European manufacturer

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SAFETY & SECURITY SYSTEMS
for a safer world!

BS-304, BS-308, BS-312, BS-316

Gas detection control panel
up to 16 inputs

Installation – operation manual

Contents

Thank you for your trust in our products
Olympia Electronics - European manufacturer

Operation instructions

Thank you for purchasing this product of Olympia Electronics. A European manufacturer.
This section contains general information and information regarding the use of the panel. All users of the panel should read these instructions very carefully in order to be able to act in the event of an alarm or a fault condition.

1.1 Description

The BS-3XX panel series are gas detection panels with 4, 8, 12 or 16 inputs. On each input it can be connected only one gas detector 4-20 mA.

1.2 Indications and Controls

The panel incorporates one liquid crystal display (LCD) and a series of indication LEDs that informs the user about its status. The indication LEDs give general information (i.e. if an alarm becomes true, then the general alarm indicator LED will turned ON.) and on display appears information about each event (i.e. Alarm sensor 1,that means alarm from sensor 1) .

Figure 1: *Main screen of the panel*

Under the display there are 6 buttons for controlling the panel. On each button there is a number 1-6 and corresponds to the functions left, right, up, down, enter, escape (exit or one step back). Generally by pushing a button one action happens immediately or one menu appears with some functions. Inside the menu the buttons 1, 2, 3, 4 operate as dimension buttons and we can move inside the menu, the button 5 (enter) to select and button 6 (esc) to come back. During the next pages we will refer to the buttons using the corresponding numbers.
All LEDs are grouped for easier indication. In detail the LEDs show the following:

General Alarm (RED)
General alarm indicator

General Fault (Yellow)
Lights in the event of a Fault

Disable Point (Yellow)
Lights to show a disabled inputs

Power (Green)
General operation indicator of the panel

Test (Yellow)
Lights to show that we are in TEST mode

Fault Battery (Yellow)
Lights to show a battery problem

1.3 Access level 1

This level contains 2 functions that can be implemented by pressing a single key.

- In the event of an Alarm or Fault condition, if the key number (1) is pressed then the internal buzzer is silenced. For as long as the event is in effect the internal buzzer sounds once in every 30 seconds. Should the panel see a new event in this state then the buzzer will start to sound continuously.
- When the panel is in standby mode (no alarm or fault events have occurred) then if the key number (2) (lamp test) is pressed the system conducts a sequential LED and Display test.

When the system is in quiescence state, the lcd screen shows info about the system.
The below screen shows some information about the system

```
OLYMPIA ELECTRONICS
   BS-316    V.055
 12:00:00  20/01/10
 SYSTEM READY
```

The below screen shows the panel name and the technician information.

```
  PANEL NAME
MAIN BUILDING
  TECHNICIAN INFO
OLYMPIA ELECTRONICS
```

The next screen shows the condition of each sensor (input)

```
 1:    0%LIE NORMAL
 2: NO CONFIGURATION
 3: NO CONFIGURATION
 4:    5ppm  NORMAL
```

The sensors 4-20mA incorporates the current have the next situations:

FAULT - (<1 mA)
UNDERFLOW (from 1 to 3.5 mA)
NORMAL (from 3.5 to 21 mA) inside these limits we can do the setup of alarm 1, alarm 2 and alarm 3)
OVERFLOW (from 21 to 24mA)
FAULT+ (24mA and Higher).
There is the disable situation (**NO CONFIGURATION**)

In case alarm or fault the LCD display shows the corresponding message.

`  EVENTS IN SYSTEM`
`ALARMS          10`
`FAULTS            5`
	This screen shows a summary of the events in the system.

`ALARM           10`
` 4:  14%LIE ALARM 2`
` 9:  60ppm  ALARM 3`
`16:  20ppm  ALARM 1`
	The alarm screen show which inputs are in alarm condition.
	For example the second line 4: 14% LIE ALARM 2 means that the 4th input sensor has detected 14% LIE of a gas and it is at ALARM 2 state.

`FAULT           5`
` 1:  FAULT +`
` 3:  FAULT -`
`BATTERY`
	The screen on the left shows the faults of the system.
	For example the second line 1: FAULT + means that the 1st input sensor has a FAULT +.

1.3.1 Events Menu

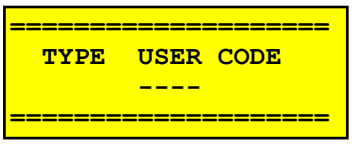
All the events of the system can be shown by pressing the key “3” View Events and then the key Enter.

ALARM 1 (59/ 59) 15%LIE S= 4 Z= 2 11:03:45 20/01/10 CAR PARKING - LPG	This screen on the left shows that the system has recorded 59 events. The event shown in the example shows that this event is a ALARM 2 of the 4th sensor (S=4) which belong to zone 2 (Z=2). The third line in the timestamp when the event occurred. The last line is the name of the sensor.
FAULT (13/ 59) BATTERY 11:00:05 18/01/10 BATTERY DISCONNECTED	This screen on the left shows that the battery was disconnected at 11:00 on 18/01/10.
GENERAL (5/ 59) PANEL 09:07:00 10/01/10 START	The screen on the left shows the panel start operating from 09:00 on 10/01/10.

1.4 Access level 2 (User access level)

All the functions of access level 2 can be accessed from a menu that is displayed when we push the button “4" User menu.

To Reset the panel, from the central menu, we press button “5” and button “ENTER” and the next message is displayed.



The user code is 1-1-1-1. So the key “1” must be pressed four times.
After this the panel resets.

Installation instructions

In this section there is information about the connectivity of panel, its peripherals, the programming of all the functions and troubleshooting. All installers who want to connect and enable the gas detection panel must read this manual carefully. The whole knowledge of the panel and its peripherals is necessary for work and installation.

Security

The panel cannot be installed correctly if the installation guide is not read.
This product must be installed, operated and maintained by skilled technician:

- Using all rules of electrical product installation in buildings.
- Installation guide.

- The operation voltage is 100-240V AC / 50-60Hz.
- Must be connected to the electrical panel of the building, but with a separate fuse.

Mounting

The mounting of panel must be in a visible place with easy access by the users. The panel BS-316 is a product for easy wall mounting and indoor use. The mounting on the wall can be done by using plugs and screws that are included in the panel package.

Description of the internal parts of the panel

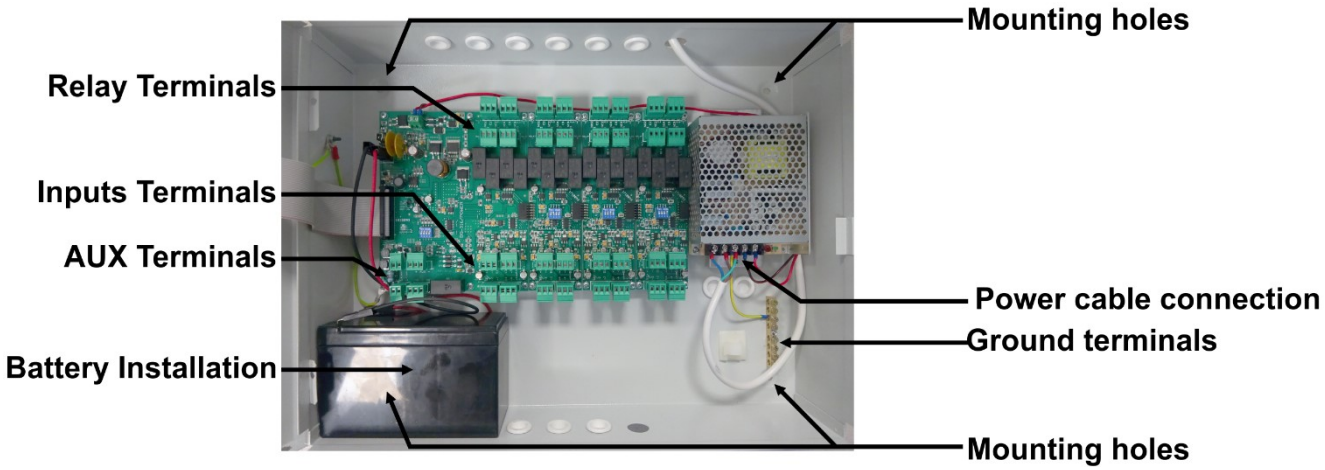


Figure 2: Inner of the panel

Cabling

After plastic glands are removed place special gaskets in order to protect the cable.
The panel has pre-opened passages from where the installation cables will enter the panel.
The terminal blocks of the panel are capable of handling cable with a cross-section of up-to 2.5mm.

Connecting the panels with the mains power supply (230V AC) and with the battery

To connect the cable with the mains power supply, a cable with double insulation must be used. The connection is done using the special terminals found on the right side of the panel as shown in the.
The battery can be placed on the bottom side of the panel.

*The battery **A-986** of **olympia electronics can be used**. The charging circuit of the panel is also calculated for the specific battery type. In case of replacement, the new battery must be of the same type.*
Two cables with connectors are used to connect the battery to the panel. The black cable is connected to the negative pole of the battery (marked with (-) or with black color) and the red cable is connected to the positive pole of the battery (marked (+) or with red color).

Warnings.
1. During the installation, the connections to the mains power supply and the battery must be done after all other connections are finished.
2. The panel connection with the mains supply must be done via a 16A external fuse or an automatic circuit breaker rated at 16A.
3. Always use cables with double insulation.
4. The diameter of the cable must be at least 1mm.
5. The inner insulation of each cable must not be cut more than 1cm
6. The outer insulation must not be cut more than 1cm away from the internal insulation.

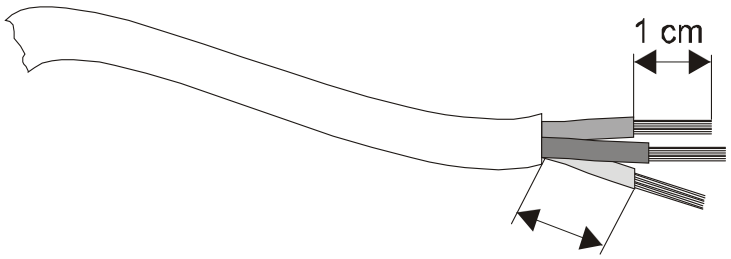
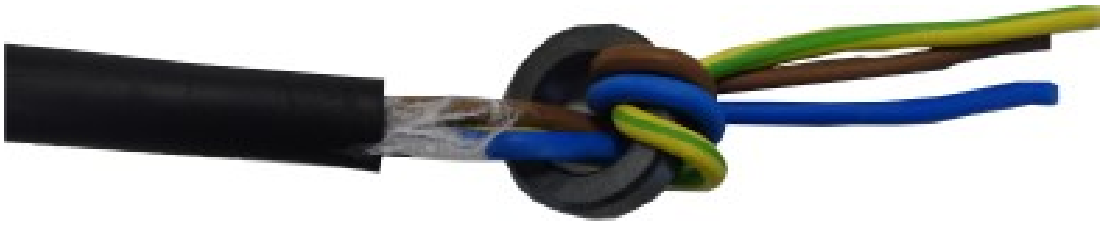


***Figure 3**: Power cable*

Sensor connectivity

Before connecting any sensor to the panel, the main power supply must be disconnected. There are two ways of connect the sensors depending on the number of contacts.

NOTE: For both following detector connections, ferrite must be applied on each detector input cable, inside the panel, to meet compliance standards of EN61000-6-1 & EN61000-6-3. Ferrites are included in the package.



Sensors with 3 contacts 4÷20mA

The connection of sensors with 3 contacts 4÷20mA, must be between «+», «-» and “S” of sensor that correspond to «+», «-» and “S” of panel as shown in figure 5.

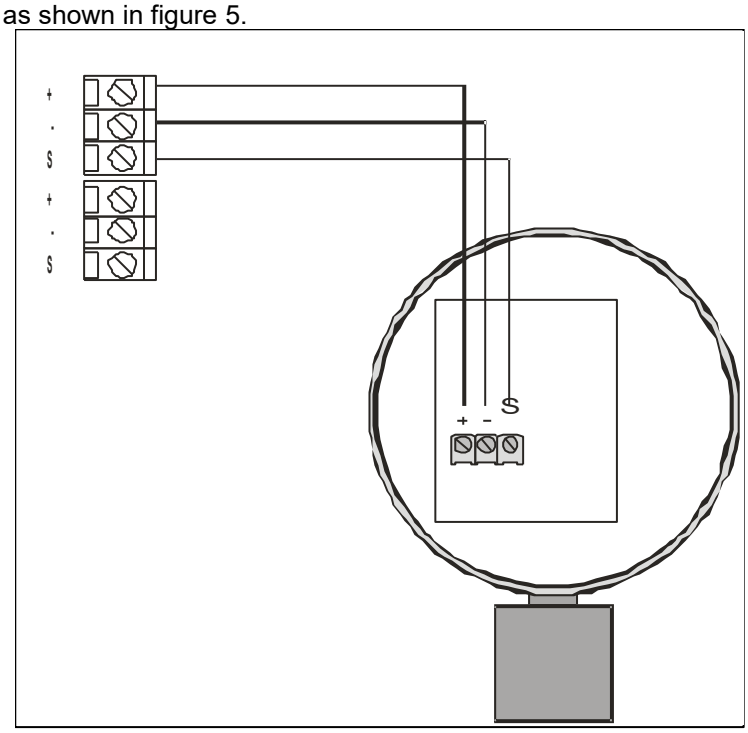


Figure 4: *Connection diagram with three pad sensor*

The cross-section of the cable depends on the cable length (see next table). The sensors with 3 contacts do not require coaxial cables.

Sensor series with three contacts	
Ranges	**Cable type**
From 0 to 300 meters	3 x 0,75 mm²
Up to 400 meters	3 x 1 mm²
Up to 500 meters	3 x 1.5 mm²
Up to 600 meters	3 x 2.5 mm²

The gas sensors, need a preheat time, in clear air, for about 20 seconds. After this time the sensor can sense gases, but the maximum sense ability is after 3 hours of continuous operation. So a sample gas test should be done after 3 hours.
After the electrical connection of the sensors, the technician must power the panel and setup all sensors.
About sensor setup see paragraph 2.6.1.

AUX INPUT (AUXILIARY RELAY)

On the AUX input we can connect fire detection buttons between inputs «-» and “S” of (Figure 5).

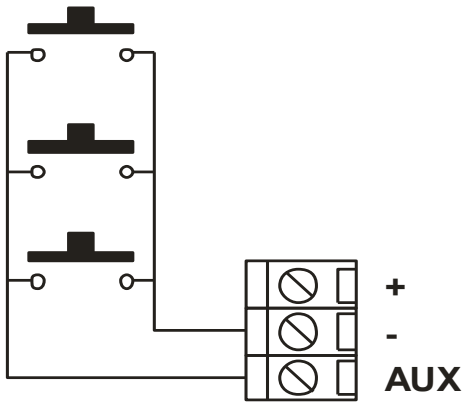


Figure 5: *Indicative connection device diagram on helpful input.*

Output connectivity

On the panel there are up to 16 programmable outputs relay. Each relay has a triple connector NO, NC, C. For more information about output setup see paragraph 2.7.1.

Other outputs and their use

The panel has the following outputs:

- **Output AUX.** This is an auxiliary power output (between «-» and «+») that has the capability of providing 20Vdc for maximum load of 300mA.

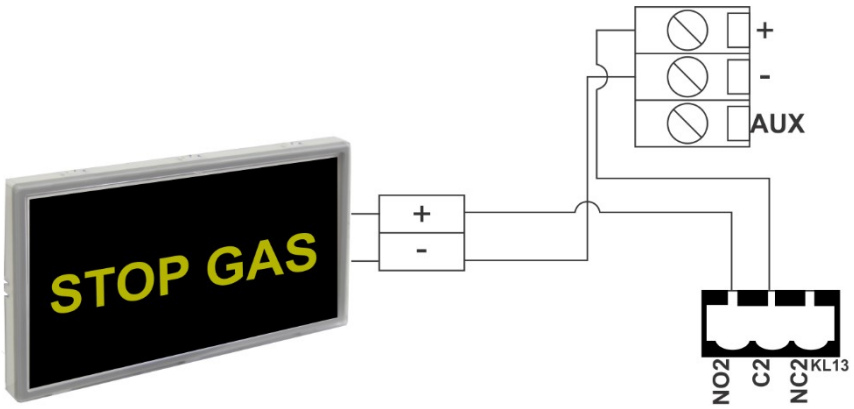


Figure 6: Indicative connection with panel relay.

NOTE The maximum drawn from output “AUX” must not be more than 300mA.

- **Connectors F_OUT.** Open collector output. If there is a general fault (Fault) it is enabled (0V).

Network connection

It is possible to have network of panels. In each network, each panel has a unique address.
The central panel has address 1 and sub-panels have address from 2 to 16. The figure below shows the network connection.

The interface cable is two cable twisted. The connection topology is parallel, for example should the cable from one table to go to another and there are no interconnections
Caution resistors 120Ohm / 0,5 W should be placed at the beginning and end of the cable.

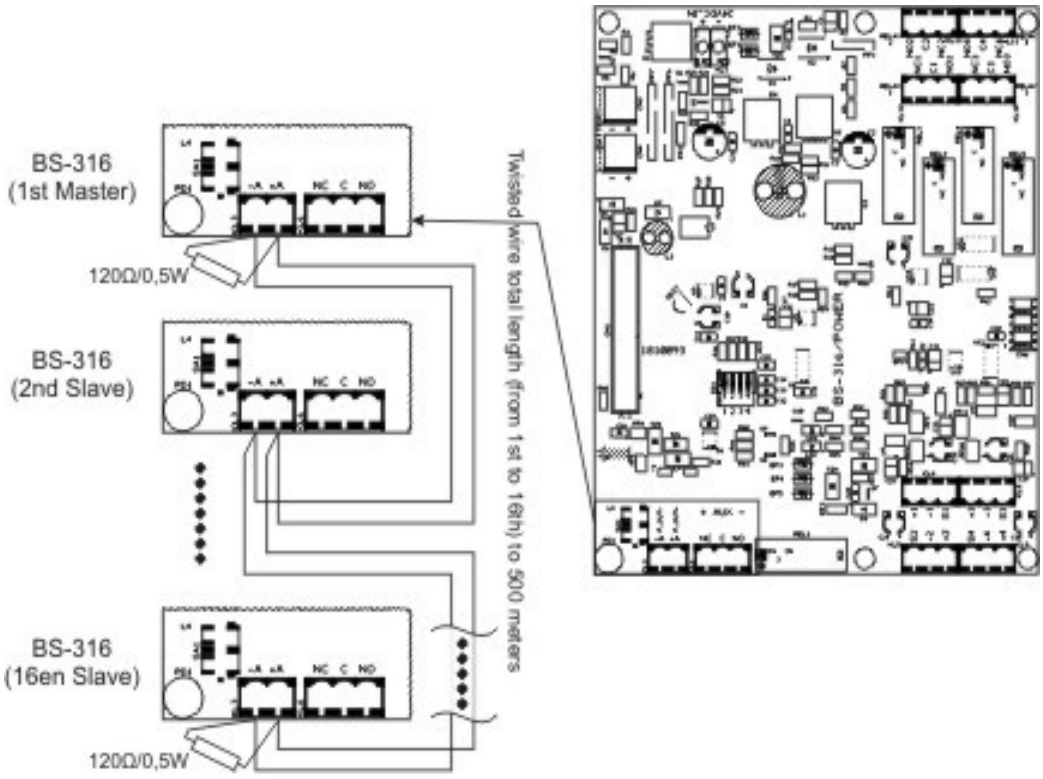


Figure 8: *Netowrk connections*

Technician menu

Access Technician menu

All the functions of access level 3 can be accessed from the menu that displayed when we press button “5" in the technician menu.
The panel prompts for the technician code

The technician code is 2-3-3-3.

After the code in entered, the operator has access to level 3 functions.

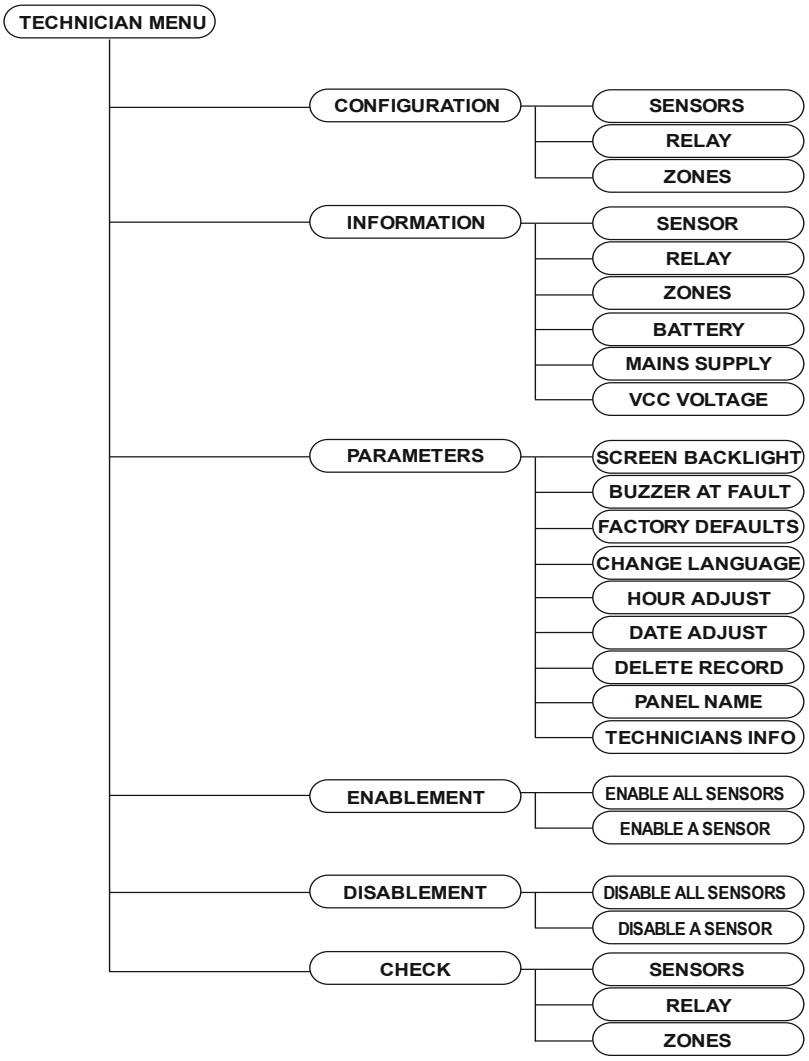


Figure 9: Technician Menu

Configuration

In the configuration menu the technician can configure the sensors, the relays and the zones.

Sensor configuration

The available options in the configuration sensor menu, are shown below,

```
===== SENSORS  =====
    SETUP SENSOR
    SELECT ENTER
====================
```

```
===== SENSORS  =====
    COPY SENSOR
    SELECT ENTER
====================
```

```
===== SENSORS  =====
   DELETE SENSOR
    SELECT ENTER
====================
```

with Setup you can setup a sensor from scratch, with Copy you can copy the setup from one sensor to another and with Delete you can delete the setup of a sensor.

If you choose the setup a sensor the next screen is shown:

```
===== SENSORS  =====
    SELECT SENSOR
   [1..16]:   1
====================
```

where you can choose which sensor you want to setup.

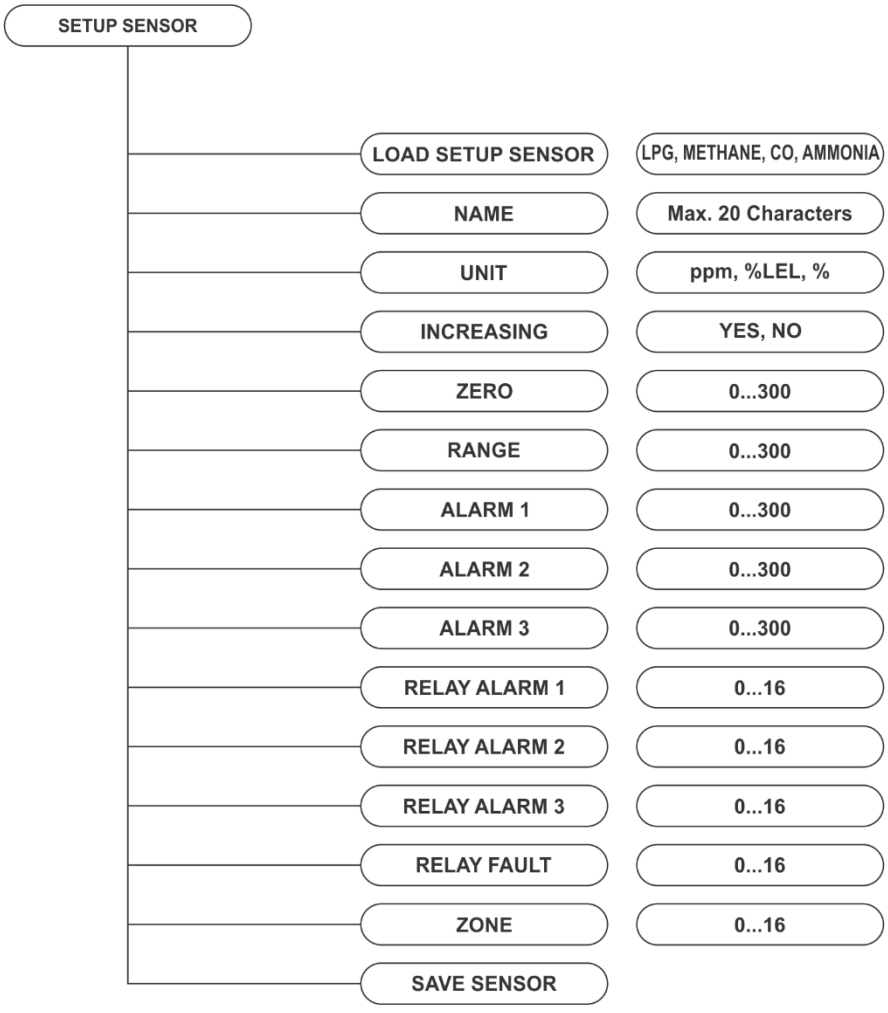


Figure 10: *Menu to setup a sensor*

The above picture shows the menu to setup a sensor. With the help of the first selection "LOAD SETUP SENSOR" the defaults values are loaded to the variables of the sensor.

The variables above are:

NAME: the name of the sensor. You can put up to 20 characters.
UNIT: Units to meter the gas. There are two kinds of units in ppm or %LIE or %.
INCREASING: if the value is increasing or decreasing.
ZERO: Minimum (start up of scale). Default is 0.
RANGE: Maximum (maximum value of scale). The value range is from 20 to 300.
ALARM 1: Alarm 1 level.
ALARM 2: Alarm 2 level.
ALARM 3: Alarm 3level.
RELAY ALARM 1: the relay that will be activated when there is an Alarm 1 level at the sensor.
RELAY ALARM 2: the relay that will be activated when there is an Alarm 2 level at the sensor.
RELAY ALARM 3: the relay that will be activated when there is an Alarm 3 level at the sensor.
RELAY FAULT: the relay that will be activated when there is a fault at the sensor.
ZONE: the zone of the sensor.

At next table we can see some typical values.

Type	Gas	Zero	Limit	Unit	Alarm 1	Alarm 2	Alarm 3
TS282KG	LPG	0	20	%LIE	7	10	20
TS282KM	Methane gas	0	20	%LIE	6	10	20
TS282EC-S	Carbon Monoxide	0	300	ppm	25:50	100	200
TC282EA	Ammonia	0	300	ppm	10	20	50:100
TS293KG	LPG	0	20	%LIE	7	10	20
TS293KN	Methane gas	0	20	%LIE	6	10	20
TS293EA	Ammonia	0	300	ppm	10	20	50:100
TS293EO	Oxygen*	0	25	%	18	19	22
TC-100N/LPG	LPG	0	100	%LIE	8	12	20
TC-100N/CNG	Methane gas	0	100	%lie	8	12	20

***The parameter increase must be set to NO.**

To connect other detector except these of our catalogue, contact our technical support.

Relay programming

All the relays of panel are programmable for connecting any application. The relay programming options in the configuration of relay menu are shown below,

with Setup you can setup the relay from scratch, with Copy you can copy the setup from one relay to another, and with Initialise you can load the default values.

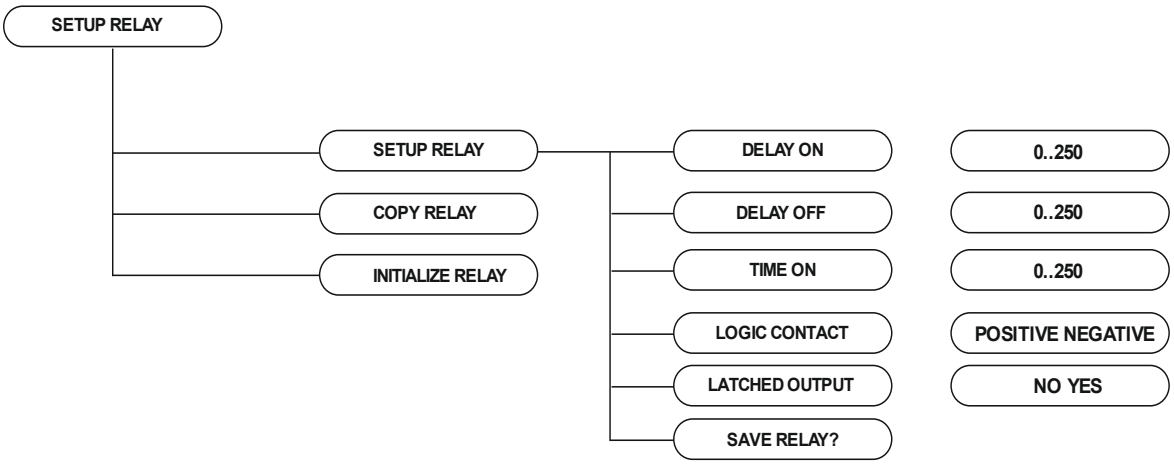


Figure 10: *Diagram menu setup relay*

The above diagram shows the menu for the configuration of a relay:
The parameters are:

DELAY ON : it is the delay time (max 250 seconds) of the output activation from the moment when the gas concentration is in the alarm setting.

DELAY OFF : it is the delay time (max 250 seconds) of the output deactivation from the moment when the gas concentration returns under the alarm setting.

TIME ON : it is the maximum time (max 250 seconds) of the output activation when the sensor is in an alarm condition. After this time the relay is deactivated.

LOGIC CONTACT: it indicates if the relay works normally activated (Positive Logic) (NC) or normally deactivated (Negative Logic) (NO).

LATCHED OUTPUT: it indicates if you want to keep the output active even if the gas concentration returns under the alarm setting.

Zones configuration

Zones configuration is a useful procedure to unify the procedures when a sensor is activated. When some sensors belong to the same zone they activate the same relays, as the zone configuration indicates.
This menu is used for the configuration of the zone. First you must choose which zone you want to change

```
===== ZONES  =====
    SELECT ZONES
   [1..16]:   1
====================
```

Below is the zone menu

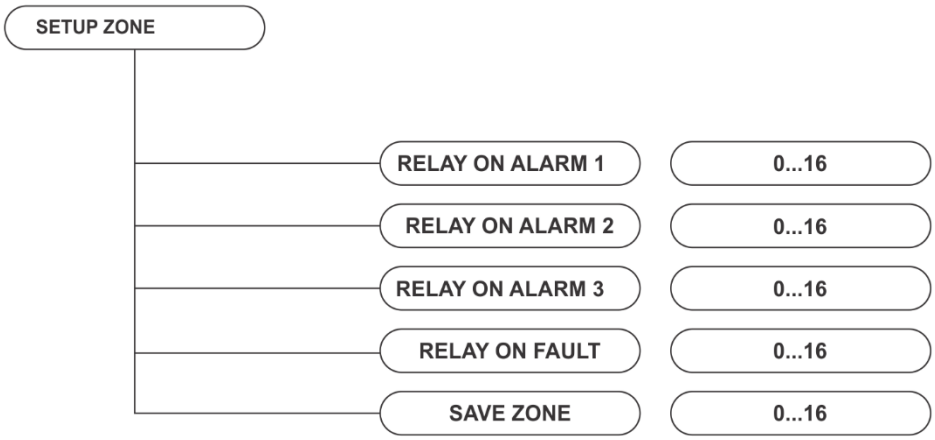


Figure 11: *Diagram menu of the zone configuration*

Information menu

From this selection the technician can be informed for all the system. The below diagram shows the menu

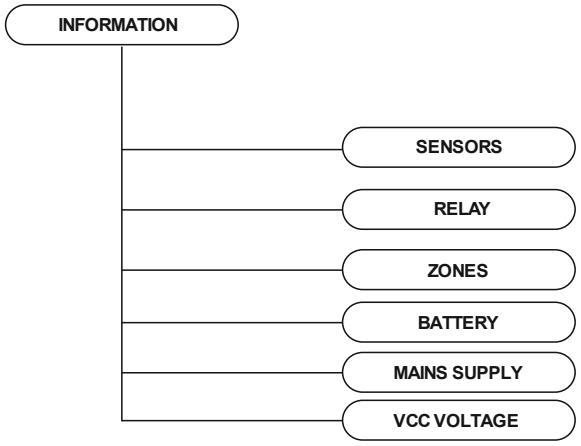
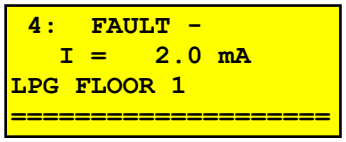
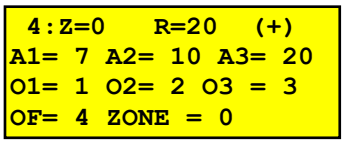


Figure 12*: Information menu*

- An example of the information of a sensor screen are



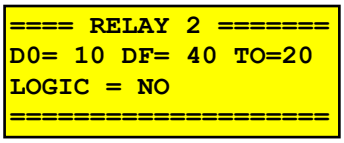


The above left screen shows the number of the sensor, the condition (FAULT -), the current consumption and the name of the sensor.

The right screen shows the ZERO, RANGE, ALARM1, ALARM2,ALARM3, RELAY ON ALARM1, RELAY ON ALARM2, RELAY ON ALARM3, RELAY ON FAULT and ZONE respectively.

To change the sensor, use the button “3” or “4”.

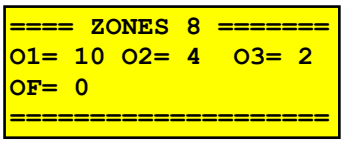
- An example of the information relay screen is



the above screen shows the delay on, delay off, time on and positive logic respectively

To change the relay, use the button “3” or “4”.

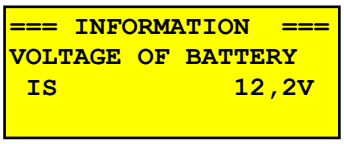
- An example of the information zone screen is



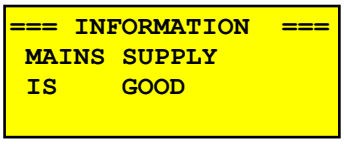
the above screen shows the relay on alarm 1, relay on alarm 2, relay on alarm 3 and relay on fault respectively

To change the relay, use the button “3” or “4”.

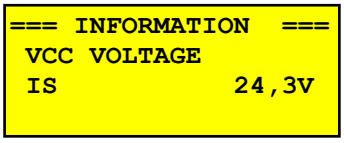
- An example of the battery information



- An example of the main supply information



- An example of the VCC voltage



Parameters menu

The parameters menu is for configuration of the general parameters of the system.

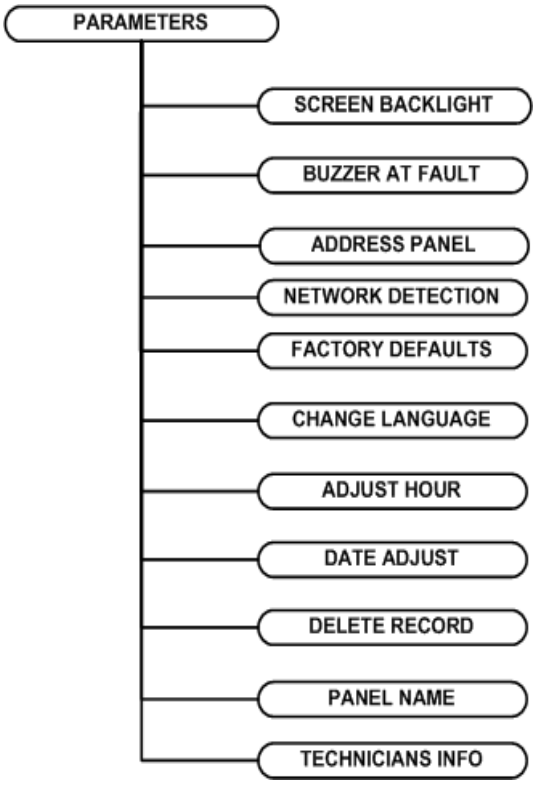


Figure 13: *Parameters menu*

The selections are:

- **SCREEN BACKLIGHT: "CONTINUOUS" means that the screen panel is lighting continually (this selection reduces the autonomy of the system) "NO CONTINUOUS" means the backlight of the display will be ON when there are events or one button is pressed.**
- **BUZZER AT FAULT: "NO SOUND" no sound if there is a fault only on alarm. "SOUNDS" the panel buzzer sounds on alarms and on faults.**

- **ADDRESS PANEL: we can change the address of the panel**

```
=== MODIFICATION ===
  ADDRESS PANEL
    [0..16]:   1
====================
```

If we put address 0 the network is disabled. If the address is the panel is a master panel. If the the address is from 2 to 16 the panel is a subpanel.

- **NETWORK DETECTION: if the panel is a master panel (address 1) we can make a network detection.**

```
PANEL IN NETWORK   :
 1 2      5

   TOTAL   ==>      3
```

- **FACTORY DEFAULTS: Load factory defaults to the panel.**
- **CHANGE LANGUAGE: change the language of the screen (Greek or English)**
- **ADJUST HOUR : adjust the time of the panel**
- **DATE ADJUST: adjust the date of the panel.**
- **DELETE RECORD : this option deletes all the recorded events from memory.**
- **PANEL NAME: the name of the panel with a maximum of 20 characters.**

- **TECHNICIAN INFO: change the technician information with a maximum of 20 characters**

Enable menu

The enable menu is used to enable a sensor or all the sensors:

```
=== ENABLEMENT  ====
 ENABLE ALL SENSORS
   SELECT → ENTER
====================
```

```
=== ENABLEMENT  ====
  ENABLE A SENSOR
   SELECT → ENTER
====================
```

Disable menu

The disable menu is used to disable a sensor or all the sensors:

```
=== DISABLEMENT  ===
 DISABLE ALL SENSORS
   SELECT → ENTER
====================
```

```
=== DISABLEMENT  ===
  DISABLE A SENSOR
   SELECT → ENTER
====================
```

Check menu

This menu is used to check the hardware of the pane
l

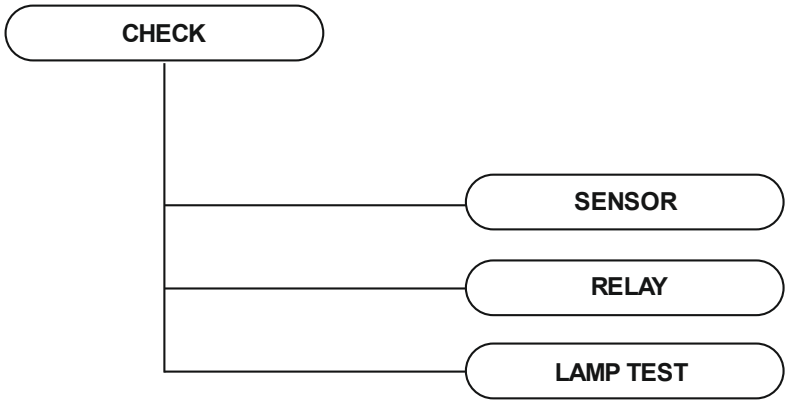


Figure 14: *Check Menu*

- On Check sensors the below screen appears

```
1: I=   5,0 mA
2: I=  11,1 mA
3: I=   4,3 mA
4: I=   4,0 mA
```

to see the other sensors press “3” or “4”

- The screen to check the relay is

```
======  CHECK ======
   RELAY    1
  STATUS ACTIVE
====================
```

To change the relay press button “3” or “4”. To change the status press button “ENTER”.

- With lamp test you can test all the LEDs and LCD backlight for correct operation.

Useful notes to setup the panel

For the correct mounting and setup of the panel, the user must do some basic steps:

1) First of all, the technician has to design the schematic which includes the way of installation of the panel and the devices, the length of the cable and the point where the device is connected. This diagram will be useful for the fault detection (short-circuits, alarms and faults).
2) The user disables all the system.
3) Next the user configures the sensors and the inputs.
4) When finished the user enables the inputs that are required.
5) The panel must be isolated from the main power supply when we install the sensors. After all connections are finished, the power to the panel is restored.
6) Leave the panel working for about 20 minutes without cutting off the power supply. Check the current of every sensor. The current must not be over 4mA. If it isn't, wait about 1 hour and then re-check. If the current of the sensor is not about 4mA, then perhaps the sensor needs setup.

7) If there is one short circuit in the power supply of a sensor (terminals +,-) for a moment, the panel shows a fault. To clear the fault first we have to correct the short circuit and then to reset the panel via the keyboard.

In case there is a fault you must check point to point, which is out of communication.

Technical Characteristics

	BS-304	**BS-308**	**BS-312**	**BS-316**
	Gas detection control panel up to 16 inputs			
Power Supply	100-240V AC / 50-60Hz			
Consumption	23W/60VA			
Battery type	12V / 7Ah Pb or 2X12V/7Ah			
Charge Circuit	Power supply 13.8V / 500mA			
Inputs	4+AUX	8+AUX	12+AUX	16+AUX
Programmable relays (5A/230V)	5	9	13	17
Outputs	Up to 16 programmable relays (5A/230VAC). 1 fault output 20V/300mA, 1 AUX			
Wrap protection class	IP30			
Operating temperature range	5 to 40 ^{o}C			
Humidity	Up to 95% humidity			
Dimensions	445 x 345 x 95 mm			
Weight	6160 gr			
In compliance with	EN50270 (TYPE I), EN61000-6-3(Use of Ferrite required), EN61000-3-2, EN61000-3-3, EN62368-1:2014			
Warranty	2 years			

Warranty

Olympia Electronics guarantees the quality, condition and operation of the goods. The period of warranty is specified in the official catalogue of Olympia Electronics and also in the technical leaflet, which accompanies each product. This warranty ceases to exist if the buyer does not follow the technical instructions included in official documents given by Olympia Electronics or if the buyer modifies the goods provided or has any repairs or re-setting done by a third party, unless Olympia Electronics has fully agreed to them in writing. Products that have been damaged can be returned to the premises of our company for repair or replacement, as long as the warranty period is valid.
Olympia Electronics reserves the right to repair or to replace the returned goods and to or not charge the buyer depending on the reason of defection. Olympia Electronics reserves the right to charge or not the buyer the transportation cost.

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Record Setup

We suggest completing the next tables for your setup and keep them for future reference.

Title : .....

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sensor's Model																
ZERO																
RANGE																
UNIT																
Alarm 1																
OUTPUT 1																
Alarm 2																
OUTPUT 2																
Alarm 3																
OUTPUT 3																

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DELAY ON																
DELAY OFF																
TIME ON																
POSITIVE (YES/NO)																
LATCHED																

Notes

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Operator Code 1 1 1 1 Technicians Code 2 3 3 3