GAS SENSE — GAS DETECTION SYSTEMS

GA-220.EI.01-04
GAS CONTROLLER

Operation Manual

Revision: A.2

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General Information

This manual is designed to provide users with simple and precise information. Manufacturer shall not be held responsible or liable for any misinterpretation that may result from the reading of this manual. Although every effort is made to ensure accuracy, this manual may contain unintentional technical inaccuracies.

Please read the following notice carefully before installation and start-up, paying particular attention to the end - user safety instructions. This user's guide should be distributed to every individual involved in the start-up, use, maintenance or repair of the product. The information contained in this manual, the data and technical drawings are correct as of the date of publication. Should questions arise, please contact Invest Electronics Ltd for additional information.

Manufacturer reserves the right to modify the technical characteristics of its equipment without notice to improve product performance. This user manual and its contents are the inalienable property of Invest Electronics Ltd

Safety Warnings

Installation and electric connections should be performed by a qualified professional, according to Manufacturer's specifications and to the standards of authorities in the field. Failure to observe these rules may result in serious injury. Accuracy, particularly regarding electricity and assembly (couplings, network connections) is imperative.

Icons have been placed on the sensor to call attention to general use safety precautions. These labels are an integral component of the sensor. The meanings of these labels are described below.

Symbols

Please refer to the instructions.

Caution: In the current operating mode, failure to adhere to the instructions preceding this symbol can result in a risk of electric shock or death.

This equipment must be grounded

Safety grounding terminal. A cable of adequate diameter must ground any terminal with this signal.

The accordance with Directive DEEE (2002/96/EC) this product may not be disposed with household waste. Dispose of this product at a collection site intended for electrical waste.

Important Information

The modification of any component or the use of any third party components will automatically void any and all guarantees. The central controller is intended to be used for precise applications of a technical nature. Exceeding the indicated values is strictly prohibited.

Limitation of liability

Neither Invest Electronics Ltd nor any other affiliated organization shall be held liable under any circumstances for any damage whatsoever including, without limitations, damages for loss of production, interruption of production, loss of information, controller failure, personal injury, loss of time, money, or materials, or for any indirect or consecutive consequence of loss occurring during the use of the product or the inability to use the product, even in the event that Invest Electronics Ltd had been informed of such damages.

Warranty

We hereby guarantee that gas detection controllers GA-220 have been manufactured and tested to the highest quality standards.

We warrant above products to be free from materials and work defects for the period of 24 months from the date of purchase. If such defects appears during the warrantee period products will be repaired or replaced with new products without charge.

Technical specifications

The GA-220.EI.01-04 gas controller is intended for installation on the DIN rail. The controller can be connected to combustible or toxic gas detectors, or oxygen detectors. The measured gas concentration are compared to the measurement from the detector is displayed on the alarm thresholds. In the event that the

measurement exceeds the threshold, the controller activates the relays which can control external components.

Tabl. Technical specification

Controller Model	GA-220.EI.01	GA-220.EI.02	GA-220.EI.03	GA-220.EI.04
INPUTS				
Number of inputs	1	2	3	4
Input signal	RS485	RS485	RS485	RS485
POWER SUPPLY				
Main power supply	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz	230VAC-50Hz
Back-up power supply	12VDC	12VDC	12VDC	12VDC
Power consumption	Max 4W	Max 5W	Max 9W	Max 10W
ALARMS				
Alarms	Alarm,1 Alarm2, FAULT	Alarm,1 Alarm2, FAULT	Alarm,1 Alarm2, FAULT	Alarm,1 Alarm2, FAULT
Alarming	LED, Internal buzzer	LED, Internal buzzer	LED, Internal buzzer	LED, Internal buzzer
Output relays	3 pcs 250V/2A	4 pcs 250V/2A	5 pcs 250V/2A	6 pcs 250V/2A
ENVIRONMENTAL				
Working temperature	-20 - +50ºC	-20 - +50ºC	-20 - +50ºC	-20 - +50ºC
Humidity	0 – 95% RH	0 – 95% RH	0 – 95% RH	0 – 95% RH
MECHANICAL				
Sizes	126 x 92 x 58mm	126 x 92 x 58mm	126 x 92 x 58mm	126 x 92 x 58mm
Weight	0,350kg	0,375kg	0,395kg	0,420kg
Enclosure material	ABS	ABS	ABS	ABS
Mounting method	On a DIN rail	On a DIN rail	On a DIN rail	On a DIN rail
CERTIFICATION				
Conformity mark	CE	CE	CE	CE
ATEX certification	Ex 2 II G Ex ia IIC T5	Ex 2 II G Ex ia IIC T5	Ex 2 II G Ex ia IIC T5	Ex 2 II G Ex ia IIC T5
SENSOR CONNECTION				
Sensors	GS-220.B.V	GS-220.B.V	GS-220.B.V	
Wire lenght	500m in 4x1.00mm^2	500m in 4x1.00mm^2	500m in 4x1.00mm^2	500m in 4x1.00mm^2

Front panel view

Front panel view of GA-220.EI.01 – 1 channel gas controller
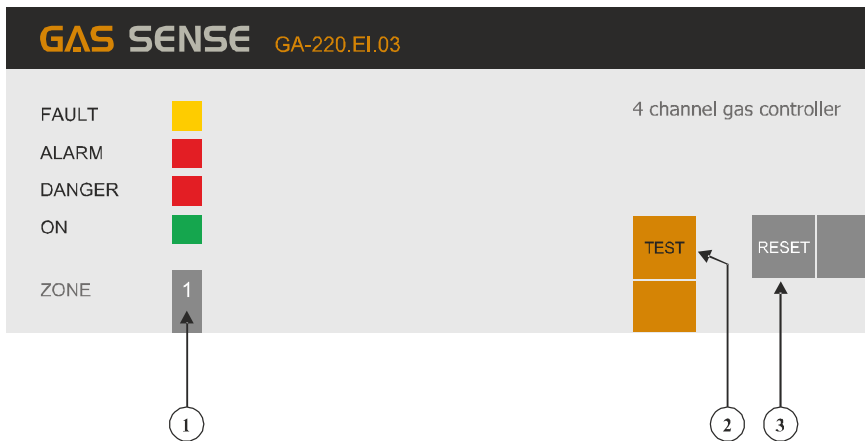
(1)LED indication for Channel 1

(2)TEST butone

(3)RESET butone

Front panel view of GA-220.EI.02 – 2 channel gas controller
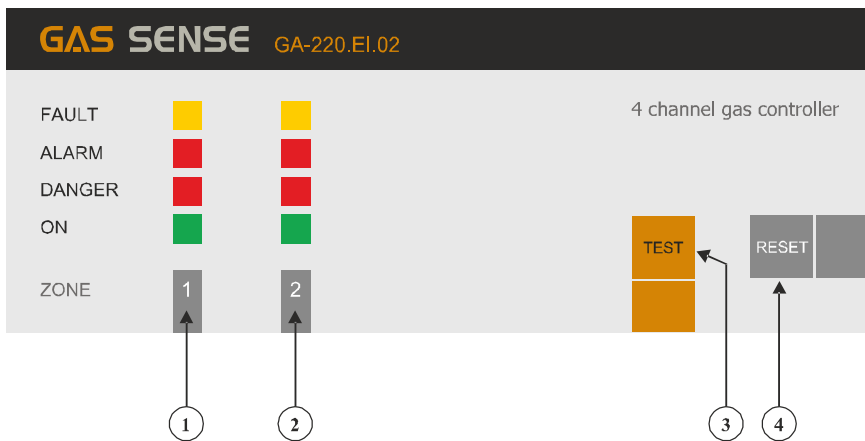
(1)LED indication for Channel 1

(2)LED indication for Channel 2

(3)TEST butone

(4)RESET butone

Front panel view of GA-220.EI.03 – 3 channel gas controller

(1)LED indication for Channel 1

(2)LED indication for Channel 2

(3)LED indication for Channel 3

(4)TEST butone

(5)RESET butone
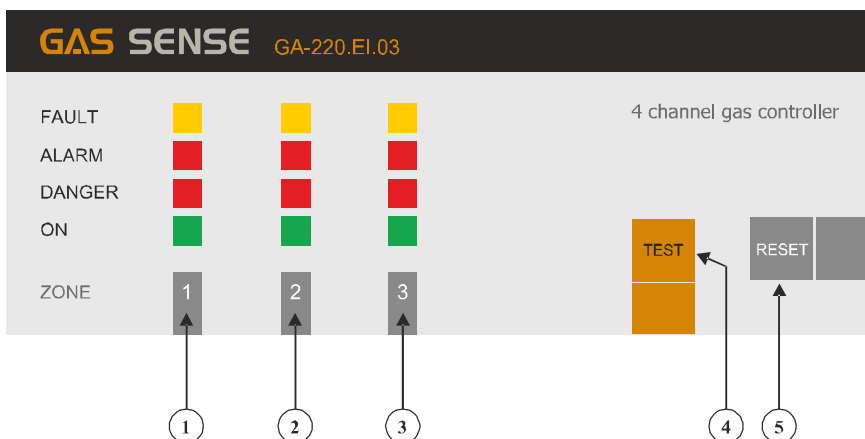
Front panel view of GA-220.EI.04 – 4 channel gas controller
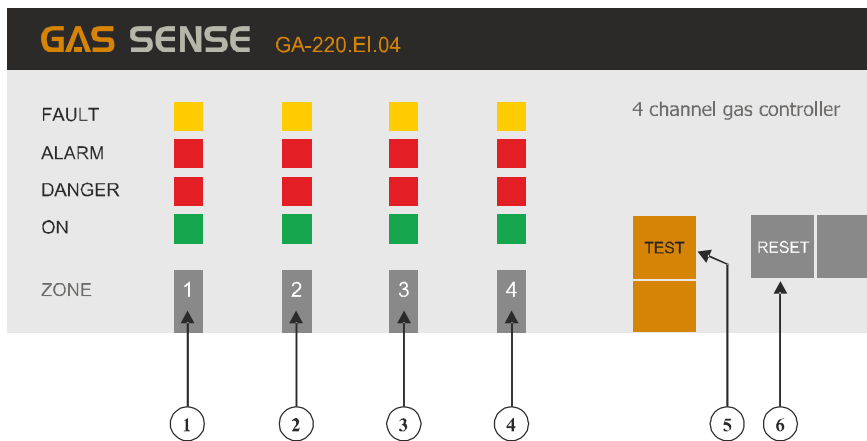
(1)LED indication for Channel 1
(2)LED indication for Channel 2
(3)LED indication for Channel 3
(4)LED indication for Channel 4
(5)TEST butone
(6)RESET butone

Connection terminals

GA-220.EI.01 – 1 channel gas controller
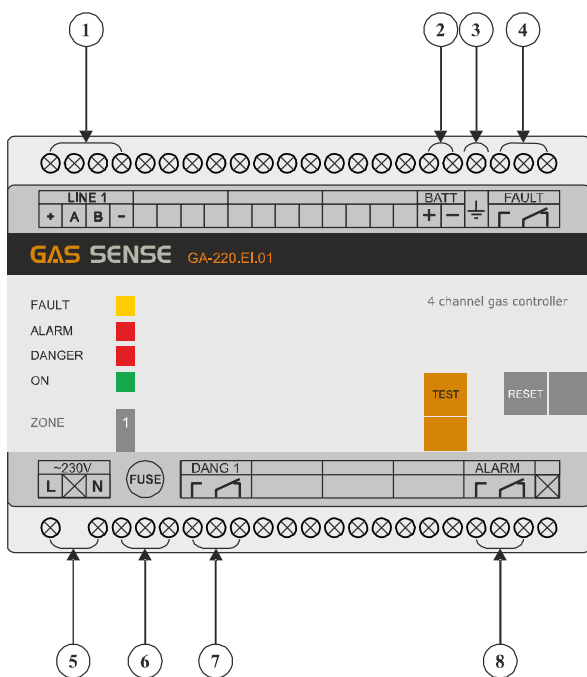
(1)Input SENSOR1 – intrinsically safe
(2)Connection to back-up battery – 12V/DC
(3)Grounging terminal
(4)FAULT – relay output for sensors or lines fault
(5)Main power supply - 230VAC-50Hz
(6)Fuse - 250V-0,250A
(7)DANGER1 – relay output for first alarm level of Channel 1
(8)ALARM – relay output for second alarm level

GA-220.EI.02 – 2 channel gas controller

(1) Input SENSOR1 – intrinsically safe

(2) Input SENSOR2 – intrinsically safe

(3) Connection to back-up battery – 12V/DC

(4) Grounging terminal

(5) FAULT – relay output for sensors or lines fault

(6) Main power supply - 230VAC-50Hz

(7) Fuse - 250V-0,250A

(8) DANGER1 – relay output for first alarm level of Channel 1

(9) DANGER2 – relay output for first alarm level of Channel 2

(10) ALARM – relay output for second alarm level

GA-220.EI.03 – 3 channel gas controller

(1) Input SENSOR1 – intrinsically safe

(2) Input SENSOR2 – intrinsically safe

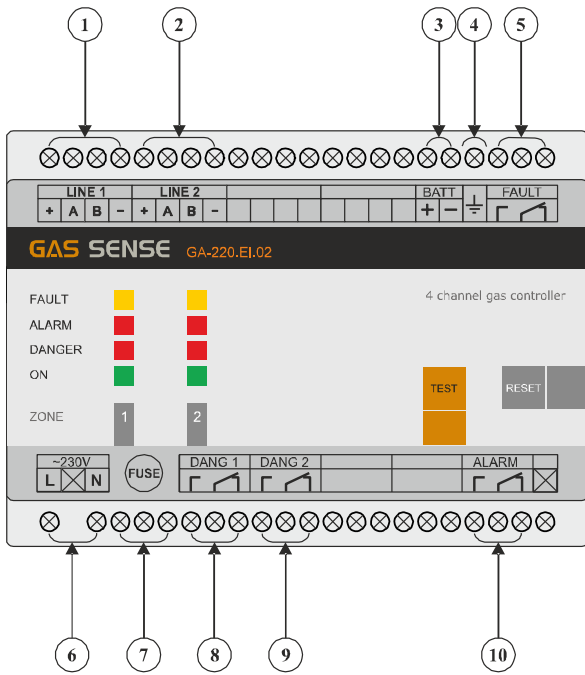(3) Input SENSOR3 – intrinsically safe

(4) Connection to back-up battery – 12V/DC

(5) Grounging terminal

(6) FAULT – relay output for sensors or lines fault

(7) Main power supply - 230VAC-50Hz

(8) Fuse - 250V-0,250A

(9) DANGER1 – relay output for first alarm level of Channel 1

(10) DANGER2 – relay output for first alarm level of Channel 2

(11) DANGER3 – relay output for first alarm level of Channel 3

(12) ALARM – relay output for second alarm level

GA-220.EI.04 – 4 channel gas controller

(1) Input SENSOR1 – intrinsically safe

(2) Input SENSOR2 – intrinsically safe

(3) Input SENSOR3 – intrinsically safe
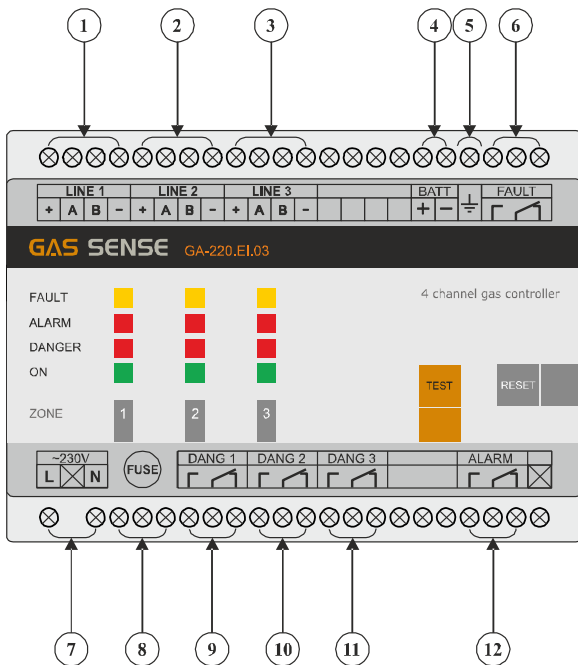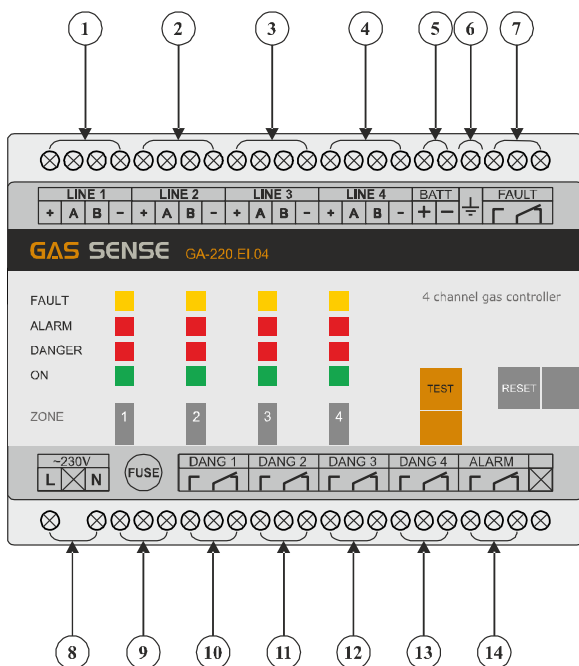
(4) Input SENSOR4 – intrinsically safe

(5) Connection to back-up battery – 12V/DC

(6) Grounging terminal

(7) FAULT – relay output for sensors or lines fault

(8) Main power supply - 230VAC-50Hz

(9) Fuse - 250V-0,250A

(10) DANGER1 – relay output for first alarm level of Channel 1

(11) DANGER2 – relay output for first alarm level of Channel 2

(12) DANGER3 – relay output for first alarm level of Channel 3

(13) DANGER4 – relay output for first alarm level of Channel 4

(14) ALARM – relay output for second alarm level

Installation and wiring

Mounting the controller
The GA-220.EI.01-04 should be mounted on a DIN rail. The controller may be installed in any area except for explosive atmospheres, ideally in a monitored area (control room, equipment room, security office, etc.), in a dry (no condensation) and temperate area. The controller's front panel should be forward facing, so that settings, monitoring and wiring can be easily accessed.

Mechanical mounting
The controller is designed for DIN rail mounting. Mount the controller on the 35mm DIN rail.

Electrical connection:
Connection between the controller and sensors is made by 4 wire connection cables. Only 1 sensor can be connected to each input.

The electrical connection must:
- Be carried out by a specialist and (with the controller) with the power supply disconnected.
- Verify the current and the grid power supply: the grid power supply must correspond to the supply indicated on the controller.
- Use a power cable connected to the grid (230 VAC) with a minimum diameter of 1.5 mm² and a maximum diameter of 2.5mm².

The GA-220.LI.01/02 does not have an on/off switch.Certain power supplies can cause serious or fatal injury. All installation and wiring should be performed before turning on the power supply.
Incorrect installation can lead to measurement errors or system failure, all instructions in this manual must be followed carefully to guarantee proper system operation.

Ground connection

The controller must be connected to a functional ground connection. The ground terminal is indicated with the following symbol

Power supply 230 V AC

Protection is provided by fuse. The sector power supply must be wired to the two terminals marked **~230V** (**N** and **L)** as shown in the back panel picture of the controller. The controller must be protected upstream by a differential bipolar circuit breaker with a nominal current of 0.5A. The response curve must be type D.

Pback-up power supply 12 VDC

The 12 V DC power supply is connected to the terminals **BATT** **+** and **-** as shown in the back panel picture of the controller.

Sensor inputs

Sensors are connected to the terminals **+ A B -** . GA-220.EI.01-04 are designed to work with sensor type GS-220.B.V. Communication between controller and the sensors is via RS485.

Sensor inputs are intrinsically safe and they are voltage and current limited by zener barriers. This is the reason that only 1 sensor can be connected to each input.

Relay outputs

The controller GA-220.EI.01 has 3 relay outputs which correspond to two instant preprogrammed alarm thresholds and FAULT of sensor or connection line. The relays are normally not energized and are voltage free.

The controller GA-220.EI.02 has 4 relay outputs which correspond to two instant preprogrammed alarm thresholds and FAULT of sensor or connection line. The relays are normally not energized and are voltage free.

The controller GA-220.EI.03 has 5 relay outputs which correspond to two instant preprogrammed alarm thresholds and FAULT of sensor or connection line. The relays are normally not energized and are voltage free.
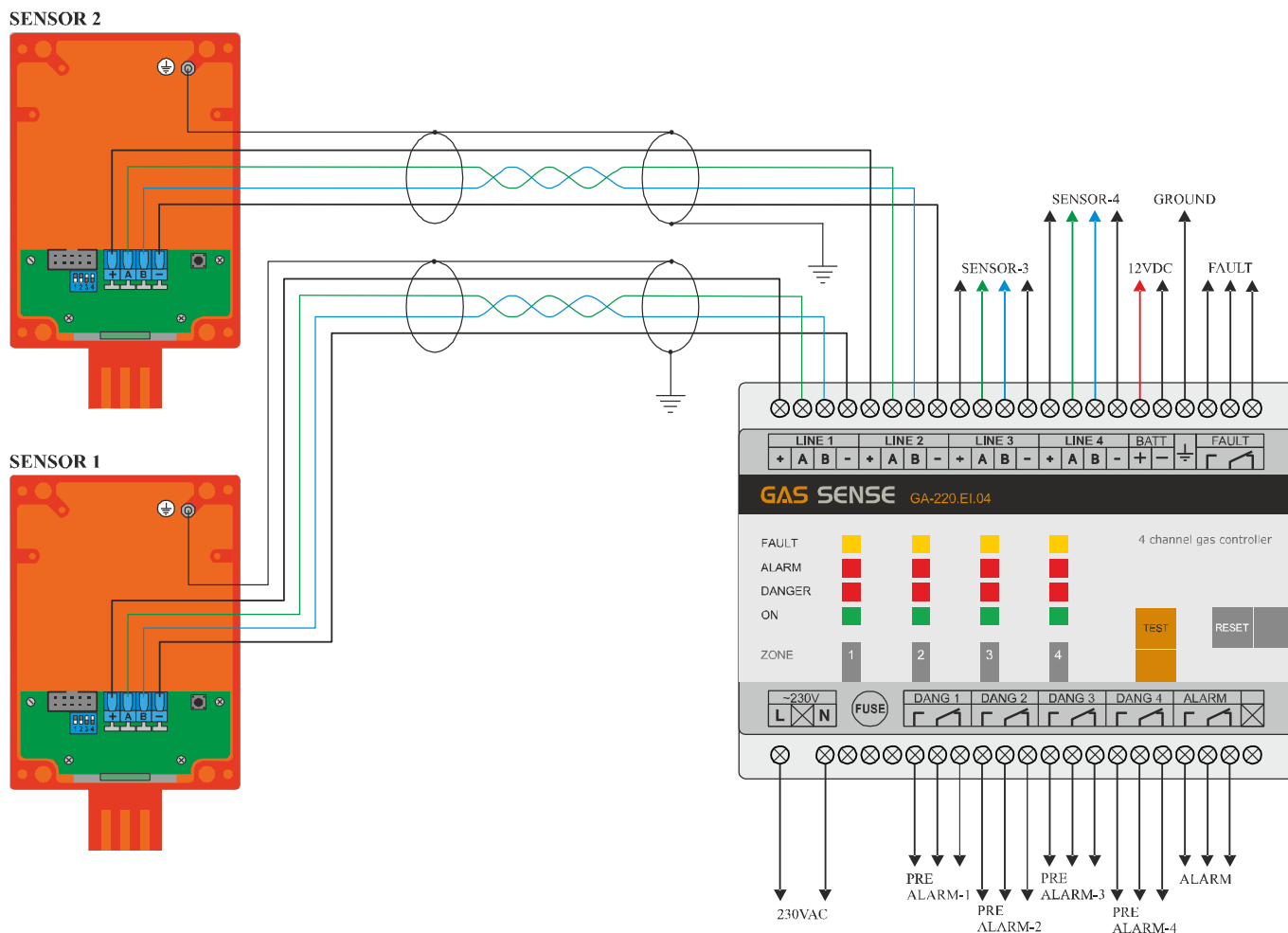
The controller GA-220.EI.04 has 6 relay outputs which correspond to two instant preprogrammed alarm thresholds and FAULT of sensor or connection line. The relays are normally not energized and are voltage free.

Typical wiring diagramme

Operating instructions

The Ga-220.EI01-04 controller has the following operating modes:

1.Initial conecting
When power supply is ON controller beeps 3 times. Only FAULT LED is ON.

2.Sensor timeout
Sensor preheating and testing mode. Continues 1 to 3 min depending on the sensor type. Green LED blinks fast.

3.Working mode
Gas detection system is working properly. Green LED is ON permanently.

4.Working mode – main power supply missing
Gas detection system is working properly. Green LED is ON and is going OFF for a short time at each 5 sec.

5.Alarm 1
Green and DANGER LED's are ON. Sound signal is interrupted. DANGER relay is activated.

6.Alarm 2
Green, DANGER and ALARM LED's are ON. Sound signal is permanent. DANGER and ALARM relays are activated.

7.Sensor or connection line FAULT
Green, and FAULT LED's are ON. Controller beeps 2 times at every 5 seconds. FAULT relay is actvated.

8.Sensor callibration
ALARM LED is ON permanently and FAULT LED is blinking. Relays are OFF.

9.Pause
PAUSE mode is activated with short pressing of TEST butone. Green and FAULT LED's are blinking. No saund signal. Relays are OFF. This mode continues 5 min and controller leaves it automaticly after that time.

10.Test
TEST mode is activated with pressing and holding the TEST butone. After second beep buton must be released. All LED's and relays are ON. Controller emmits interupted sound signal. This mode continues 5 sec and controller leaves it automaticly after that time.

11.Initialization
When sensors are connected to the controller you must start initialization procedure. With this procedure gas controller will test and recognize connected gas sensors. If initialization is not done controller will not recognize the sensors and the system will not work properly.

To initialize the system you must do the following:
1.Connect gas detection systems to power supply.
2.Press and hold the TEST button:
-you will hear a short beep - continue holding the button;
-after 5 seconds you will hear second short beep - continue holding the button;
-after another 5 seconds you will hear next short beep - release the button. Gas controller is in the initialization mode - greed LED blinks, DANGER LED is OFF, ALARM and FAULT LED's are ON. Controller emits specific sound. Initialization mode is continuing e few seconds and controller leaves this mode automatically. Then the system is ready for use.

Maintenance and servicing

Cleaning
If necessary, clean the exterior of the enclosure with a damp cloth. Do not use alcohol or ammonia based liquids to clean the controller.

Servicing
We recommend that the user periodically inspect the proper triggering of alarm and fault relays, the buzzer and indications on the front panel of the controller. Test must me done by applying etalone gas mixture to the gas detectors.

The adjustment operations of the gas detection system must be done only by authorized, trained personnel

because they may compromise gas detection detection system reliability.

Servicing frequency
Invest Electronics recommends regular testing of fixed gas detection installations. The type of test consists of injecting a standard gas mixture of sufficient concentration into the sensor to set off the preadjusted alarms. This test does not, replace a full calibration of the detector. Frequency of gas testing depends on the industrial application in which the sensors are used. Inspection should be done frequently during the first months after installation start up, later it may be spaced out if no problem is observed.
If a detector does not react upon contact with gas, it must be calibrated. The frequency of calibration will depend on tests (humidity, temperature, dust, etc.); calibration should occur at least once every year. We also recommend calibrating the detector after exposure to high gas concentrations. The site manager is responsible for implementing the safety procedures on
his site. Invest Electronics is not responsible for implementing safety procedures.

Ordering information

Model – ordering code	Number of inputs
GA-220.EI01	1
GA-220.EI02	2
GA-220.EI03	3
GA-220.EI04	4

GAS SENSE

⟨Ex⟩ CE ® UKAS

EC Declaration of Conformity
Issued in accordance with the ATEX Directive 94/9/EC

Manufacturer: Invest Electronics Ltd
145, Brezovsko shose Str
Plovdiv 4003, Bulgaria

Product: Gas detector (analyzer) GA-220

is in conformity with the provisions of the Directive 94/9/EC for use in potentially explosive atmospheres

Marking: ⟨Ex⟩ II 2G Ex Ia IIC T5

Harmonized standards: EN 60079-0:2009, EN 60079-11:2007

EC-Type examination certificate: MP 07 ATEX 0036/2012
Minproekt JSC, Notified Body 1877

Conformity to type procedure certificate: MP 07 ATEX 0036 CT/15.06.2012
Minproekt JSC, Notified Body 1877

EC Directive: 94/9/EC ATEX Directive

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Title: General Manager
Date: 05-01-2015