

## Gas Detection Computer

**GMC 8420**  
**RK 8420**



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**Operating and Installation Instructions**

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**Gas Detection and Warning Systems**

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### Instructions for Users of These Operating and Installation Instructions



Failure to accept and act on the information provided by this symbol can result in:

- serious consequences for persons;
- malfunctioning of the gas detection computer.



**Danger due to electric voltage at electrical components! Never touch electrical components or contacts when the equipment is switched on!**

**Danger of electric shock which can result in damage to health or death.**



**Parts sensitive to electrostatic discharge. Touching such parts can damage or destroy them!**

**Grip printed circuit boards only at their edges!**

**Before starting work, ensure that you are electrostatically discharged by touching an earthed metal part!**

### Declaration of Conformity

A declaration of conformity is available.

### Safety

- Install and operate this device in accordance with the present operating instructions!
- Observe relevant safety instructions!

### Personnel

Have the installation, configuration and maintenance of the device carried out by qualified specialist personnel!

### Further Information

Because the product is subject to continual further development, there may be a change in the operating instructions without prior notice. If you have any questions or need more information, please contact Bieler + Lang.

### Instructions for Users



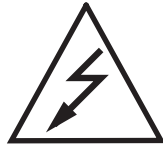
- Changes to the device or improper use can result in electric shock.
- Never open the gas detection computer.
- In the event of damage to housings or to the installed leads, the unit must be taken out of service by switching off the electric power supply.



- Never test the equipment using gas from a cigarette lighter or a spray can, combustible vapours from paint, or solvents.
- Have the equipment checked at least once a year by a specialist authorised by Bieler + Lang!
- Clean the device only externally using a damp cloth. Do not use cleaning agents!



**General Instructions for Installation, Connection and Commissioning the Gas Detection Computer**



- Appropriate installation and commissioning by suitably qualified personnel (e.g. a qualified electrician) according to the requirements specified in these operating instructions
- Installation and electrical connections must comply with valid national regulations of the country in which the device is installed.
- The gas installation and, where appropriate, the cut-off device must comply with valid national regulations of the country in which the device is installed.
- The device may only be used within the limits of the published technical data. Pay particular attention to the operating temperature, humidity, and the electric power supply.
- The gas detection computer must not be installed out of doors.

**Installation**

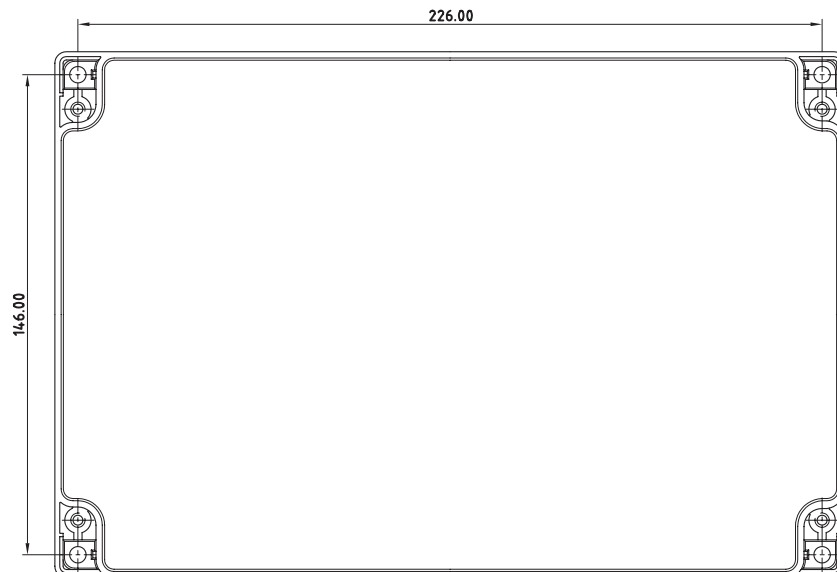
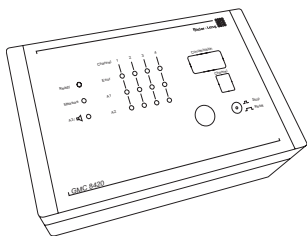


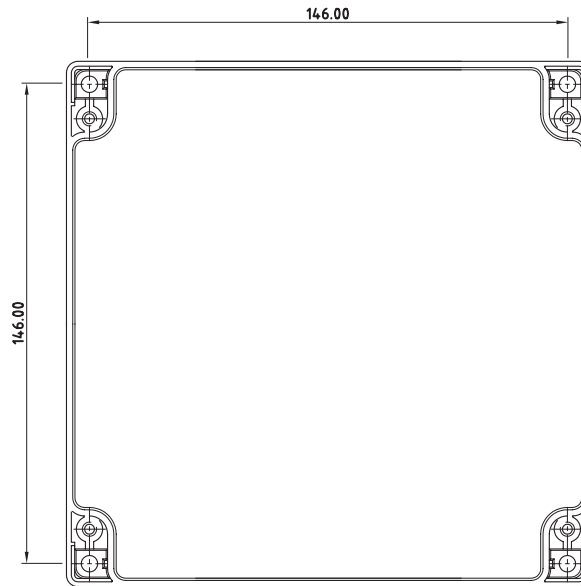
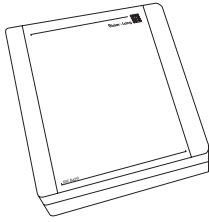
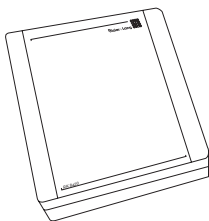
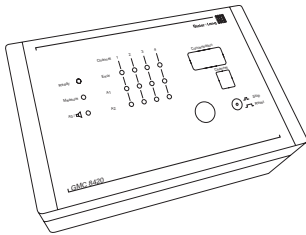
- Avoid external influences such as waves of water, oil etc., and exposure to causes of mechanical damage.
- For installation only outside areas where there is an explosion hazard.
- Install in a location where there is low vibration, and where the temperature is as stable as possible.
- Ensure that there is adequate space for maintenance of the detector.

**Installation Location  
Preparation for Installation**

- Remove the two blue trim strips on the right and left sides of the housing cover. On the sides there are shallow depressions at the ends. Insert a flat screwdriver and apply light upward pressure to remove the trim strip.
- Undo the four screws holding the cover.
- Carefully remove the cover.
- For GMC 8420 only: disconnect the ribbon cable from the PCB in the housing body. To do this, unclick the retaining clips on the sides of the connector, then pull gently to disconnect the cable.
- You can now mount the housing body.

**Drilling Plan for GMC 8420**



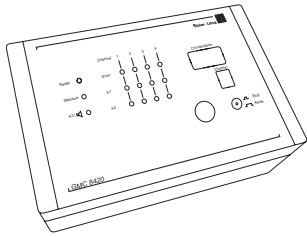
**Installation****Drilling Plan RK 8420****Cable Glands****GMC 8420  
RK 8420**

Attention mains voltage! Before starting work, make sure all leads are disconnected from a power supply.

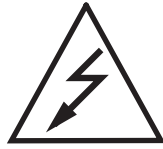
Pass the lead through the diaphragm gland: pierce centre of the diaphragm with a Philips screwdriver. Pull an adequate length of lead through. To achieve the best seal, pull the cable ca. 10 mm in the other direction until the diaphragm collar presses tightly on the cable insulation.



**Connections  
GMC 8420**

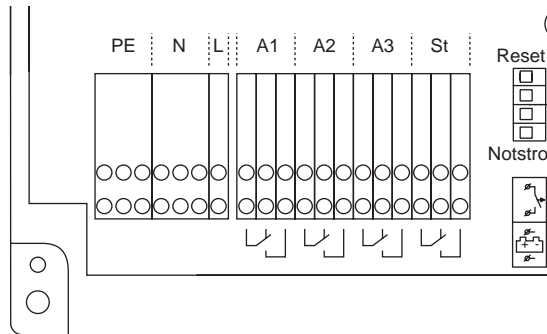


**Alarm Output Connections**



Attention mains voltage! Before starting work, make sure all leads are disconnected from a power supply.

Remove the insulation plate from the housing body. Replace this protection component after connection!



Contacts shown in alarm status!

- **Connection terminals PE / N / L**

Power supply must be 230 VAC. Use the cable gland provided to introduce the cable. Take care to tighten the gland cap sufficiently to achieve effective strain relief.



For safety, provide a 6 A automatic fuse in the supply (see the typical circuit, below)!

- **Connection terminals A1**

Switching relay 1 (max 230VAC, 4A)

- **Connection terminals A2**

Switching relay 2 (max 230VAC, 4A)

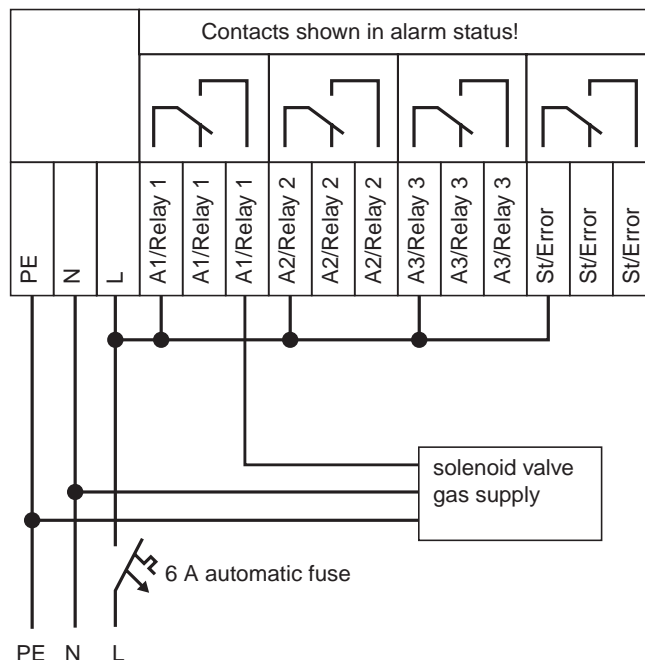
- **Connection terminals A3**

Switching relay 3 (max 230VAC, 4A)

- **Connection terminals St/Error**

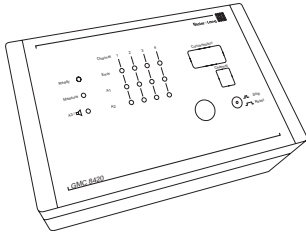
Switching contacts for device and sensor faults (max 230VAC, 4A)

**Typical Circuit**



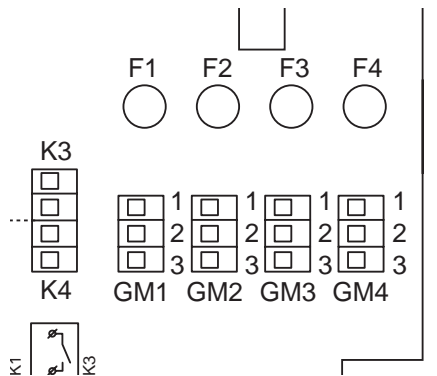
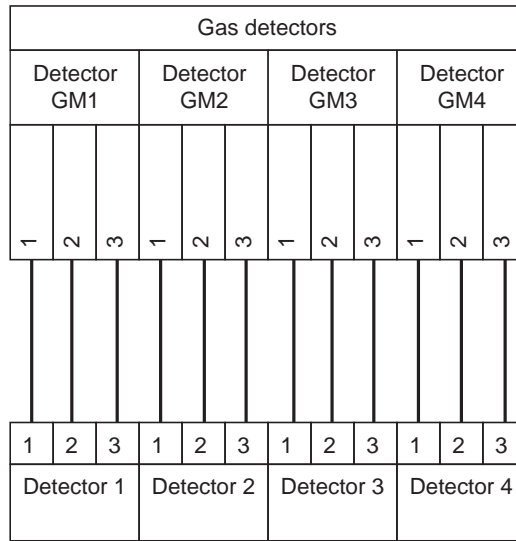


## Connections GMC 8420



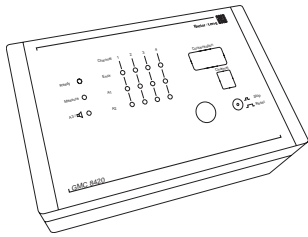
### Detector Connections

Now connect the required number of detectors. Start with GM1 and proceed in sequence to GM4





**Connections  
GMC 8420**



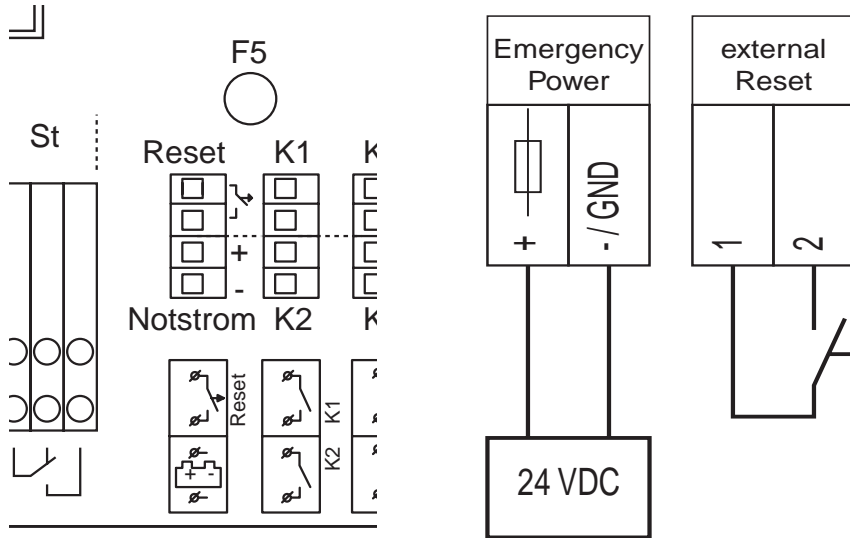
**Options**

- External Reset
- Emergency Power Supply

Optionally the device can be supplied for use with a 24 VDC power supply. The power supply must comply with the requirements given in the technical data. The device is protected by fuse F5 (1 A/T). When connecting make sure the polarity is correct.

Another option allows the device to be reset by remote control. In this case a button with normally-open contacts must be connected at the external reset input.

Attention! Never apply an external voltage here!

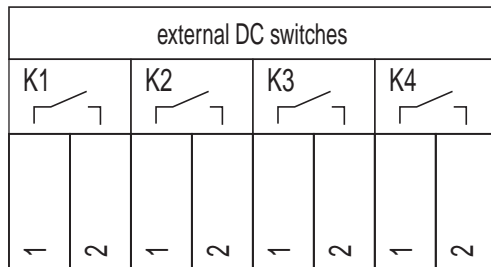


**Option**

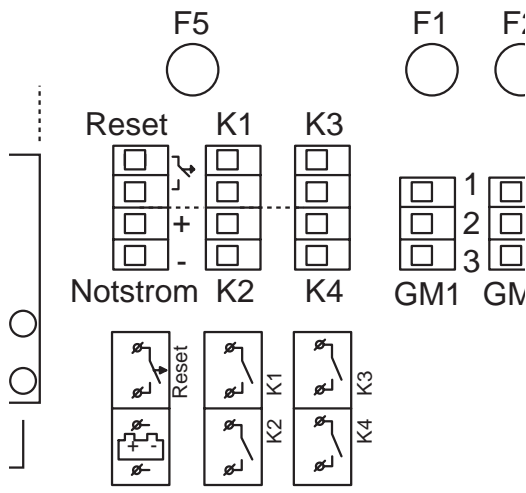
- DC Switches  
(Relays 4-7)

For additional switching operations there are four DC switches. They can be freely programmed when setting the device.

Note the connection data: max. 32 VDC, max 200 mA.



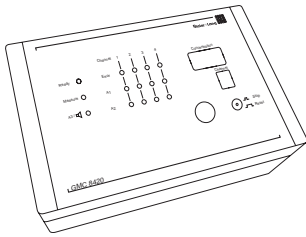
- K1 = Relay 4
- K2 = Relay 5
- K3 = Relay 6
- K4 = Relay 7







## Connections GMC 8420

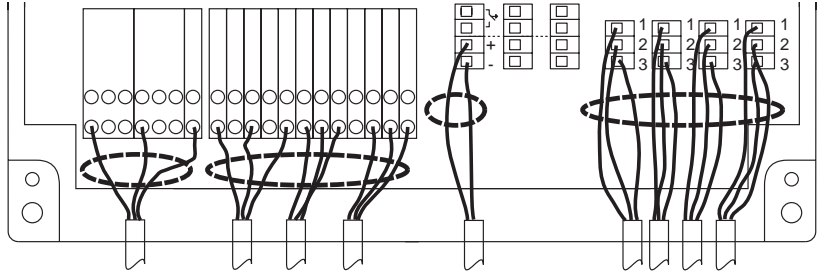


### Final Installation Steps



When you have carried out the installation operations described above, the following steps are required to complete installation:

- To prevent unintentional disconnection of individual leads, bundle the leads of related circuits together using the cable ties provided. Take care that there is adequate space between the mains power supply and the switch contacts (when used) and SELV circuits (sensor connections, external reset).

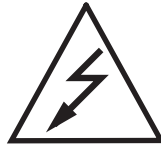
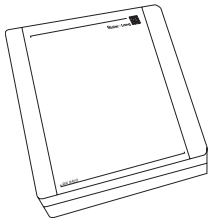


Example showing groups of circuit leads bundled together

- Reconnect the ribbon cable from the cover to the PCB in the housing body. To do this, press the connector gently into place. Take care that the polarity is correct. This is ensured mechanically by a rib on the side. The clips on the short sides of the connector must be engaged.
- Replace the insulation plate in the housing body.
- Replace the housing cover. Take care that the seal is correctly seated.
- Secure the cover with its four screws. Do not use excessive force when tightening the screws.
- Replace the two blue trim strips.



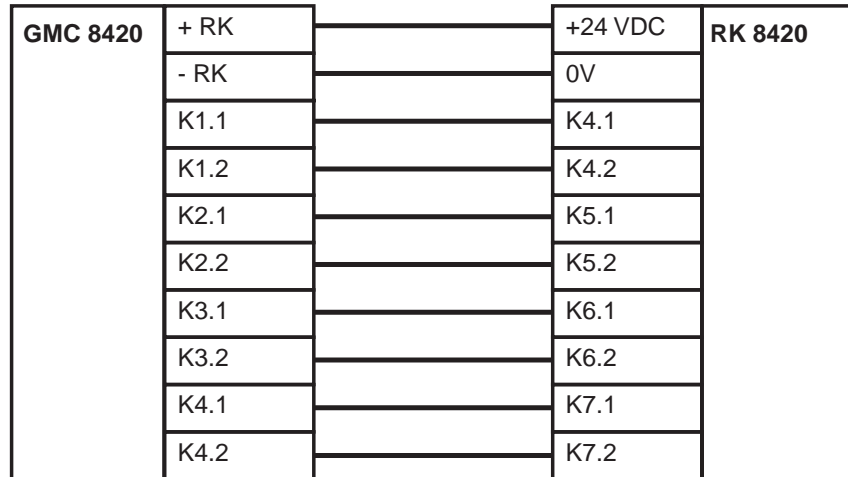
#### Connections RK 8420



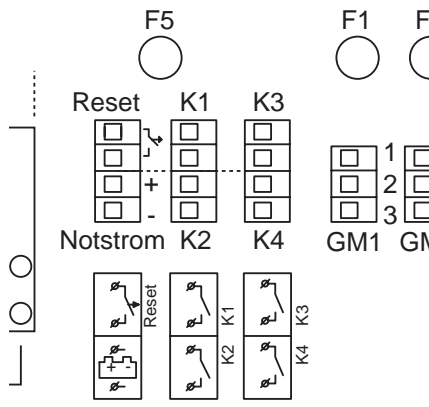
Attention mains voltage! Before starting work, make sure all leads are disconnected from a power supply.

The relay extension RK 8420 provides the option of four further freely programmable relay outputs. The relay extension must be connected to the GMC 8420 using a control cable (LIYY 10 x 0.34). The maximum permissible lead length is 30m.

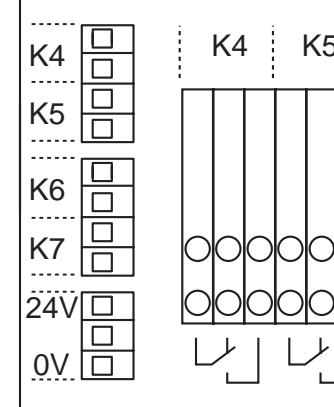
#### Connection



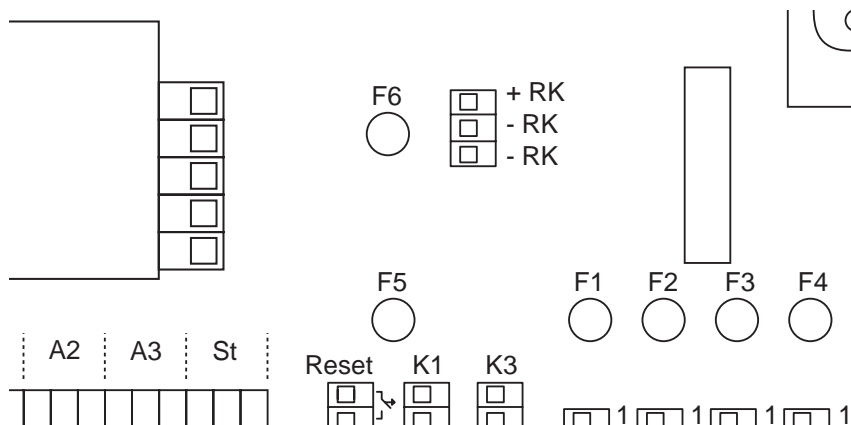
View of GMC 8420 (K1 ... K4)



View of RK 420

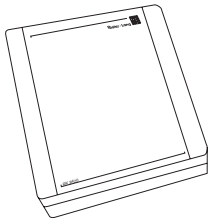


View of GMC 8420 (+RK, -RK)

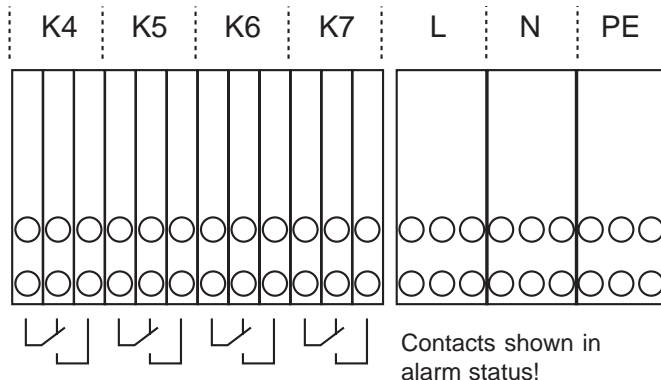




#### Connections RK 8420



#### Alarm Output Connections



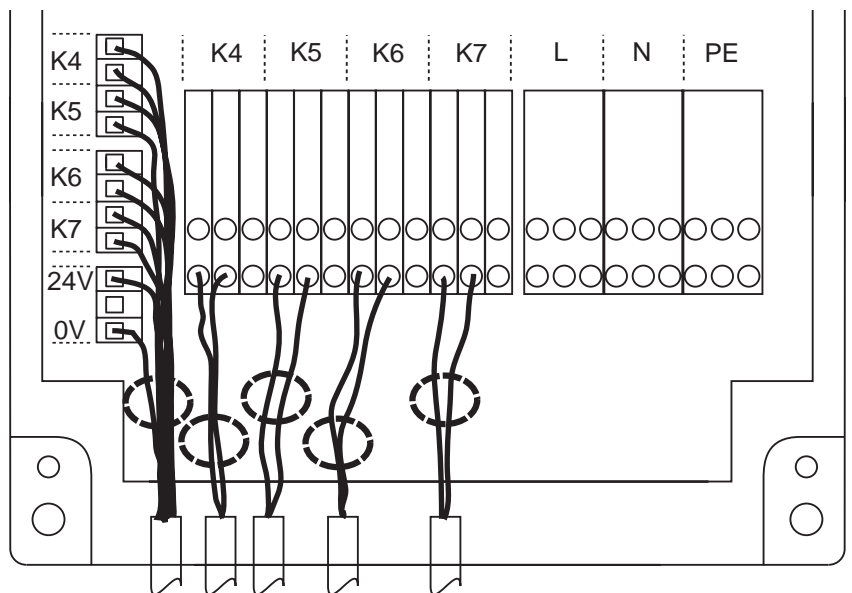
- Distribution terminals PE / N / L**  
 Use the cable gland provided to introduce the cable. Take care to tighten the gland cap sufficiently to achieve effective strain relief.
- Connection terminals K4**  
 Switching relay 4 (max 230VAC, 4A)
- Connection terminals K5**  
 Switching relay 5 (max 230VAC, 4A)
- Connection terminals K6**  
 Switching relay 6 (max 230VAC, 4A)
- Connection terminals K7**  
 Switching relay 7 (max 230VAC, 4A)

#### Final Installation Steps



When you have carried out the installation operations described above, the following steps are required to complete installation:

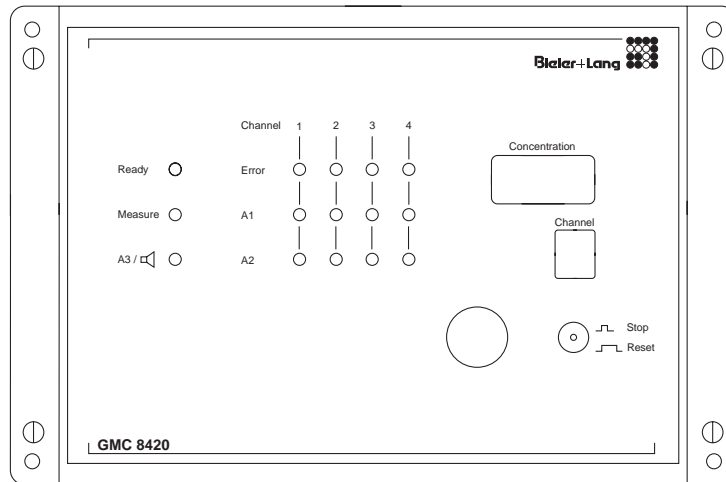
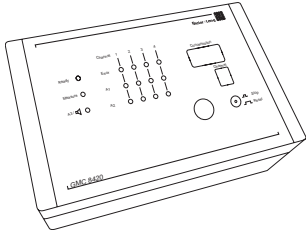
To prevent unintentional disconnection of individual leads, bundle the leads of related circuits together using the cable ties provided.



Example showing groups of circuit leads bundled together



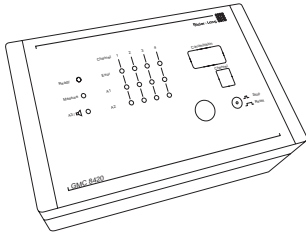
#### Display and Control Elements



Ready	Illuminated green	Device ready for use, power supply OK
Measure	Blinks green	Sensor signals being read
Error	Illuminated yellow	Fault at the appropriate sensor input: Signal outside measurement range, wire break, short circuit, no sensor connected
Concentration / Channel		Shows current reading of detector indicated in channel display
Stop / Reset		<p><b>Stop:</b> Press the button briefly (&lt; 1 second) Concentration display shows the reading of the selected measurement channel (see channel display) continuously.</p> <p>Please note: This does not affect alarm monitoring by other connected sensors. When the button is pressed briefly a second time, all measurement channels are again displayed in sequence.</p> <p><b>Reset:</b> Press the button for a longer period (&lt; 1 second) Resets the horn/A3 Resets Alarms 1 and 2</p> <p>Please note: The horn/A3 output can be acknowledged while an alarm threshold is exceeded. Alarms 1 and 2 can only be acknowledged when the concentration reading has fallen below the switching threshold.</p>
A1	Illuminated red	Alarm threshold 1 (pre-alarm) for the appropriate sensor has been exceeded, relay output switched
A2	Illuminated red	Alarm threshold 2 (main alarm) for the appropriate sensor has been exceeded, relay output switched
A3	Illuminated red	Alarm threshold 2 (main alarm) of a sensor has been exceeded and the separate relay output for the horn is switched.



## Commissioning



Attention! Only switch the mains voltage on when all installation work has been completed and correct operation is assured.

- Switch the gas detection computer on (power supply).
- Check the settings of the GMC 8420. The settings are displayed in five steps. The display step is shown in the „Channel“ field, and the associated reading in the field „Concentration“:

Display step	Content
1	<u>Channel 1</u> 1.1 state (on / off) 1.2 measuring range 1.3 alarm threshold Alarm 1 1.4 alarm threshold Alarm 2
2	<u>Channel 2</u> 2.1 state (on / off) 2.2 measuring range 2.3 alarm threshold Alarm 1 2.4 alarm threshold Alarm 2
3	<u>Channel 3</u> 3.1 state (on / off) 3.2 measuring range 3.3 alarm threshold Alarm 1 3.4 alarm threshold Alarm 2
4	<u>Channel 4</u> 4.1 state (on / off) 4.2 measuring range 4.3 alarm threshold Alarm 1 4.4 alarm threshold Alarm 2
5	software version

- After 30 minutes warm-up time, check operation of the detector/evaluator combination with test gas. Proceed as described in the section Adjustment.

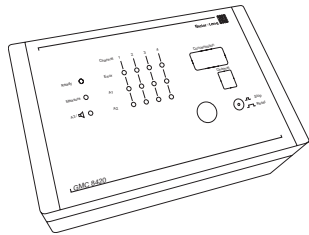
## General Instructions for Maintenance, Adjustment and Care of the Gas Detection Installation



- Never test the equipment using gas from a cigarette lighter or a spray can, combustible vapours from paint, or solvents.
- Have the equipment checked at least once a year by a specialist authorised by Bieler + Lang!
- Clean the device only externally using a damp cloth. Do not use cleaning agents!



**Parameterisation  
GMC 8420**



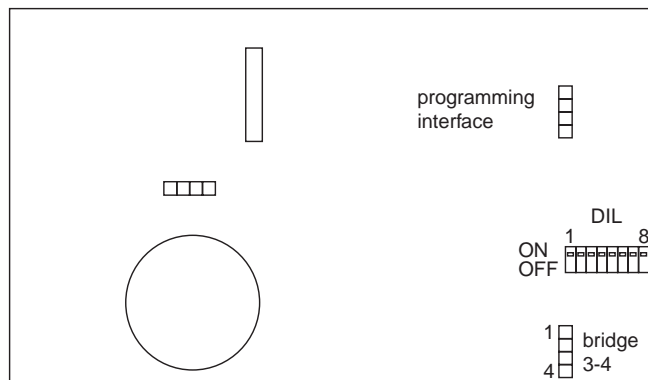
**Software,  
Setting Up a Connection**



Parameterisation of the device may only be carried out by a specialist authorised by Bieler + Lang.

In operation, the gas detection computer GMC 8420 can have a range of functions assigned to it. Configuration is by means of a terminal emulation.

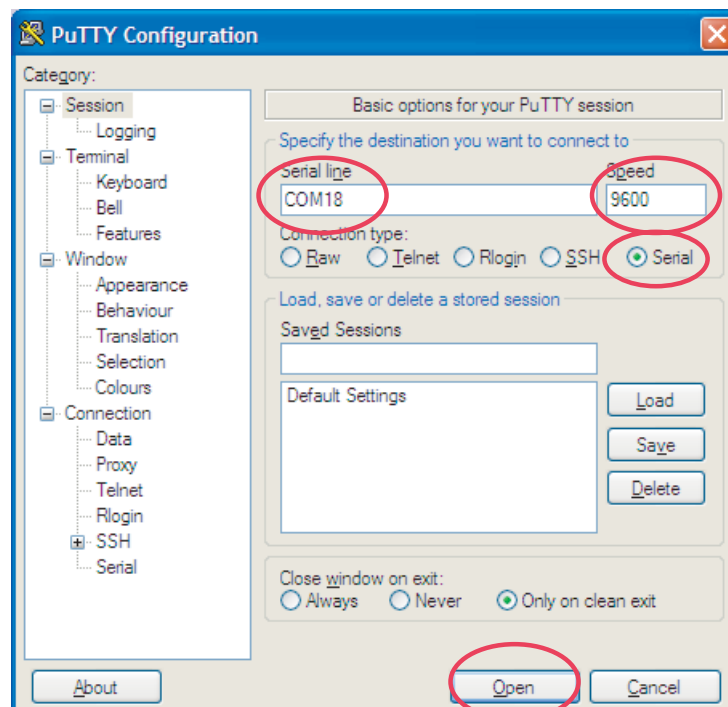
Use the optional USB data cable to connect your computer to the display unit („Program interface“ connection). When the data cable is connected for the first time, the operating system will request the driver supplied with the device, if necessary.



Start a terminal emulator (e.g. PuTTY, Hyperterminal).

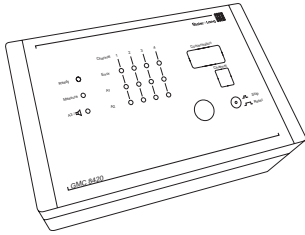
*Please note: PuTTY is a terminal emulator available as freeware on many download servers.*

In the field „Connection type“ select Serial. Enter the data transmission rate 9600 Baud in the Speed field and the connection number of the serial interface under „Serial line“.

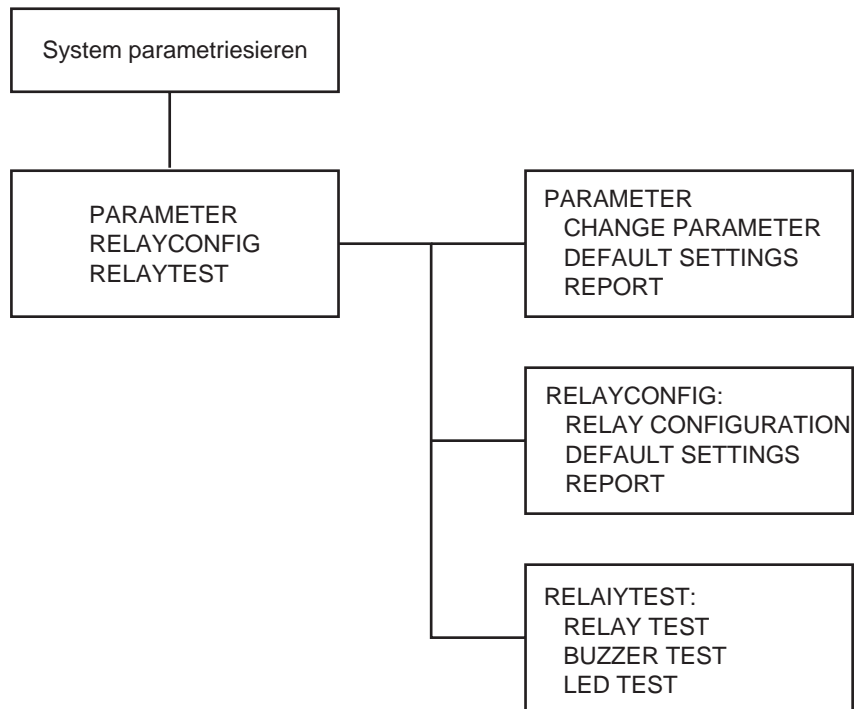




### Parameterisation GMC 8420



#### Main Menu



#### Selection of Parameterisation Selection of Measurement Mode

Before parameterisation, the device must exit normal measurement mode. To do this use a suitable tool to set DIL switch 1 to the position „ON“. To return to measurement mode, DIL switch 1 must be reset to „OFF“.

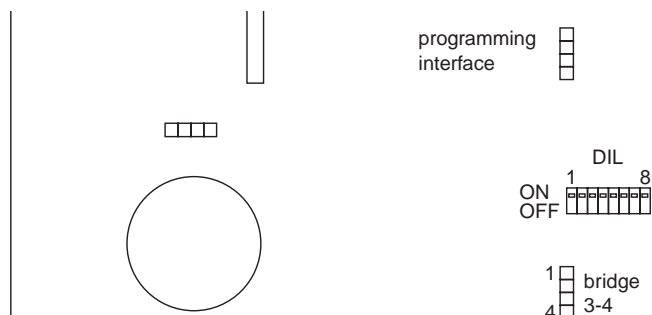


*Please note: during parameterisation the device does not monitor the gas concentration. This is indicated by a fault message.*

#### Main Menu Selections

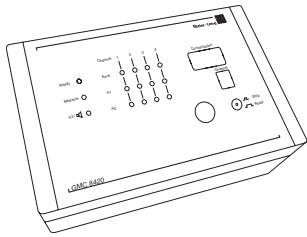
DIL switches 2-4 are used to call up the main functions:

DIL-switch				Function
1	2	3	4	
off	off	off	off	measuring mode
on	on	off	off	menu PARAMETER
on	off	on	off	menu RELAYCONFIG
on	off	off	on	menu RELAYTEST





## Parameterisation GMC 8420



The terminal emulation offers the following choices:

- 1) Change parameters
- 2) Default settings
- 3) Report

Select the function you require.

## PARAMETER Menu Changing Parameters

Number of the required channels (1 to 4)	
[1]=Channel_1 [2]=Channel_2 [3]=Channel_3 [4]=Channel_4 [5]=Horn [6]=Exit	Select the desired channel. Exit: back to main menu.

### Selection Channel {1, 2, 3, 4}

Channel_{1, 2, 3, 4}	
[1]=enable or [0]=disable	For service purposes a channel can be switched off (disable). The device signals this with a error message.

Display format of Channel_{1, 2, 3, 4}	
[1]=000 [2]=00.0 [3]=0.00	

Measuring range of Channel_{1, 2, 3, 4}	
---	--

Alarm_1 level of Channel_{1, 2, 3, 4}	
---------------------------------------	--

Alarm_1 of Channel_{1, 2, 3, 4}	
[1]=exceeding [0]=fall short	

Alarm_1 of Channel_{1, 2, 3, 4}	
[1]=latching [0]=non latching	

Alarm_2 level of Channel_{1, 2, 3, 4}	
---------------------------------------	--

Alarm_2 of Channel_{1, 2, 3, 4}	
[1]=exceeding [0]=fall short	

Alarm_2 of Channel_{1, 2, 3, 4}	
[1]=latching [0]=non latching	

Expanded zero-point of Channel_{1, 2, 3, 4}	
[1]=on [0]=off	Zero point catch (on/off). Measured values in the area of -5% to 2% are represented as a measured value "0"

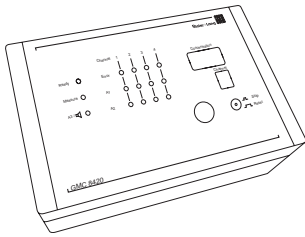
### Selection Horn

Horn it is activated by	
[1]=Alarm_1 [2]=Alarm_2	





## Parameterisation GMC 8420



### PARAMETER Menu Default settings

In the „Default settings“ menu, all device parameters can be overwritten with a standard configuration.

- 1) Load default settings
- 2) Exit

Select the function you require.

Standard settings:

measuring channels	4
parameter of each channel	Channel enable Display format 000 Measuring range 0 to 100 Alarm_1 level 020 exceeding non latching Alarm_2 level 040 exceeding latching Expanded zero off
horn	Horn activated by alarm_2

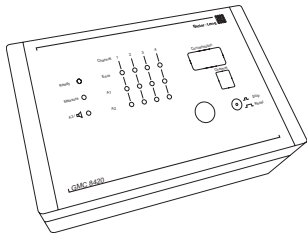
### PARAMETER Menu Report

This selection displays all parameters (example):

Manufacturer: Bieler + Lang GmbH, D-77855 Achern	
Type: GMC 8420	Software version: 1.0
Channel_1 : enable Display format : 000 Measuring range : 0 to 100 Alarm_1 level : 020; exceeding; non latching; Alarm_2 level : 040; exceeding; latching; Expanded zero : off	
Channel_2 : enable Display format : 000 Measuring range : 0 to 100 Alarm_1 level : 020; exceeding; non latching; Alarm_2 level : 040; exceeding; latching; Expanded zero : off	
Channel_1 Alarm_1 = Rel_1 ; Channel_2 Alarm_1 = Rel_1 ;	
Channel_1 Alarm_2 = Rel_2 ;Rel_4 ; Channel_2 Alarm_2 = Rel_2 ;Rel_5 ;	
Horn activated by alarm_2	
Horn	= Rel_3 ;



## Parameterisation GMC 8420



### RELAYCONFIG Menu Change relay configuration

The terminal emulation offers the following choices:

- 1) Change relay configuration
- 2) Default settings
- 3) Report

Select the function you require.

Relay of Channel_{1,2,3,4} Alarm_1 [1]=activate [0]=deactivate [return]=next	Control relay by alarm 1 of measuring feeler {1,2,3,4} - activated - deactivated
Relay of Channel_{1,2,3,4} Alarm_1 activate [1]=Rel_1 [2]=Rel_2 [3]=Rel_3 [4]=Rel_4 [5]=Rel_5 [6]=Rel_6 [7]=Rel_7 Esc finishes the input	Alarm 1 of channel {1,2,3,4} activates - relay 1 - relay 2 - relay 3 - relay 4 - relay 5 - relay 6 - relay 7
Relay of Channel_{1,2,3,4} Alarm_2 [1]=activate [0]=deactivate [return]=next	Control relay by alarm 2 of measuring feeler {1,2,3,4} - activated - deactivated
Relay of Channel_{1,2,3,4} Alarm_2 activate [1]=Rel_1 [2]=Rel_2 [3]=Rel_3 [4]=Rel_4 [5]=Rel_5 [6]=Rel_6 [7]=Rel_7 Esc finishes the input	Alarm 2 of channel {1,2,3,4} activates - relay 1 - relay 2 - relay 3 - relay 4 - relay 5 - relay 6 - relay 7
.....	
Relay of Horn [1]=activate [0]=deactivate [return]=End	Control relay by horn - activated - deactivated
Relay of Horn activate [1]=Rel_1 [2]=Rel_2 [3]=Rel_3 [4]=Rel_4 [5]=Rel_5 [6]=Rel_6 [7]=Rel_7 Esc finishes the input	- relay 1 - relay 2 - relay 3 - relay 4 - relay 5 - relay 6 - relay 7

**Note 1:**

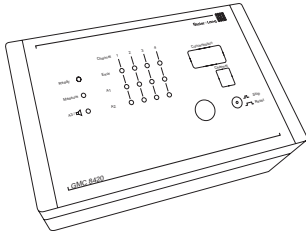
**An alarm threshold can be assigned to several relays.**

**Note 2:**

**Relays 4-7 are implemented as DC switches. Using the optional relay extension RK 8420, relays 4-7 are available in addition for connecting signalling devices**



## Parameterisation GMC 8420



### RELAYCONFIG Menu Default settings

In the „Default settings“ menu, all device parameters can be overwritten with a standard configuration.

- 1) Load default settings
- 2) Exit

Select the function you require.

Standard settings:

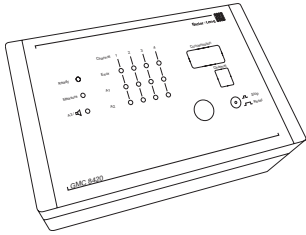
Channel_1 Alarm_1	Rel_1
Channel_2 Alarm_1	Rel_1
Channel_3 Alarm_1	Rel_1
Channel_4 Alarm_1	Rel_1
Channel_1 Alarm_2	Rel_2 + Rel_4
Channel_2 Alarm_2	Rel_2 + Rel_5
Channel_3 Alarm_2	Rel_2 + Rel_6
Channel_4 Alarm_2	Rel_2 + Rel_7
Horn	Rel_3

### Menü RELAYCONFIG Report

This selection displays all parameters (example):

Manufacturer: Bieler + Lang GmbH, D-77855 Achern	
Type: GMC 8420	Softwareversion: 1.0
Channel_1 : enable	
Display format : 000	
Measuring range : 0 to 100	
Alarm_1 level : 020; exceeding; non latching;	
Alarm_2 level : 040; exceeding; latching;	
Expanded zero : off	
Channel_2 : enable	
Display format : 000	
Measuring range : 0 to 100	
Alarm_1 level : 020; exceeding; non latching;	
Alarm_2 level : 040; exceeding; latching;	
Expanded zero : off	
Channel_1 Alarm_1 = Rel_1 ;	
Channel_2 Alarm_1 = Rel_1 ;	
Channel_1 Alarm_2 = Rel_2 ;Rel_4 ;	
Channel_2 Alarm_2 = Rel_2 ;Rel_5 ;	
Horn activated by alarm_2	
Horn	= Rel_3 ;

## Parameterisation GMC 8420



The terminal emulation offers the following choices:

- 1) Relay test
- 2) Buzzer test
- 3) LED test

Select the function you require.

### RELAYTEST Menu Relay Test

In the „Relay test“ menu, the output relays can be switched manually for a function test without applying test gas.

Select the relay you require:

- |              |                         |
|--------------|-------------------------|
| (1) Rel_1_on | Switches relay 1 on     |
| (2) Rel_2_on | Switches relay 2 on     |
| (3) Rel_3_on | Switches relay 3 on     |
| (4) Rel_4_on | Switches relay 4 on     |
| (5) Rel_5_on | Switches relay 5 on     |
| (6) Rel_6_on | Switches relay 6 on     |
| (7) Rel_7_on | Switches relay 7 on     |
| (0) Rel_off  | Switches all relays off |
| (ESC)        | Ends relay test         |

### RELAYTEST Menu Buzzer Test

In the „Buzzer test“ menu, you can test the built-in alarm buzzer .

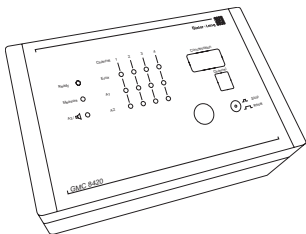
- |                |                     |
|----------------|---------------------|
| (1) Buzzer_on  | Switches buzzer on  |
| (0) Buzzer_off | Switches buzzer off |
| (ESC)          | Ends buzzer test    |

### RELAYTEST Menu LED Test

In the „LED test“ menu, you can test all the visual displays.

- |             |                                  |
|-------------|----------------------------------|
| (1) LED_on  | Switches all visual displays on  |
| (0) LED_off | Switches all visual displays off |
| (ESC)       | Ends test of visual displays     |

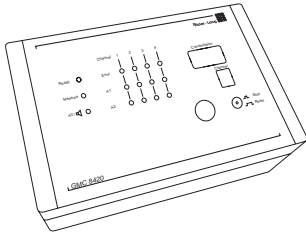
## Checking Parameterisation GMC 8420



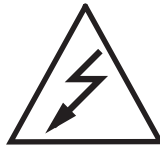
On completion of parameterisation, the plausibility of programming must be checked by carrying out a functional test.



#### Overview of Fault Messages GMC 8420



Message	Cause	Possible cause
LED Ready: off	missing power supply	faulty connected fuse  in case of connected emergency power supply: - faulty fuse F5 - Battery is unloaded
LED Error: on	incorrect sensor signal	measurement < -6 % of measuring range measurement > 106 % measuring range wire break on the feeler connection short circuit on the feeler connection faulty fuse F1 - F4

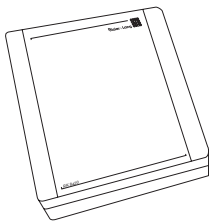
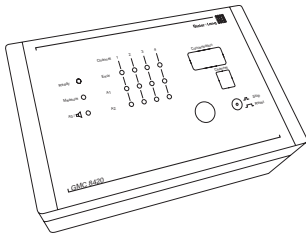


Attention! Repairs may only be carried out by a qualified electrician.



After a repair, the complete gas warning system must be checked. This should be carried out as described in the section „Commissioning“.

#### Spare Parts



- **GMC 8420:**
  - Fuses F1 - F4, F6  
100 mA, Type TR5-T  
Order No. TN 12.070969
  - Fuse F5  
1 AT, Type TR5-T  
Order No. TN 12.070438



Attention! Repairs may only be carried out by a qualified electrician.



After a repair, the complete gas warning system must be checked. This should be carried out as described in the section „Commissioning“.

#### Cleaning

Clean the device only externally using a damp cloth.  
Do not use cleaning agents!

**Accessories**

- Connection cable (USB) GMC 8420
  - Warning lamps, illuminated warning signs
  - Signal horns
- 

**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**  
**Gasmess- und Warnsysteme**

Postfach 1129, 77842 Achern  
Oberkirchstr. 19-21, 77855 Achern

Telefon +49 (0) 78 41 69 37 - 0  
Telefax +49 (0) 78 41 69 37 - 99  
e-Mail [info@bieler-lang.de](mailto:info@bieler-lang.de)

Internet: [www.bieler-lang.de](http://www.bieler-lang.de)

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