



GAS SENSE

Invest Electronics LTD



GA-220.L.06

Gas Controller

mount • settings • operation • maintenance



mount and exploitation manual (version 1.0/October 2007)
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GA-220.L.06 CONTENTS

1. Introduction	4
1.1. Safety instructions	4
1.2. Specifications	5
1.3. Certificates and standards	5
2. Product review	6
2.1. General review	6
2.2. Typical application	7
2.3. Control buttons	7
2.4. LED indication	7
3. Mount	8
3.1. Introduction	8
3.2. Transportation and storage	8
3.3. Prior to mount	8
3.4. Dimensions	9
3.5. Mechanical installation	10
3.6. Electrical installation	11
3.6.1. Connecting power cables	12
3.6.2. Connecting gas sensors	12
3.6.3. Connecting output relays	13
4. Settings	14
4.1. Initial start up	14
4.2. Functional check up	14
4.3. Sound signalization	14
5. Operation	15
5.1. Operation modes	15
5.1.1. Normal operation mode	15
5.1.2. Danger mode	15
5.1.3. Alarm mode	16
5.1.4. Fault sensor mode	16
5.1.5. Test mode	17
5.1.6. Reset mode	17

6. Maintenance	18
6.1. Diagnostics and frequent problems	18
6.2. Preventive maintenance	18
7. Customer support	19
7.1. Contact information	19
7.2. Warranty	19
7.3. Order codification	20
APPENDIX A – abbreviations	21

CHAPTER

1

INTRODUCTION

1.1. Safety instructions

Before using the unit read carefully this chapter. It consists important information for customer safety and correct system exploitation.



The gas detection system is designed for use in a potentially combustible or toxic environment. The long lasting exposure to high concentrations may lead to death.

Electrical installation:

- ✓ Electrical connections must be done only by licensed electrical installer.
- ✓ Make sure that prior to connection, all electrical pins ARE NOT energized
- ✓ All electrical connections must be done according to unit's normative requirements
- ✓ Prior to switching on the unit make sure that the voltage of the power supply corresponds to manufacturer requirements.

Exploitations in potentially combustible environments:

- ✓ The gas controller is to be used only in working environments for which it has certification.
- ✓ In case of mechanical damages of the gas controller's corpus, the unit becomes non-effective for exploitation in potentially combustible environments.
- ✓ For dismounting first switch off the power supply and after no less than 10 minutes start dismounting.

1.2. Specifications

Parameters	Value
Dimensions	144 x 72 x 162 mm
Controlled lines	6
Safety	Intrinsically safe lines
Signalization levels	2
Maintained sensors	for combustible and toxic gases <ul style="list-style-type: none"> • GS-220 series • GS-ADR series
Light Indication	LED
Relay outputs	<ul style="list-style-type: none"> • 6 danger relay • 1 alarm relay • 1 fault relay <p><i>all relay outputs have normally opened and normally closed contact with capacity 5A / 230VAC</i></p>
Electrical supply	Power supply: 220 VAC / 50Hz Accumulator: 12 VDC 30 Ah
Power consumption	18 W
Weight	1,2 kg
Operating temperature	-20 ÷ 50°C
Humidity	30 ÷ 95 % RH (non condensing)
Other	Sound signalization (turn off option)

Table 1.1 – specifications

1.3. Certificates and standards

Gas controller GA-220.L.06 is certified according to all requirements of Directive 94/9/EC (ATEX) and has marking

 II 2G EEx Ia IIC T5

CHAPTER
2

PRODUCT REVIEW

2.1. General review

GA-220.L.06 gas controller is part of a gas detection system. It is designed and produced according to European standards and provide safety. The controller is designed to operate with 6 gas sensors, installed inside the controlled area (potentially combustible). The actual controller is mounted in a panel outside the controlled (potentially combustible) area. The communication is performed via four core line. A microcontroller constantly scans line data and activates relative indication and remote devices.



The gas controller is mounted outside the potentially combustible area.

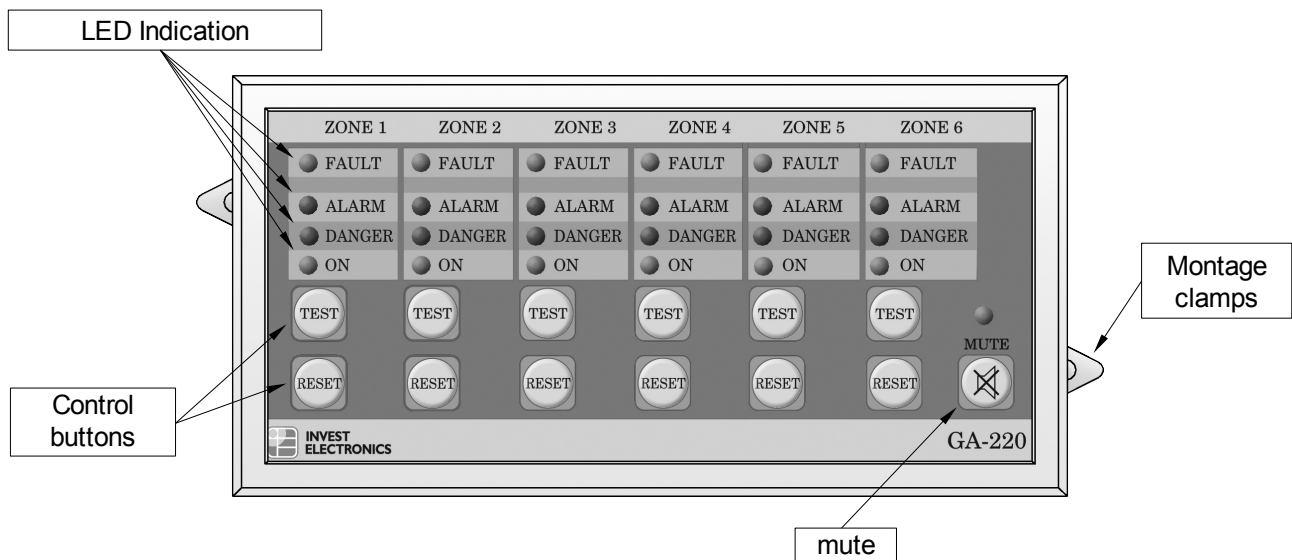


Figure 2.1. – general view

2.2. Typical applications

Gas controller GA-220 is designed for gas control of combustible and toxic gases in industrial environments. Few of its typical applications are:

- ✓ underground parking garages
- ✓ boiler premises
- ✓ natural gas stations, petrol stations
- ✓ manufactures with toxic gases emissions
- ✓ laboratories

2.3. Control buttons

Gas detection system GA-220 has 2 functional buttons for each zone for testing and switching off (for short period of time):

- ✓ **TEST** – activate light and relay signalization of the corresponding zone
- ✓ **RESET** – deactivate relay outputs of the corresponding zone for 2 minutes

2.4. LED indications

GA-220.L.06 gas controller has 24 light-emitting diodes (6 columns with 4 diodes), situated on the front panel.

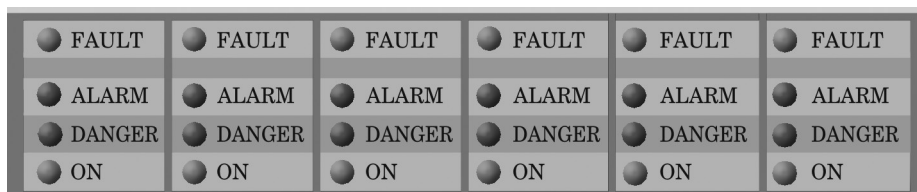


Figure 2.2 – LED indication

LED description:

- ✓ **ON** (green LED) – lights up for normal operation mode of the corresponding zone
- ✓ **DANGER** (red LED) – lights up for excess of danger level gas concentration in the corresponding line sensors
- ✓ **ALARM** (red LED) - lights up for excess of alarm level gas concentration in the corresponding line sensors
- ✓ **FAULT** (yellow LED) – lights up for problem in the corresponding line (Ex.: broken conductor, defective sensor, etc.)

CHAPTER

3

MOUNT

3.1. Introduction



Warning: gas controller must be mounted only by licensed technician, familiar with this document or authorized by the manufacturer.

Gas controller GA-220 is designed for panel mount. It uses power supply of ~220V/50Hz and accumulator supply of 12 VDC. The controller communicates and maintains up to 5 GS-220 series gas sensors.

3.2. Transportation and storage

During transportation of gas detection system GA-220 specific measures for minimum vibration and shaking of the unit must be taken. The unit must be transported only in its original packaging.

Gas controller could be stored indoors with temperature from -20°C to +70°C and humidity from 10% to 95%. The unit must not be exposed on direct sun light.



Warning: the storage period of the gas controller does not affect its work efficiency, but the life of the electrochemical gas sensors expires and their sensitivity towards the gas decreases with time regardless the fact that they may not be installed!

3.3. Prior to mount

Before mounting the unit, make sure that:

- ✓ You are familiar with the safety instructions
- ✓ You are familiar with the mount instructions (this manual)
- ✓ You have all parts of the delivery. In case any of the parts is missing contact your supplier or Invest Electronics Ltd., contacts are listed in Chapter 7, part 7.1.
- ✓ You have all necessary tools

3.4. Dimensions



Note: all dimensions are given in millimeters – mm

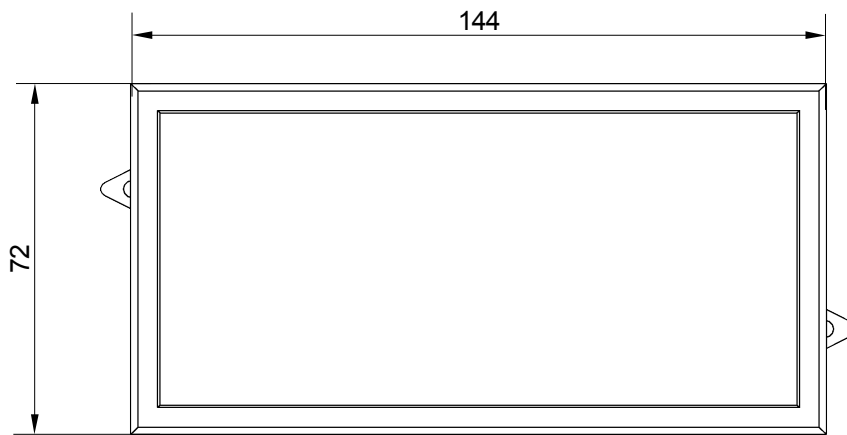


Figure 3.1 – Dimensions – front view



Figure 3.2 – Dimensions – side view

3.5. Mechanical mount

The controller is mounted on panel with previously cut mount orifice. For attachment use two montage clamps.

Mechanical mount stages:

- 1) drill a 134x68mm orifice on the panel

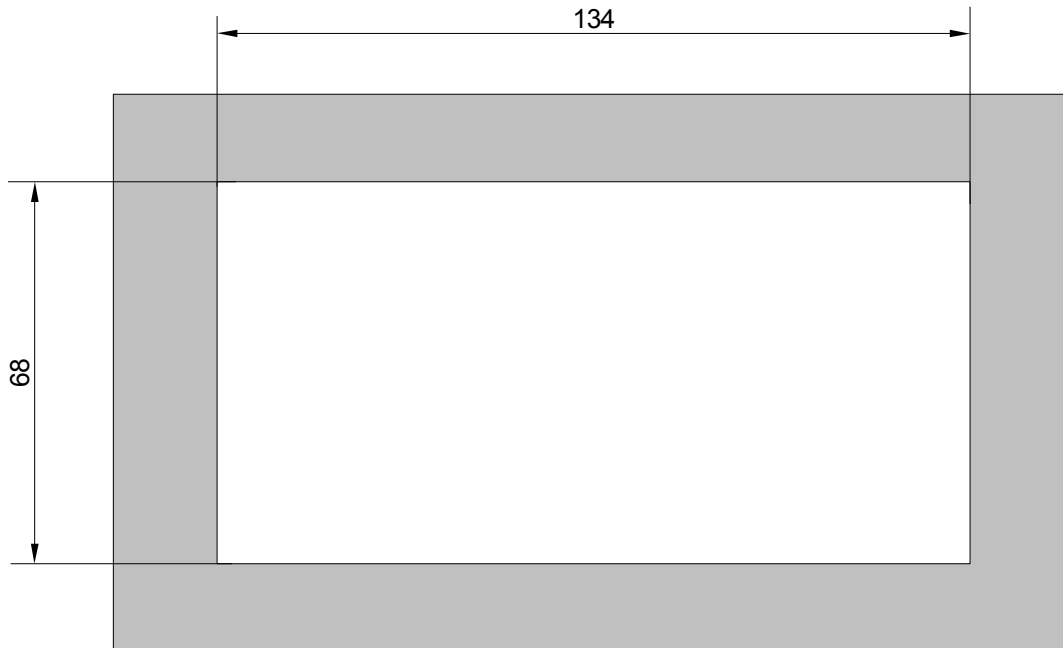


figure 3.3 – controller's attachment orifice

- 2) remove montage clamps from the controller
- 3) place the gas controller inside the orifice

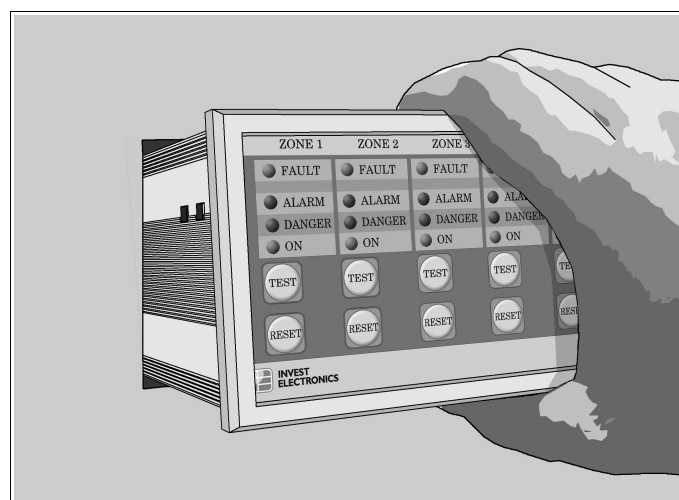


figure 3.4 – place controller in the orifice

4) insert and tighten the montage clamps

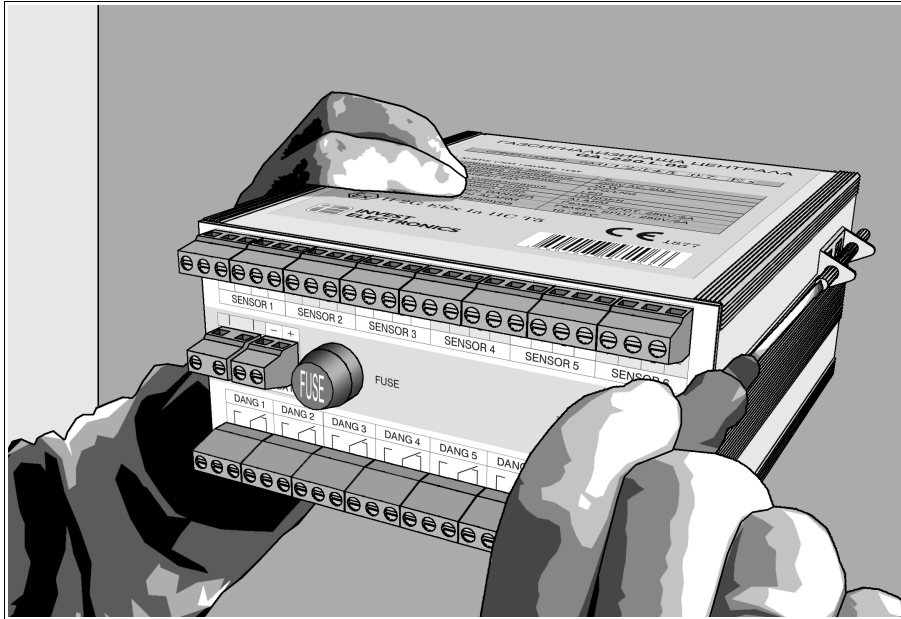


figure 3.5 – tighten the montage clamps

5) proceed to electrical mount

3.6. Electrical installation

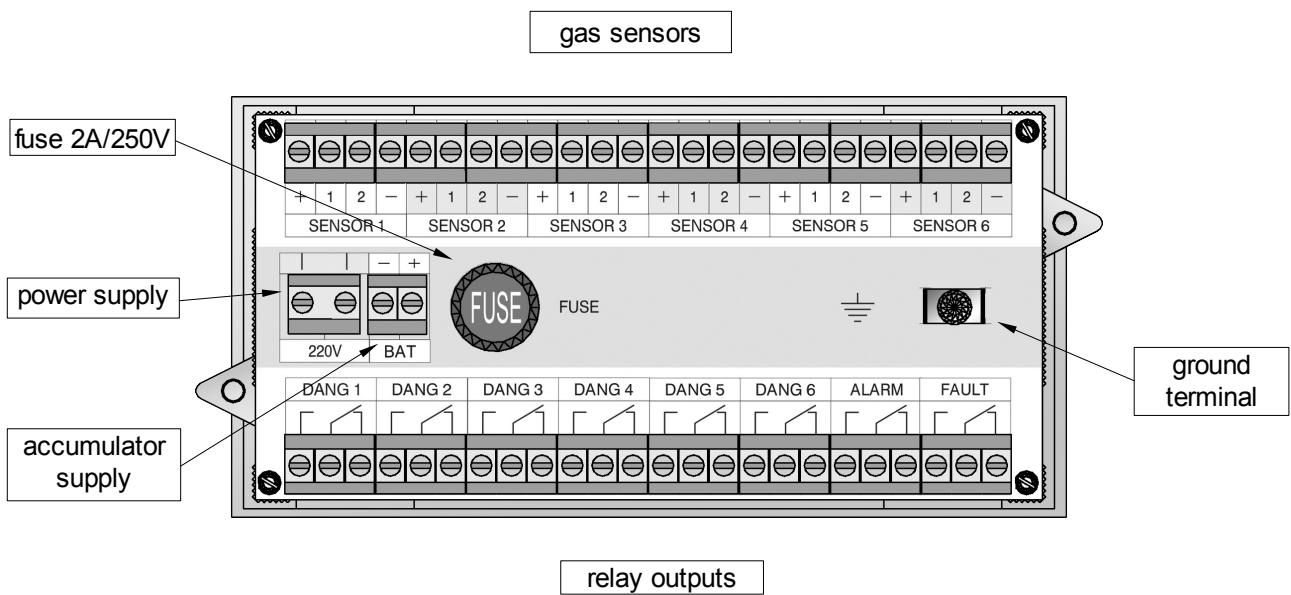


figure 3.6 – electrical mount

3.6.1. Connecting power cables

Gas detection system is powered by two power supply sources. All Connection terminals are situated on the back panel (fig. 3.6)

1. Power supply ~220V/50Hz connected to terminal „220V“
2. Accumulator supply 12 VDC connected to terminal „BAT“
3. Connect grounded conductor to ground terminal



Warning: connect correctly the accumulator (keep the polarity)

During power supply mode the system automatically charges the accumulator.



Accumulator supply is designed for emergency events and could provide power supply of the controller for up to 24 hours (depending on controller's loading and accumulator capacity of 30Ah). When battery fully runs down it must be manually recharged with external charging device.

3.6.2. Connecting gas sensors

Gas detection system GA-220.L.06 is designed to operate with Invest Electronics Ltd GS-220 series gas sensors. Sensors are connected via four core line. The recommended connecting conductor's section according to line length is as follows:

<i>Length</i>	<i>Section</i>
up to 100m	4 x 0,5 mm ²
up to 200 m	4 x 0,75 mm ²
from 200m to 300m	4 x 1 mm ²

Table 3.1 – length and section of the connecting conductors

The input terminals for the sensor are situated on the back panel of the GA-220.L.06 gas controller, marked as “SENSOR1” to “SENSOR6” (figure 3.6). To the gas controller could be connected up to 3 sensors.

During connecting controller ↔ sensor, corresponding terminals of both devices are connected.

- ✓ „+“ ↔ „+“
- ✓ „1“ ↔ „1“
- ✓ „2“ ↔ „2“
- ✓ „-“ ↔ „-“

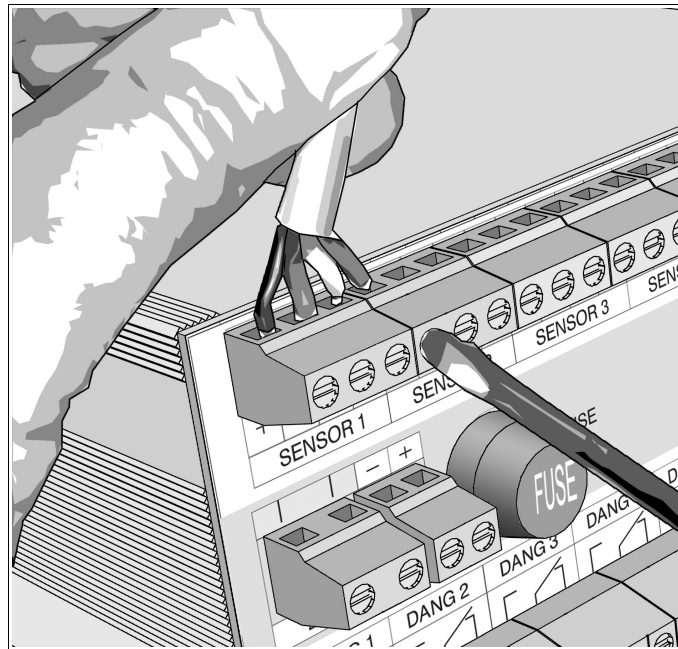


figure 3.7 – connecting conductor to sensor



Warning: connect controller only when its not energized. Even the slightest touch of conductors one to another when the unit is energized could lead to operation damage of the whole system.

3.6.3. Connecting output relays

Gas detection system GA-220.L.06 has 8 relays situated on the back panel. Every relay has normally open and normally closed switch with 5A/220VAC or 10A/24 VDC capacity.

Relay outputs description:

- ✓ 6 danger relay (marked **DANG1** to **DANG6**), which are activated when danger (DANGER) level in the corresponding line is reached.
- ✓ 1 alarm relay (marked **ALARM**) – activated when alarm level in any of the zones is reached.
- ✓ 1 fault relay (marked **FAULT**) – activated when there is line fault (broken line)

CHAPTER

4

SETTINGS

4.1. Initial start up

Prior to the initial start up of the controller check if :

- ✓ power supply is in the permitted levels of ~220V ±10%/ 50Hz
- ✓ the accumulator is correctly connected (polarity)
- ✓ gas sensors are connected according part 3.6.2.

When switched on the device activates green LEDs. If this does not happen check connections, power conductors and/or fuse.

4.2. Functional check up

For gas controller GA-220 functional test use TEST button, situated under LED indication of each zone. After pushing the button observe the following:

- ✓ all LED of the corresponding line get activated
- ✓ danger relay DANG of the corresponding line is activated
- ✓ alarm relay ALARM is activated

4.3. Sound signalization

GA-220.L.06 gas controller has build in differentiated sound signalization. It could be deactivated by MUTE button on the front panel. For blocked sound signalization the yellow LED – MUTE – lights up.

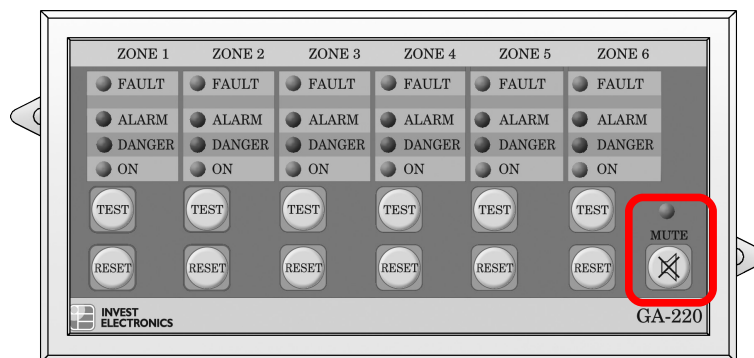


Figure 4.1. – blocking sound signalization

CHAPTER 5 OPERATION

5.1. Operating modes

Gas controller GA-220.L.06 has 6 input lines with connected gas sensor to each one of them. This chapter describes all operating modes of GA-220.L.06. All light and relay signals that are generated in each operating mode are described.

5.1.1. Normal operating mode

This is the condition where no problems and alarm events of the specific zone are detected.

Characteristics and output levels of Normal operation mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – does not light • ALARM – does not light • DANGER – does not light • ON – lights
Relay outputs	<ul style="list-style-type: none"> • DANGER – inactive • ALARM – inactive • FAULT – inactive
Sound signalization	Turned off

Table 5.1. – characteristics of normal operating mode

5.1.2. Danger mode

This is a mode where the measured gas concentrations in the specific zone are between danger level (DANGER) and alarm level (ALARM).

Characteristics and output levels of danger mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – does not light • ALARM – does not light • DANGER – lights • ON – lights
Relay outputs	<ul style="list-style-type: none"> • DANGER – active • ALARM – inactive • FAULT – inactive
Sound signalization	Turned on (turn off option – 4.2.)

Table 5.2. – characteristics of danger mode

5.1.3. Alarm mode

This is a mode where the measured gas concentrations in the specific zone are above alarm level (ALARM).

Characteristics and output levels of alarm mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – does not light • ALARM – lights • DANGER – lights • ON – lights
Relay outputs	<ul style="list-style-type: none"> • DANGER – active • ALARM – active • FAULT – inactive
Sound signalization	Turned on (turn off option – 4.2.)

Table 5.3. – characteristics of alarm mode

5.1.4. Fault mode

This is a mode when there is a broken communication line with the sensor or there is no gas sensor in the zone.

Characteristics and output levels of fault mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – lights • ALARM – does not light • DANGER – does not light • ON – blinks
Relay outputs	<ul style="list-style-type: none"> • DANGER – inactive • ALARM – inactive • FAULT – active
Sound signalization	Turned off

Table 5.4. – characteristics of fault mode

5.1.5. TEST mode

This mode is activated when TEST button is pushed. The mode is used for check up of the functionality of the relay outputs and light indication. The zone stays in this mode until the TEST button is released.

Characteristics and output levels of test mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – lights • ALARM – lights • DANGER – lights • ON – blinks
Relay outputs	<ul style="list-style-type: none"> • DANGER – active • ALARM – active • FAULT – active
Sound signalization	Turned on (turn off option – 4.2.)

Table 5.5. – characteristics of test mode

5.1.6. Reset mode

This mode is activated when the RESET button is pushed. It is used to temporary (two minutes) deactivate the relay outputs. To exit Reset mode use TEST button.

Characteristics and output levels of reset mode:

<i>Characteristic</i>	<i>Value</i>
LED indication	<ul style="list-style-type: none"> • FAULT – does not light • ALARM – does not light • DANGER – does not light • ON – blinks
Relay outputs	<ul style="list-style-type: none"> • DANGER – inactive • ALARM – inactive • FAULT – inactive
Sound signalization	Turned off
Other	Duration: 2 minutes

Table 5.6. – characteristics of reset mode

CHAPTER 6 MAINTENANCE

6.1. Diagnostics and frequent problems

<i>Symptom</i>	<i>Problem</i>	<i>Solution</i>
Green LED does not lighten after starting the system	No power supply	Check connection cables
Loss of voltage in a line	Defective Intrinsically safe line	Change of Intrinsically safe line is necessary. Contact the manufacturer.

Table 6.1 – frequent problems

6.2. Preventive maintenance

The gas detection system, part of which is GA-220.L.06 gas controller, must be an object of preventive maintenance and adjustment (of gas sensors) every 6 months.



During preventive maintenance the controller activates the relay outputs and all remote devices should be disconnected manually !

To test the actual GA-220 controller use TEST button – chapter 5.1.5.

CHAPTER

7

CUSTOMER SUPPORT

7.1. Contact information

INVEST ELECTRONICS LTD.

145 Brezovsko shose street
Plovdiv 4003 Bulgaria

Tel. + 359-32-960143

Fax: + 359-32-960144

e-mail: info@investelectronics.com

web: <http://www.gassense.eu>

7.2. Warranty

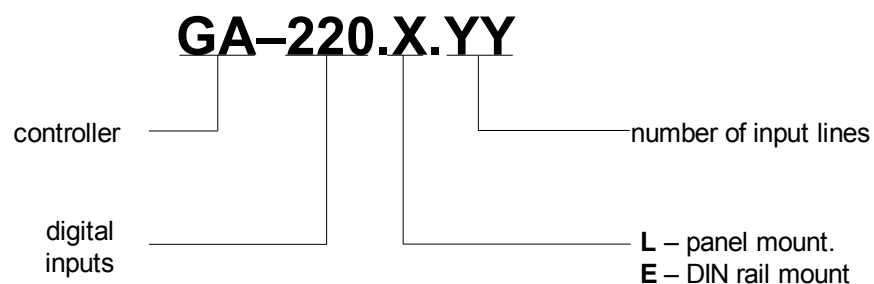
- ✓ Warranty period is 12 months, but not more than 18 months from date of warranty issuing
- ✓ Warranty applies for defects, due to exploitation during the warranty period, because of non quality materials or bad production. Such defects are managed free of charge in the manufacturer production area.
- ✓ The warranty is accepted only with correctly in clear hand writing warranty document. The warranty must contain signatures of the vendor and vendee and the date of purchasing.

Free of charge warranty maintenance could be refused in the following situations:

- ✓ Discrepancy between information in the document and the actual product or when the serial number marking is removed or switched.
- ✓ The requirements for storage, mount or exploitation are not obeyed
- ✓ For any repairs made by unauthorized individuals or when warranty sticker or seal is damaged
- ✓ Damages due to vibrations, mechanic faults, hitting, or overloading on poor management account.
- ✓ Damages due to natural disasters – lightning, inundation, power stroke, fires and other force majeure circumstances.

The warranty does not cover: batteries, adapters and other consumables. This warranty does not apply to cosmetic damages on the outside of the corpus, as well as normally wear of mechanical and electrochemical components, due to normal operation. The manufacturer does not have any responsibility for loss or gain or afterwards losses. This warranty is addition and does not restrict consumer rights according to Bulgarian law.

7.3. Purchase code



APPENDIX

A

ABBREVIATIONS

Abbreviation	Meaning
A	Ampere
AC	Alternating Current
ACC	Accumulator
ATEX	Atmospheres Explosibles – European directive for devices operating in combustible environment
BAT	Battery
C	Common / common relay output
CE	The product confirm with all European directives
DC	Direct Current
g	Gram
Hz	Hertz
IP	Ingress Protection
LCD	Liquid crystal display
LED	Light Emitting Diode
LEL	Lower Explosive Limit
LNG	Liquefied Natural Gas
LPG	Propane butane
kg	kilogram
mA	Milliampere (1/1000 from the ampere)
mm	Millimeter
NC	Normally Closed relay output
NO	Normally Open relay output
ppm	Parts per million
RH	Relative Humidity
V	Volts
VAC	Volts Alternating Current
VDC	Volts Direct Current