories and equipment are required:

- Voltmeter
- Test gas set consisting of:
 - 1 x Minican of test gas (e.g. 40% LEL)
 - 1 x Minican of synthetic air
 - Pressure regulator unit with regulating valve and flow meter.
 - Test gas cap (see Accessories)
 - Measurement leads (see Accessories)

Adjustment

- Remove the cover from the housing.
- **Important:** before opening make sure that an explosive atmosphere is not present.
- Fit test-gas cap to the sensor.
- The flow rate of the two gases should be 10 to 15 l/h (second graduation).

Setting the bridge voltage

- Apply zero-response gas (synthetic air) if the environment contains the gas to be detected.
- Connect the voltmeter at the measurement socket „Br“.
- Wait for the voltage reading to stabilise.
- Adjust the „Br“ potentiometer until the voltmeter reads 0 mV.

Setting the base current to 4 mA

- Connect the voltmeter at the „0,4-2V“ socket.
- Wait for the „0,4-2V“ voltage signal to stabilise.
- Adjust the „N“ potentiometer until the voltmeter reading is 400 mV (4 mA).

Setting the 4-20 mA output current

- Apply test gas of a known concentration C₁.
- Wait for the „0,4-2V“ voltage signal to stabilise.
- Adjust the „V“ potentiometer until the voltage corresponds to the value U_S

$$U_S = 0,4V + 1,6V \frac{C_1}{C_{max}}$$

C₁ = testgas concentration in % LEL

C_{max} = Measuring range (100%LEL)

U_S = Signal voltage

Measuring the sensitivity (bridge voltage)

- Connect the voltmeter at the measurement socket „Br“.
- Note the voltage reading U_{Br} in mV.
- Remove the test gas.
- Write a test report.

Testing sensor sensitivity E:

- Calculate E using the following formula:

$$E = \frac{U_{BR} \text{ (mV)}}{C_1 \text{ (%UEG)}} \quad \begin{array}{l} U_{BR} = \text{bridge voltage} \\ C_1 = \text{known test gas concentration} \end{array}$$

- If sensor sensitivity E < 0.5, the sensor must be replaced.
- If sensor sensitivity E is below 50% of the E value from initial adjustment (works calibration), the sensor also must be replaced.

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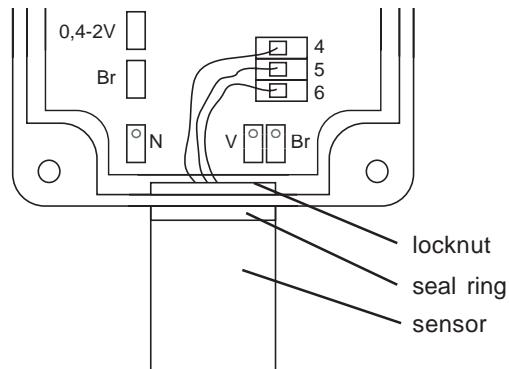
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Replacing the Sensor

Please note:

Sensors may only be replaced by specialist personnel authorised to do so by Bieler+Lang. Do not open the housing when the power supply is switched on!



Procedure:

- Switch off the power supply to the detector
- Remove the housing cover
- Disconnect the leads from terminals 4, 5 and 6
- Undo the locknut
- Unscrew the sensor
- Screw the replacement sensor in.
Make sure the sealing ring is correctly seated.
- Screw the locknut on (serrations towards the housing wall)
- Connect the leads according to their markings
- Replace the housing cover
- Switch on the power supply
- Calibrate the detector

Spare Parts

- Replacement sensor for ExDetector HC 150 D1
- Replacement sensor for ExDetector HC 150-K D1

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Accessories

- Test gas set
 - Calibration gases
 - Measurement lead
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Maintenance Instructions

Regular maintenance ensures the safety and longterm reliability of your gas warning installation. For this reason it is absolutely essential that the system is checked at regular intervals. We therefore strongly recommend that you conclude an installation-specific maintenance contract with us.

At least once a year the condition (correct operation) of a gas warning installation must be checked by a qualified person (§8 and §53; BGV 61 UVV Gases). Before commissioning and at appropriate intervals the gas warning installation is to be checked by an expert (§56; BGV 61, UVV Gases).

In addition the requirements of BG-Bulletin T023 (BGI 518), Gas warning devices for explosion protection - selection and operation, must be observed. Further relevant standards:

- DIN EN 60079-14 Electrical apparatus for explosive gas atmospheres - Electrical installations, design selection and erection
 - DIN EN 60079-17 Electrical apparatus for explosive gas atmospheres - Electrical installations, inspection and maintenance.
 - DIN EN 60079-29-2 Explosive atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen
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Guarantee

For all deliveries the general delivery conditions for products and services of the electrical industry apply.

There is a guarantee on all parts for two years from the delivery date or from the date of commissioning for the first time by our customer service or by our representative, with the exception of parts subject to wear (e.g. sensors).

In particular, please note that in the event of improper operation the right to notify material defects is forfeited. The time limit for notifying claims for material defects is 12 months.

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Bieler + Lang GmbH
Gas Detection and Warning Systems

PO Box 1129, D-77842 Achern
Oberkirchstr. 19-21, D-77855 Achern

Telephone +49 (0) 78 41 / 69 37 - 0
Telefax +49 (0) 78 41 / 69 37 - 99
E-mail info@bieler-lang.de

Internet www.bieler-lang.de

DUOTECAS

MÅLEINSTRUMENTER TIL MILJØKONTROL

DUOTEC A/S

Herstedøstervej 19 · 2600 Glostrup

Tlf. 4345 9188 · Fax 4343 2330

e-mail: info@duotec.dk

www.duotec.dk

We reserve the right to make technical changes!