



Operating Manual

GasGard XL Wall Mount Controller



Order N°. 10081908/03



The Safety Company

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Switzerland



The Safety Company

EC Declaration of Conformity

The manufacturer or his authorized representative established in the community

MSA Europe GmbH, Schlüsselstrasse 12, CH-8645 Rapperswil-Jona

declares that the product: **GasGard XL**

based on the EC-Type Examination Certificate: **FTZU 07 ATEX 0066 X**

complies with the ATEX directive 94/9/EC, Annex III. Quality Assurance Notification complying with Annex IV of the ATEX Directive 94/9/EC has been issued by DEKRA EXAM in Bochum, Notified Body number: 0158

Standards: EN 60079-29-1:2007, EN 50104:2010, EN 50271:2010,
EN 50402:2009

The product is in conformance with the directive 2004/108/EC:

EN 50270:2006 Typ 2, EN 61000-6-4:2007

The product is in conformance with the directive 2006/95/EC:

EN 61010:2010

The product is in conformance with the directive 2006/66/EC.

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Rapperswil-Jona, March 2015

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1. Safety Regulations

1.1. Correct Use

GasGard XL Wall Mount Controller (hereinafter referred to as Control Unit) is a compact Control Unit in wall housing for connection of up to 8 EX, TOX and/or OX sensors. The Control Unit is suitable for a large number of applications in many industrial areas. Simplest installation and user-friendly configuration via push buttons with comfortable editing and copying functions make the unit an ideal control instrument for smaller, independent gas warning systems.

It is imperative that this operating manual be read and observed when using the product. In particular, the safety instructions, as well as the information for the use and operation of the product, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.



Danger!

This product is supporting life and health. Inappropriate use, maintenance or servicing may affect the function of the device and thereby seriously compromise the user's life.

Before use the product operability must be verified. The product must not be used, if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

Alternative use, or use outside these specifications will be considered as non-compliance. This also applies especially to unauthorised alterations to the product and to commissioning work that has not been carried out by MSA or authorised persons.

1.2. Liability Information

MSA accepts no liability in cases where the product has been used inappropriately or not as intended. The selection and use of the product are the exclusive responsibility of the individual operator.

Product liability claims, warranties also as guarantees made by MSA with respect to the product are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

2. Description

2.1. General overview



Fig. 1 GasGard XL

The control system is a wall mounted version of a permanent gas warning device. It is used to monitor industrial premises and installations for the presence of combustible, explosive, toxic gases or air/vapour mixtures and oxygen content. The control system provides power to the sensors, signal conditioning and display of measured gas concentrations, alarm thresholds, outputs for alarm devices and self-monitoring diagnostics.

The unit consist of up to 8 channels for monitoring active or passive sensors.

It can be used for:

- **EX-monitoring** for protecting operational plants and individuals working there by continuously monitoring the atmospheres for potentially explosive gases/vapours in air before they reach the lower explosion limit – activating alarms and initiating risk aversion measures.
- It is approved in accordance with Directive 94/9/EC [ATEX].
- **OX-monitoring** for protecting individuals by continuously monitoring the atmosphere for oxygen deficiency or oxygen enrichment or monitoring the inerting of operational plants.
- It is approved in accordance with Directive 94/9/EC [ATEX].
- **TOX-monitoring** for protecting individuals by continuously monitoring the atmosphere toxic gas concentrations.

In case of reaching the set limit values, e. g. maximum/minimum concentration in the atmosphere, an alarm will be activated.

Typical applications are:

- Chemical and petrochemical industry,
- Paint and solvent industry,
- Gas-processing industry and
- Municipal areas.

2.2. Control Unit

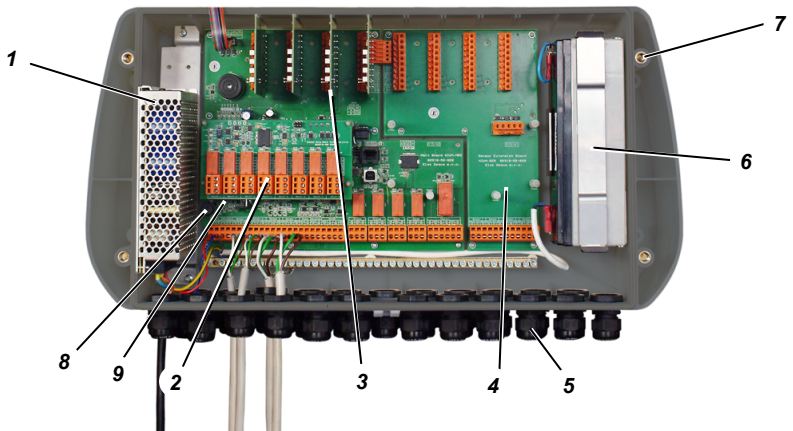


Fig. 2 Enclosure

The Control Unit consist of the following basic modules:

- Enclosure with mounting holes (7) and cable entries (5)
- Power Supply (1)
- Backup Battery (6)
- Sensor Extension Board (4)
- Channel Board (3)
- Channel Relay Board (2)
- Internal Fuse T4 A (8)
- Internal Fuse T250 mA (9)

2.2.1. Wall Mount Enclosure

The Control Unit has a plastic ABS enclosure in accordance with IP 56. Dimensions 515 mm x 277 mm x 129 mm.

Cable entry points are not provided. They are predesigned on the bottom of the enclosure.

The front panel is moulded with predesigned holes for fully equipped configuration (8 channels).

The unit is mounted by 4 screws.

2.2.2. Power Supply

- 100 W for fully equipped unit from 4 to 8 channels.

The power supply accepts main AC and DC power. 24 VDC external power is possible.

Switching power supply certified CE, UL, CSA (100 to 255 VAC; 50/60 Hz).

In case of loss of main power the power supply automatically switches to backup battery.

Power source for detectors from 24 VDC \pm 20 %.

2.2.3. Backup Battery

Two batteries 12 VDC/2.2 Ah (connected in series) can be incorporated optionally into the Control Unit. The batteries supply 20 minutes of backup for 8 catalytic combustion sensors.

Operating under back-up power is indicated on the front panel (Power LED starts blinking).

2.2.4. Main Board

The Main Board is equipped by the most performance microcontroller which offers many interfaces. Further it includes watchdog, internal buzzer (85 dB), standard common outputs and battery charger circuit.

All necessary information is stored on the Main Board.

Following communications are possible:

- 1 Ethernet configurable for ModBus TCP/IP (galvanically isolated)
- 1 RS485 configurable for ModBus RTU (galvanically isolated)
- 1 USB configurable for ModBus RTU.



The communication shall not interfere with the operation of the Control Unit.

For SCADA visualization software all three interfaces can be used. For service access only both of ModBus RTU communications can be used (safety

precaution).

Standard common outputs are incorporate:

- 2 SPDT (**S**ingle **P**ole **D**ouble **T**hrow) relays common alarm (ALARM 1 and ALARM 2)
- 1 DPDT (**D**ouble **P**ole **D**ouble **T**hrow) relay common fault
- 2 addressable common horn relays.

2.2.5. Display Board

The Display Board is located on the back side of the lid.

It includes microcontroller, watchdog, push buttons and graphic display (128x64).

2.2.6. Sensor Extension Board

The sensor extension board is used for fixing channel boards and for connecting internal communication.

For Sensor connection please refer to Section 0.

2.2.7. Channel Board

There are two versions of channel boards available according to the requested sensor type (passive sensors, 4-20 mA transmitters).

Every board includes 4 LEDs (A1, A2, Status, Power) and fits to Channel's Connectors (4 on the Main Board, 4 on the Sensor Extension Board).

The sensors power and connection is designed as "fail-to-safe" (wrong connection/configuration does not damage the remote sensor).

2.2.8. Channel Relay Board

Every Channel Relay Board provides 8 output relays and is connected to the Main Board or to the Sensor Extension Board (one by one) via connectors. Relays are fully configurable by user from the front panel or from the connected PC via configuration software.







Two optional SPDT relays (**S**ingle **P**ole **D**ouble **T**hrow) per channel (8 relays per 4 channels) are configurable for individual alarms:

- Normally open/close
- Normally energized/de-energized
- Latching/non latching
- Increasing/decreasing
- N out of m voting
- New re-invoked alarms (common horn relays only)
- Grouping
- Contacts are resistive load.

2.2.9. Safety Symbols according to EN 61010-1

The following table shows the safety symbols used on the device according to EN 61010-1.

Table of Safety Symbols

Symbol	Description
	DC Voltage
	AC Voltage
	Earth Terminal
	Protective Conductor Terminal
	Caution, Risk of Electrical Shock
	Caution, Risk of Danger

2.3. Front Panel

The Front Panel allows communication with the Control Unit.

It is used to monitor the status of all connected field sensors, to determinate system settings and to configure all parts.

On the panel there are:

- LCD graphic display (5)
- Four control LEDs per channel (6)
- Three Common LEDs (1)
- Alarm Acknowledgement button (4)
- Alarm Reset button (2)
- Four Control push buttons (3)

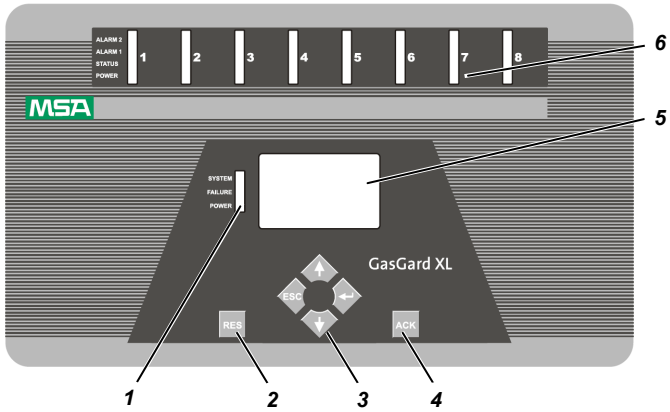


Fig. 3 Operator Panel

- | | |
|------------------------|----------------------------|
| 1 Common LEDs | 4 Alarm Acknowledgement |
| 2 Alarm Reset | 5 Graphic Display |
| 3 Control Push Buttons | 6 Channel Status Info LEDs |

2.3.1. Graphic Display

The Control Unit has a 128 x 64 pixel large graphic display which shows information of all channels.

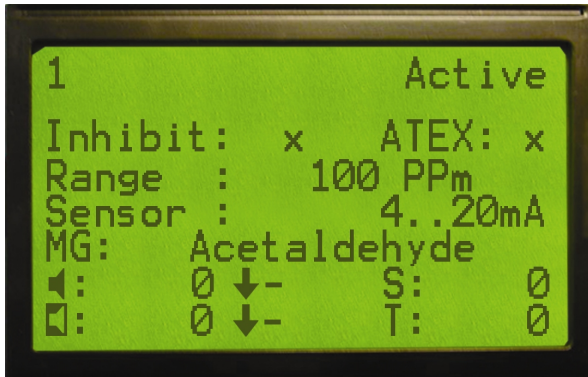


Fig. 4 Graphic Display

2.3.2. Control Push Buttons

Using the control push buttons you can operate the menu prompt as shown below. For more information please refer to Section 4.



Right button [←]



Up Button [↑]



Left button [ESC]



Down button [↓]



Alarm Acknowledgement



Alarm Reset

2.3.3. Channel Board Status Info LEDs

For each of eight Control Channels there are four LEDs for monitoring the operating status of the units.

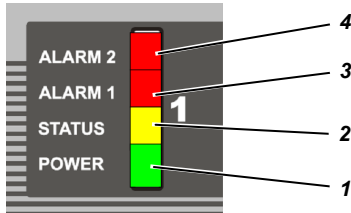


Fig. 5 Channel Status Info LEDs

- | | | | |
|---|------------|---|-------------|
| 1 | Power LED | 3 | Alarm 1 LED |
| 2 | Status LED | 4 | Alarm 2 LED |

- The **Power LED** (green) indicates the channel is under power and is enabled by the system.
- The **Status LED** (yellow) indicates the channel is in a fault condition. When the LED is blinking (with 0.5 Hz) the channel is inhibited or in service.
- The **Alarm 1 LED** (red) indicates that 1st alarm level has been reached. It indicates different statuses:
 - 4 Hz blinking: 1st alarm level has been reached (not acknowledged yet)
 - Steady: 1st alarm is acknowledged but is still inside alarm range.
 - 0.5 Hz blinking: 1st alarm is configured as latching. Measured value is out of alarm level (not reset yet).
- The **Alarm 2 LED** (red) indicates that 2nd alarm level has been reached. It indicates different statuses:
 - 4 Hz blinking: 2nd alarm level has been reached (not acknowledged yet)
 - Steady: 2nd alarm is acknowledged but is still inside alarm range.
 - 0.5 Hz blinking: 2nd alarm is configured as latching. Measured value is out of alarm level (not reset yet).

2.3.4. Channel Relay Board Status LED

Each Channel Relay Board has a small smd LED on the board marked as VD1, which indicates different statuses:

0.5 Hz blinking	Channel Relay Board is activated in the system and works properly
Steady	Channel Relay Board is activated in the system and is in a fault condition
Off	Channel Relay Board is activated in the system

2.3.5. Unit Status Info LEDs

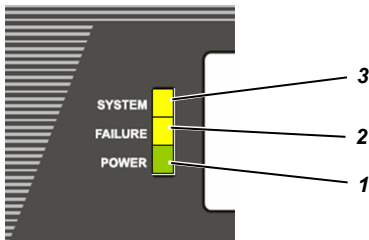


Fig. 6 Channel Status Info LEDs

- | | | | |
|---|-------------|---|------------|
| 1 | Power LED | 3 | System LED |
| 2 | Failure LED | | |

- The **Power LED** (green) indicates that the Control Unit is under power. A blinking LED (0.5 Hz) indicates power supply from battery.
- The **Failure LED** (yellow) indicates that some sensor is in fault condition.
- The **System LED** (yellow) indicates that the Control Unit has a system fault.

3. Installation



Before beginning the installation, with the help of the shipping documents and the sticker on the shipment carton, check that the delivered components are complete and correct.

The installation location for the Control Unit must be outside the potentially explosive area and free of corrosive gases.

Sensors for use in the Ex area must have the appropriate Ex approval and must be installed in accordance with all relevant local and national regulations.

MSA configures and calibrates all control systems with a checklist and all systems are supplied with a data sheet for each measuring point.

The gas warning system must only be installed by qualified personnel after reading the documentation supplied.

All relevant local and national regulations and instructions must be observed.

The correct assignment of each sensor and control system module must be ensured during installation by referring to the serial numbers indicated on the data sheet.

3.1. Mechanical Installation

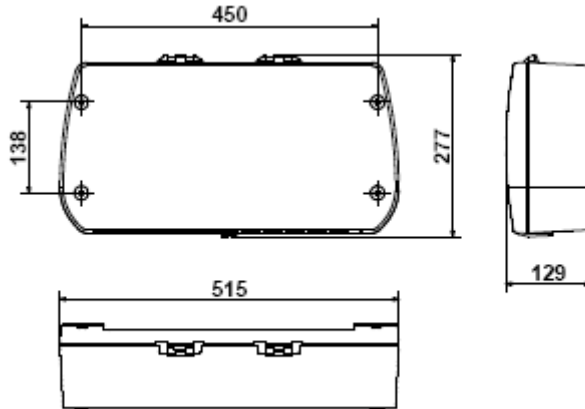


Fig. 7 Mounting Drawing

Mount the Control Unit as follows:

- (1) Mark the holes as shown in Fig. 7 for the four fixing screws.
- (2) Drill four holes of appropriate diameter for wall plugs.
- (3) Remove the front panel from the enclosure.
- (4) Fix the unit to the wall, by appropriate screws (M6 screws or 6.4 mm SPAX)
- (5) Attach lid with existing screws.

3.2. Electrical Installation

**Attention!**

The control system must be installed only in compliance with the applicable regulations, otherwise the safe operation of the instrument is not guaranteed.

During installation, use the internal earth connection to ground the instruments.

If an external earth connection is permitted or demanded by the local authorities, it serves merely as additional earthing.

The installation location shall be selected such that the environmental conditions indicated in the technical data can be met.

When installing the Control Unit the following conditions must be met to comply with the EMC Directive

- To connect devices to the main power supply, a fault-free ground or fault-free potential bonding conductor must be provided.
- The user must ensure an appropriate supply voltage in accordance with EMC directives.
- If the devices are supplied from a direct voltage (DC) source, the supply cable must be shielded.
- All sensor and control cables must be shielded.
- Shielded cables must have at least 80 % coverage.
- Control and sensor cables must be installed physically separate from power supply cables.
- Shielded cables must be laid in a group. If cable lengths are to be extended using terminal boxes, the boxes must be shielded and the internal connections must be kept as short as possible.

The control system can be simultaneously connected to AC mains voltage and 24 VDC in which case power will automatically switch over if the AC main supply should fail. Terminals to connect an external 24 VDC supply are shown in Appendix D – Terminal Connectors.

Please note that when using an external 24 VDC supply the charging function for the backup battery must be deactivated. For more information please refer to Section 5.3.



Warning!

When opening the instrument's housing care must be taken of high voltage danger from relay contacts and main power supply.

Only authorized person should be authorized to open the instrument. The AC mains source shall not be subjected to voltage variations exceeding the limits as specified in this Manual.

The AC mains source shall be free of any surges and sudden voltage changes due to heavy electrical loads and disturbances as caused by inductive or capacitive loads, false contacts and strong electromagnetic interference.

Do not penetrate the housing of the power supply with screw drivers or small parts. Care must be taken with screws falling into the power supply!

In addition to the above, if the GasGard XL is supplied by a direct voltage (DC) source, the supply cable must be properly shielded.

3.2.1. Power Supply

Standard power supply 100 to 255 VAC, 50/60 Hz, 24 VDC $\pm 20\%$ is used to power internal circuits up.

Three options to power up the Gasgard XL are available by MSA:

1. Mains supply 100 to 255 VAC only *)
2. Mains supply 100 to 255 VAC **and** 24 VDC internal backup battery
3. External 24 VDC only, no internal backup battery *)

*) Make sure that the battery charging function is deactivated if no backup battery is used. For more information please refer to Section 5.3.

Main voltage is connected to terminal **L** (Line), **N** (Neutral), and ground.

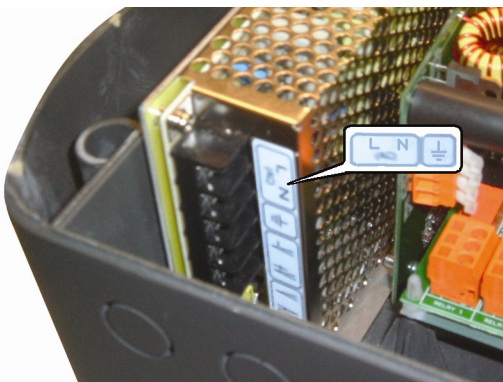


Fig. 8 Connecting Main Supply

3.2.2. Sensor connection

Sensor must be connected to the terminals on the main board or sensor extension board (for details → Appendix C and Appendix D).

**Attention!**

Follow the instructions for components subject to damage from static electricity!

Incorrect connection of the sensors shall not damage both of Control Unit or sensor.

The wiring diagrams for different sensors are shown in Appendix B. The sensors must be connected to the terminals using shielded cables.

For the maximum cable length of sensors refer to the technical specification.

4. Operation

The control system's user interface is the integrated operation/display unit. This unit displays alarms and warnings as well as system parameters.

Connecting the operating unit to a PC permits a user friendly operator interface.

The input fields are set up as selection fields as much as possible, with all known inputs displayed. Selection is cursor-controlled, which makes use of the integrated operation/display unit very easy.

4.1. Basic Screen

The basic screen displays the information about active channels status (active, inhibit, in service) including information about the system (system date and time).

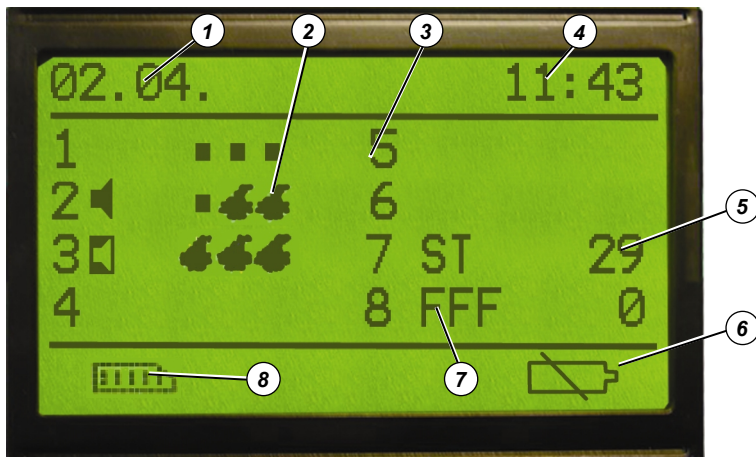


Fig. 9 Basic Screen

1	System Date	5	Actual Value
2	FlameGard Status	6	Battery Status
3	Channel Number	7	Status Information
4	System Time	8	Events Archive














System Date and Time : Actual preset values for events archive

Channel Number : Position of the channel board counted from the left to the right on the Main Board (1 ... 4) and the Sensor Extension Board (5 ... 8).

Status Information : Information about the channel status (alarm, fault, in service etc.; see symbols)

- Actual Value** : Measured value of gas concentration.
- Events Archive** : Last 1000 events (Alarms, Alarms acknowledgement and reset, Faults, Calibrations etc.) are stored in the memory and can be restored by the operator.

Table of Status Info Symbols

Symbol	Description
	Alarm 1 Displayed if the alarm level is reached
	Alarm 2 Displayed if the alarm level is reached
	Overrange Displayed if channel signal is above the range (more than 105 % from FS).
	Underrange Displayed if channel signal is below the range (less than -5 % from FS)
	Sensor Fault Displayed if a sensor connection is broken or shorted
	Internal Channel Fault Displayed if channel board has a system fault
	In Service Displayed if channel is in service mode (calibration)
	Inhibit Displayed if channel is inhibited
	STEL Alarm Displayed if the STEL alarm is reached
	TWA Alarm Displayed if the TWA alarm is reached
	Battery is included and is under charging.
	Battery is included but discharged (The symbol starts blinking (0.5 Hz) if the battery cable is disconnected)
	Battery not included

If FlameGard is connected to the mA channel board then basic screen contains further symbols defining the FlameGard status:



FlameGard is connected – No Flame



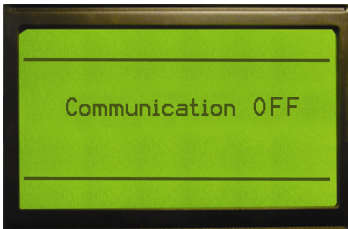
Warning - FlameGard is in 1st alarm condition



Alarm FlameGard is in 2nd alarm condition








The channel where alarm condition is reached as the first one is identified by blinking value.



The Display board screen displays text “Communication OFF” in case of communication failure between Display board and Main board.

4.2. Controls

On the front panel there are 4 control push buttons for operating and configure the Control Unit.

Symbol	Description
	ENTER Pressing this button will enter a lower menu or accept the change.
	UP Pressing this button will change the values / options forward. (Holding this button and pressing the DOWN button will change the values / options backward).
	DOWN Pressing this button will replace the cursor to the next position.
	ESCAPE Pressing this button will escape the upper menu or cancel the change.
	ACKNOWLEDGEMENT In case of alarm pressing will disable audible signal.

**RESET**

Pressing this button will reset alarm relays to normal operating conditions (only in case of measured value drops below latching alarm level).

Using the Hotkeys

Pressing some of the control push buttons on the front panel for a longer period will start some additional features of the basic screen.

**UP**

Pressing this button for 5 seconds will change the language from English to the local one.

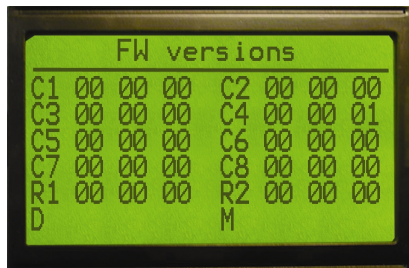
**ESCAPE**

Pressing this button for 5 seconds will start the GasGard XL Selftest Process:

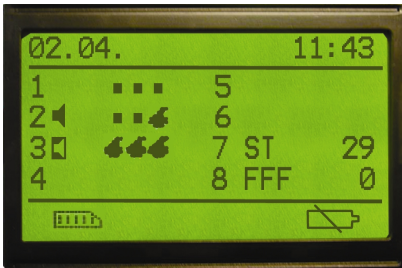
- a test of the LCD display
- a test of all LEDs
- a test of internal buzzer.

After finishing the selftest the actual firmware version for every assigned board will be displayed:

- C1 ... C8 - Channel boards,
- R1 ... R2 - Relay Boards,
- D- Display Board,
- M – Main Board.



4.3. Viewing Channel Information



(1) Viewing the Basic Screen press **[ENTER]**.

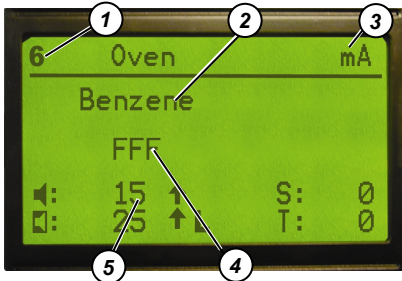


(2) Select the channel by pressing **[DOWN]**



(3) Press **[ENTER]** to confirm.

- On the next screen will be shown the channel information as:



- ① - Channel number
- ② - Measured gas
- ③ - Active/Passive Channel Symbol
- ④ - Measured gas value and unit or channel state
- ⑤ - Preset alarm levels

4.4. Viewing Events Archive



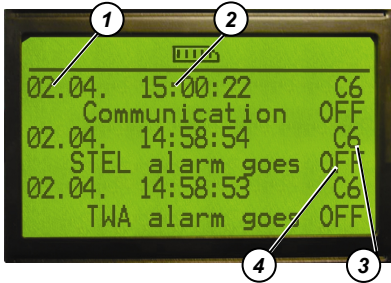
- (1) Viewing the Basic Screen press **[ENTER]**.



- (2) Select the Events Archive by pressing **[DOWN]**



- (3) Press **[ENTER]** to confirm.



- On the next screen will be shown the information as:

- ① - Event Date
- ② - Event Time
- ③ - Channel Identification
- ④ - Event Description



- (4) Scroll the Events Archive by pressing **[DOWN]** or **[UP]**.

List of Assigned Events

00	Device Turned On	27	Master Calibration Saved
01	Communication OFF	28	New Calibration Saved
02	Communication ON	29	Coil Relay 1 FAULT
03	Board Reset	30	Coil Relay 2 FAULT
04	Alarm1 ON	31	Coil Relay 3 FAULT
05	Alarm1 OFF	32	Coil Relay 4 FAULT
06	Alarm1 Acknowledgement	33	Coil Relay 5 FAULT
07	Alarm1 Reset	34	Coil Relay 6 FAULT
08	Alarm2 ON	35	Coil Relay 7 FAULT
09	Alarm2 OFF	36	Coil Relay 8 FAULT
10	Alarm2 Acknowledgement	37	Main Power Supply OFF
11	Alarm2 Reset	38	Main Power Supply ON
12	UnderRange	39	Low Battery
13	OverRange	40	Battery FAULT
14	STEL alarm ON	41	Common Coil Relay Horn2 FAULT
15	STEL alarm OFF	42	Common Coil Relay Horn1 FAULT
16	STEL alarm Acknowledgement	43	Common Coil Relay Alarm2 FAULT
17	TWA alarm ON	44	Common Coil Relay Alarm1 FAULT
18	TWA alarm OFF	45	Common Coil Relay Fault FAULT
19	TWA alarm Acknowledgement	46	RAM Check FAULT
20	Sensor FAULT	47	ROM Check FAULT
21	System FAULT	48	System Password entered
22	Start of Calibration	49	Calibration Password entered
23	ZG accepted	50	Read FAULT
24	SG accepted	51	Write FAULT
25	FAULT of ZG result	52	Test Mode ON
26	FAULT of SG result	53	Test Mode OFF

List of Assigned Channel Identifications

C1	Channel Board 1
C2	Channel Board 2
C3	Channel Board 3
C4	Channel Board 4
C5	Channel Board 5
C6	Channel Board 6
C7	Channel Board 7
C8	Channel Board 8
R1	Channel Relay Board 1
R2	Channel Relay Board 2
DB	Display Board
MB	Main Board
RTC	Real Time Clock

5. Configuration

All parameters of the GasGard XL Control Unit can be configured by pressing control pushbuttons on the front panel, or using configuration software tool (→ Section 6).

There are two menus that allow changing unit parameters:

System Menu

The operator can change any parameter needed according to application requirements. The system menu is accessible only via access password.

From the system menu it is possible to enter additional menus for setting up the Control Unit:

- Relay Setting Menu for setting up individual relay parameters
- Calibration Menu for calibrating all channels
- General Setting Menu for setting up units general parameters

Direct access to the Calibration Menu

The operator can calibrate every channel, but he is not able to change anything else on the configuration of the unit.

This function is accessible only via access password.



There are different passwords for System Menu and direct access to the Calibration Menu.

Passwords can be set in the General Setting Menu.

5.1. System Menu

The system menu includes all parameters that allow fully configuring the complete unit as:

- Modifying channel parameters
- Output relays setting (Relays setting menu)
- Calibration (Calibration menu)
- General settings (General setting menu)



- (1) Press **[ENTER]** and **[ESCAPE]** together and hold them for a second.
 - You are prompted to input the password.



Access Password is any number from 1 to 9999.



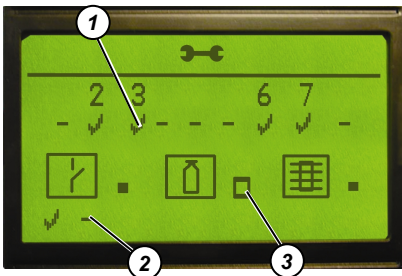
The factory password preset value is 123.



- (2) Use **[UP]**; **[DOWN]** and **[ENTER]** to enter the password.



- (3) Press **[ENTER]** to confirm the password.
 - If the password is valid the system menu screen appears.



On the system menu screen are displayed:

- ① - Channel Board Identification Mark
- ② - Relay Board Identification Mark
- ③ - Setting Icons

Channel number

If selected allows to set channel parameters.



Channel Board Identification Mark

Needs to be selected by operator to confirm that a channel board is inserted in the slot.

Relay Board Identification Mark

Needs to be selected by operator to confirm that a channel relay board is inserted in the slot (left mark for the 1st board (connected to the Main Board) counting from the left, right mark for the 2nd board (connected to the Sensor Extension Board) counting from the left).

Setting Icons

Marking icons will allow to enter into additional submenu as there are:



Relays setting menu (individual relays modification menu; → Section 5.2).



Calibration menu (Channel calibration; → Section 5.4)



General setting menu (General parameters setting; → Section 5.3)



(1) Use control push buttons to select the item to set.



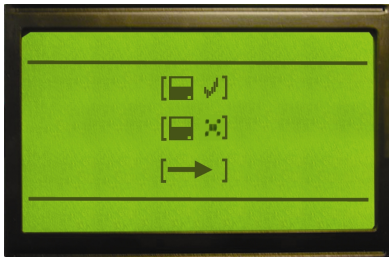
(2) Press **[ENTER]** to confirm the selected item.



A selected setting item becomes inverse and non-blinking.



Pressing **[ESCAPE]** will leave the system menu.



(3) Use control push buttons to set:



– Accept changes and leave menu.



– Do **not** accept changes and leave menu.



– Return to the system menu.

5.1.1. Description of Channel Parameters

(1) Enter into System Menu
(→ Section 5.1).



(2) Use control push buttons to select a channel number to modify.



(3) Press **[ENTER]** to confirm.

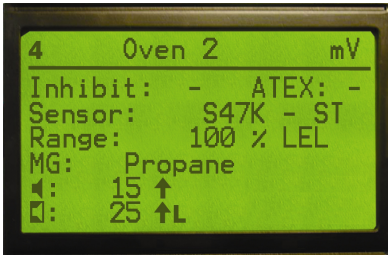
- First of two configuration screens appears.



Setting ATEX option has this immediate effect on ATEX related parameter:

- Alarms delay parameter is fixed to 0 [sec]
- Alarm1, Alarm2 Edges are fixed to Rising Edges
- Alarm1, Alarm2 thresholds limited to 0..80 [%] Full Range
- Alarm2 is fixed to be Latching
- Assigned relays are fixed to be NE (Normally Energised)

Check all ATEX related parameters when you unmark ATEX option as they keep ATEX configuration.



Inhibit

Marking will inhibit the channel

ATEX

Marking will preset alarm and relay conditions according to ATEX 94/9 requirements.

Range

Defines measuring range and units.

Sensor

Specifies sensor head to be connected.

MG

Defines measuring gas.



Alarm 1 Parameters group are affected by ATEX option.

Alarm 1 value threshold.



- Rising value will activate alarm.



- Falling value will activate alarm.



- Alarm is deactivated automatically.



- Alarm is latched until acknowledgement by **[RESET]**.



Alarm 2 Parameters group are affected by ATEX option.

Alarm 2 value thresholds.



- Rising value will activate alarm.



- Falling value will activate alarm.



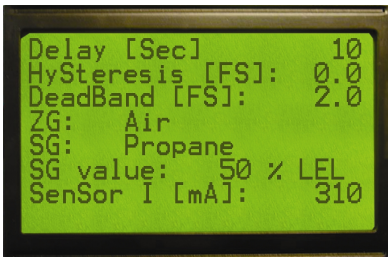
- Alarm is deactivated automatically.



- Alarm is latched until acknowledgement by [**RESET**].



Use [**DOWN**] to toggle between the two screens.



The second screen displays:

Delay

Time delay for alarm activating (0 – 180 sec.)



In ATEX version value is fixed to 0 [sec].

Hysteresis

Defines Alarm 1 and Alarm 2 hysteresis (from 0.0 to ± 2.0 % FS)

Dead Band

Defines zero baseline (from 0.0 to ± 5.0 % FS)

ZG

Zero gas to be used for calibration.

SG

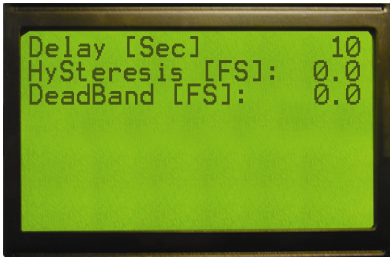
Span gas to be used for calibration.

SG value

Span gas value

Sensor I

Defines current sensor required for the selected type of sensor head (only for passive sensors).



If active channel (mA) is used then the second screen contains this information only.



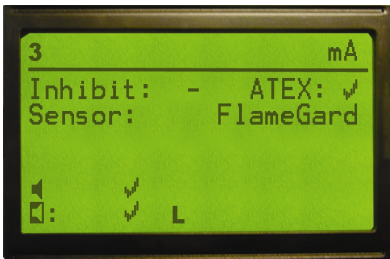
If active channel (mA) is used then the first screen contains also STEL and TWA parameters.

S: 0

Set STEL threshold value from the range 0..FullRange Nonzero value enable STEL alarm.

T: 0



Set TWA threshold value from the range 0..FullRange Nonzero value enables TWA alarm.

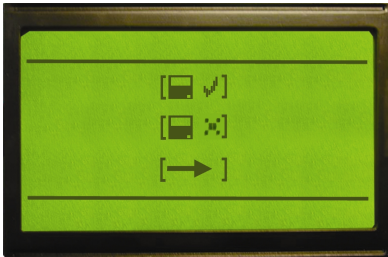





If flame detector (FlameGard, FG 5 series) is selected from the sensor list the setting menu will be changed into screen as shown on the picture. Second screen will contain only "Delay" parameter.



Alarm level evaluation to respective flame detector.

Sensor Type	1 st Alarm 	2 nd Alarm 
FlameGard	7.5 [mA]	12.5 [mA]
FlameGard 5 MSIR-H	15.0 [mA]	19.0 [mA]
FlameGard 5 MSIR	15.0 [mA]	19.0 [mA]
FlameGard 5 UV/IR	15.0 [mA]	19.0 [mA]
FlameGard 5 UV/IR-H	15.0 [mA]	19.0 [mA]
FlameGard 5 UV/IR-H2	15.0 [mA]	19.0 [mA]



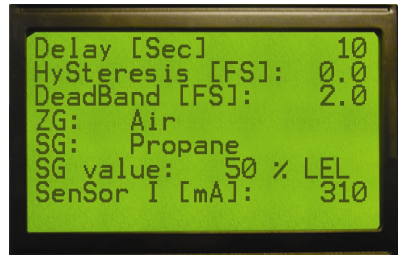
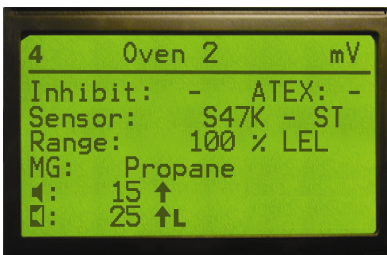
- (4) Use control push buttons the set:
-  – Accept changes and leave menu.
 -  – Do **not** accept changes and leave menu.
 -  – Return to the system menu.

5.1.2. Modifying Channel Parameters

- (1) Enter into System Menu
(→ Section 5.1).



- (2) Use control push buttons to select a channel number to modify and press **[ENTER]** to confirm.
- First of configuration screens appear (left figure).



Use **[DOWN]** to toggle between the two screens.



- (3) Use control push buttons to select required parameter.



- (4) Press **[ENTER]** to confirm the selected parameter.



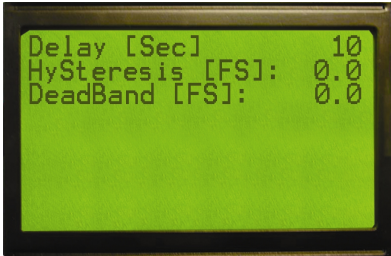
- (5) Use control push buttons change parameter value.



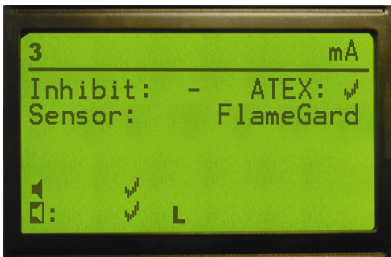
(6) Press **[ENTER]** to accept the changes.



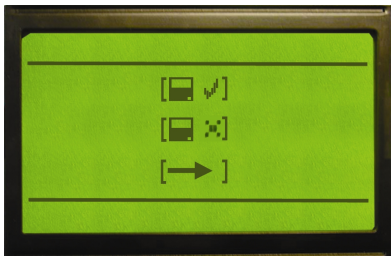
Pressing **[ESCAPE]** will return to the upper menu.



If active channel (mA) is used then the second screen contains this information only.



If flame detector (FlameGard, FG 5 series) is selected from the sensor list the setting menu will be changed into this single screen.



(7) Use control push buttons to set:



– Accept changes and leave menu.



– Do **not** accept changes and leave menu.



– Return to the menu.

5.2. Relay Setting Menu

The relay setting menu allows setting configuration of every individual relay in relation to the individual channel.

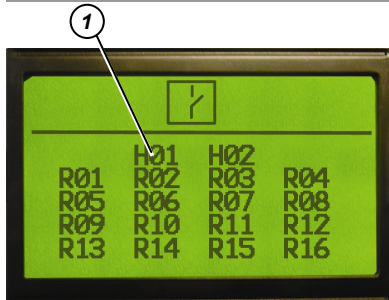
5.2.1. Description of Relays Parameters

(1) Enter into the system menu.



(2) In the system menu select the item for “Relay Setting Menu” and press **[ENTER]** to confirm (→ Section 5.1).

- First of two configuration screens appears.



① - **Horn Relay Number (H01-H02)**

Position of the horn relay on the Main Board.

② - **Relay Status (S)**

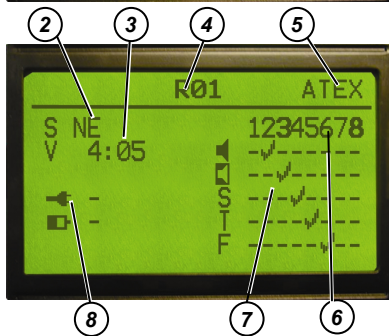
Defines contacts position in de-energized status.

NE - Normally energized

ND - Normally de-energized



In ATEX version value is fixed to NE.



③ - **Relays voting (V)**

Allows setting voting the selected relays.

④ - **Relay Number (R01-R16)**

1 - 8 (Channel Relay Board No.1)

9 - 16 (Channel Relay Board No.2)

⑤ - **ATEX status**






Defines the selected relay is related to the channel being configured according to ATEX regulation. ATEX channels are displayed in bold numbers on the screen. Some relay parameters are limited (for example normally energized status **S**: **NE** is only allowed to be set)

⑥ - **Channel Number**

Relates the relay to the selected channel (bold number indicates channel is configured according ATEX regulation).



⑦ - Configuration Grid

Setting following items to the grid will define the status on the selected channel that activates the selected relay.



-  - Alarm 1 is set.
-  - Alarm 2 is set.
-  - STEL alarm is set.
-  - TWA alarm is set.
-  - Fault is set

⑧ - Battery/Power Relay Control

Sets the relay that will be energized in case if:

-  The main power is off and the Control Unit is powered from battery.
-  The battery voltage is low.

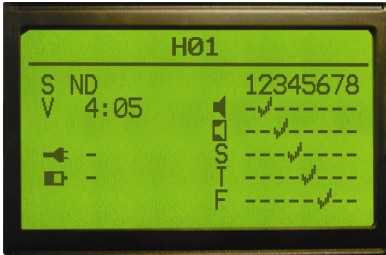
Relay is set using these symbols:

-  - Not selected
-  - Selected



Use **[DOWN]** to toggle between the two screens.

Example of relay configuration



Relay HORN no. 1:

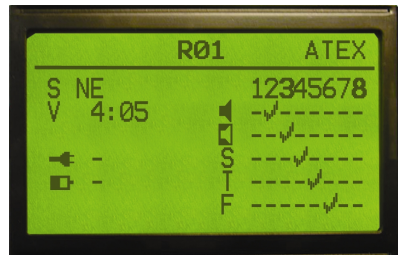
- Is configured as normally de-energised (ND).
- Is not activated if power is off or battery comes down
- Is voted if 4 from 5 conditions are fulfilled and
- Is energised if at least 4 of these conditions are fulfilled
 - Channel 2 comes into alarm 1
 - Channel 3 comes into alarm 2
 - Channel 4 comes into STEL alarm
 - Channel 5 comes into TWA alarm
 - Channel 6 comes into FAULT

5.2.2. Modifying Output Relays

- (1) Enter into the system menu.



- (2) In the system menu select the item "Relay Setting Menu" and press [ENTER] to confirm (→ Section 5.1).
 - First (left figure) of the configuration screens appears.



Use [DOWN] to toggle between the two screens.



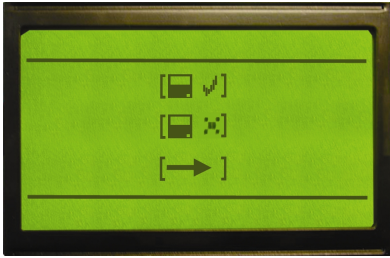
- (3) Use control push buttons to select and to change required parameter.



- (4) Press **[ENTER]** to accept the parameter changes.



Pressing **[ESCAPE]** will return to the upper menu.



- (5) Use control push buttons to set:



– Accept changes and leave menu.



– Do **not** accept changes and leave menu.



– Return to the system menu.



Common relays are not configurable. Their condition is set to fixed settings (→ below).

Fixed setting for Common Relays

- Alarm 1 on any channel will de-energise common Alarm 1 relay on Main Board.
- Alarm 2 on any channel will de-energise common Alarm 2 relay on Main Board.
- Fault on any channel will de-energise Fault relay on Main Board.
- System fault will de-energise Fault relay on Main Board.

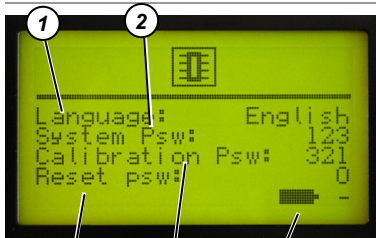
5.3. General Setting Menu

General setting menu allows to configure access passwords for the system and the calibration menu and to set parameters.

- (1) Enter into System Menu
(→ Section 5.1).



- (2) Use control push buttons to select “General Setting Menu” and press **[ENTER]** to confirm.
 - First of configuration screens appears.



- ① - **Language**
Marking will allow setting required language.
- ② - **System Psw:**
Setting the system password.



Factory preset password is: 123

- ③ - **Battery Back Up**
Select if battery backup is used.
- ④ - **Calibration Psw:**
Setting the calibration password.



Factory preset password is: 321

- ⑤ - **RESET Psw:**
Setting password for alarm reset.

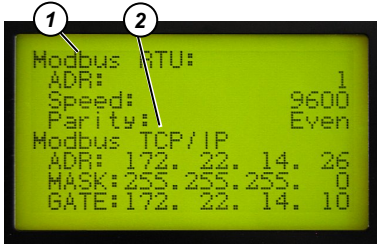


Factory preset password is: 0

Setting any above password to “Zero” (0) will disable the password itself.



Use [DOWN] to toggle to the second screen.



① - **Modbus RTU**

Defines the RS 485 communication parameters.

ADR – unit address

Speed – communication speed

Parity – setting the parity (Even/Odd)

② - **Modbus TCP / IP**

Defines the Ethernet communications parameters.

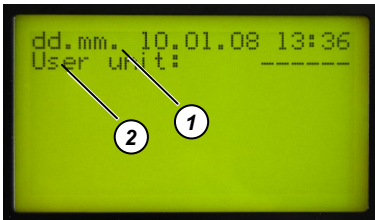
ADR – unit IP address

MASK - subnetwork mask

GATE – internet gate



Use [DOWN] to toggle to the second screen.



① - **Time/date**

Different time or date format (dd.mm. or mm.dd) can be selected.

② - **User Unit**

Marking will allow to define own measuring units by the operator.



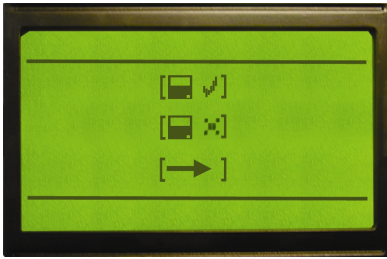
(3) Use control push buttons to select and to change required parameter.






(4) Press [ENTER] to accept the parameter changes.



Pressing [ESCAPE] will return to the upper menu.



- (5) Use control push buttons the set:
-  – Accept changes and leave menu.
 -  – Do **not** accept changes and leave menu.
 -  – Return to the system menu.

5.4. Calibration

Calibration procedure must be used regularly to prove the sensors performance and to assure the system is working properly. Generally the calibration is required:

- At start-up (initial calibration)
- Periodically according to users or local official requirements
- After a sensor replacement or for safety reasons

During calibration, the specific requirements of the sensors must be observed according to the relevant operating instructions. (e.g. sensor warm-up time, zero gas, test gas composition, test gas flow, test gas adapter, hose materials and lengths, etc.).

The Control Unit allows proceeding two kinds of calibrating every individual channel:

- Manual calibration (→ Section 5.4.1)
- „One man“ calibration (→ Section 5.4.3)

The difference between these procedures is only in time that is expected to perform calibration.

There is a certain delay set for „One man“ calibration to allow the operator to apply zero and span gas himself on the site. After returning from the site he can accept or cancel obtained values.

5.4.1. Manual Calibration



Attention!

Manual calibration must be used for **passive** detectors calibration only. Active sensors are calibrated at factory or at site.



- (1) Press **[ENTER]** and **[ESCAPE]** together and hold them for a second.

- You are prompted to input the password.



Access Password is any number from 1 to 9999.



The factory password preset value is 321.



- Use **[UP]**; **[DOWN]** and **[ENTER]** to enter the password.



- Press **[ENTER]** to confirm the password.

- If the password is valid the calibration menu screen appears.

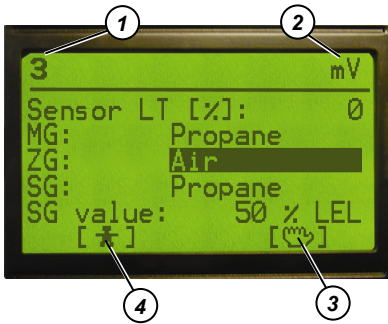


- (2) Use **[UP]**; **[DOWN]** and **[ENTER]** to enter number of channel ① for calibrating.

- You are entering the calibration start screen of the selected channel (→ next figure).



Only channels allowed in the system are displayed.



- ① - Channel number
- ② - Sensor type
- ③ - Start Manual Calibration
- ④ - Start One man Calibration

Sensor LT

Provides info about expected lifetime of the sensor head (% value of span gas signal related to the master calibration).



If the Sensor LT value starts blinking it means that the sensor is eligible to be replaced.

If the Sensor LT value is 0 % the sensor must be replaced.

MG

(Measured Gas) - Gas to be detected

ZG

Zero gas that should be used for calibration

SG

Span gas that should be used for calibration

SG Value

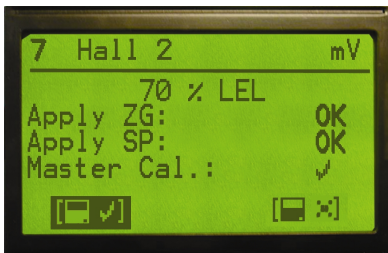
Concentration of the span gas to be used for calibration (for example 50 % LEL)



Use control push buttons to select

Manual Calibration and press **[ENTER]** to confirm.

- You are entering the calibrating screen.



- (3) Apply zero gas and wait until the displayed measured gas value is stable.
- (4) Then push **[Apply ZG]** (apply zero gas).
 - If the value is **within** a defined limit a **[OK]** symbol is displayed.
 - If the value is **outside** a defined limit an **[E]** symbol is displayed.



In case of an error **[E]** you can only cancel the calibration. There is no choice to accept.



Use **[ENTER]** to confirm any value.

- (5) If only Zero gas calibration is required, then press **[ZERO]**.
Zero gas value will be stored.
Calibration will be ended.

- (6) Apply span gas and wait until the displayed measured gas value is stable.
- (7) Then push **[Apply SG]** (apply span gas).
 - If the value is **within** a defined limit a **[OK]** symbol is displayed.
 - If the value is **outside** a defined limit an **[E]** symbol is displayed.



Use **[ENTER]** to confirm any value.



- (8) If a new sensor is used select **[Master Cal.]** (Initial calibration).
 - Calibration values are stored as the initial values. Any further calibration values will be compared with the initial to define conditions of the sensor head.
 - Expected sensor lifetime is calculated from the initial values.



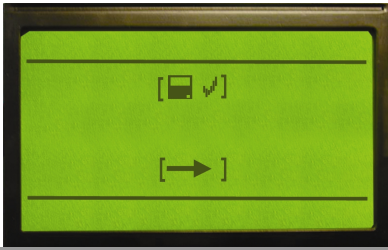
For selecting and changing calibration parameters use **[UP]**; **[DOWN]** and **[ENTER]**.





Use **[ENTER]** to confirm any value.



Use **[ESCAPE]** to return to upper menu.



(9) Use control push buttons to set values or return to the menu.

-  – To save all changes.
-  – To cancel all changes and return back to menu.

5.4.2. Manual Calibration (4 – 20 mA)

If the Channel board is configured to accept 4–20 mA input signals from either 2-wire or 3-wire remote transmitters it does not require any additional calibration.

5.4.3. One man Calibration

This procedure allows the operator to calibrate passive detectors without any other persons help. After setting the channel into „One man” calibration menu the system starts automatic calibration following these steps.

- The system waits for span signal scanning the sensor signal every 2 seconds
- After the span signal is achieved (signal oversteps the level „B”) last 4 samples of the zero making average value. The zero value is stored in to the memory (if the zero level is within acceptable limits „B1” and „B2”)
- After the span signal is achieved the system waits until the signal drops below limit „C”. Then it finds last four span signal values making average span value.
- Then span value is compared to a required span gas value (C2, C3) and then it is stored into the memory.
- During the automatic calibration the output relays are inhibited
- 5 minutes after span signal is stored the system goes into the measuring mode and will cancel alarm inhibition.
- After finishing One man calibration it is necessary to confirm zero and span gas values on the Control Unit.
- If the span signal is not received within 8 hours the channel will go automatically into the measuring mode.

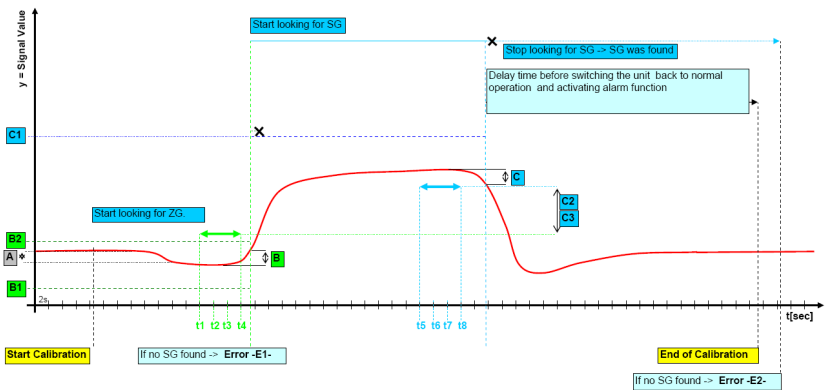


Fig. 10 Principle of “One man” Calibration

**Attention!**

This procedure shall be used for passive detectors calibration only!



You can interrupt the calibration on any time you want using the control buttons as follows:



– Do **not** accept changes and leave menu.



– Return back to the menu (for doing One man calibration for another channel).



– Pressing this button will accept changes and leave menu.



- (1) Press [**ENTER**] and [**ESCAPE**] together and hold them for a second.

- You are prompted to input the password.



Access Password is any number from 1 to 9999.



The factory password preset value is 321.



- Use [**UP**]; [**DOWN**] and [**ENTER**] to enter the password.



- (2) Press [**ENTER**] to confirm the password.

- If the password is valid the calibration menu screen appears.

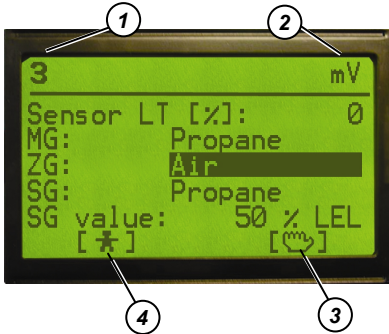


- (3) Use [**UP**]; [**DOWN**] and [**ENTER**] to enter number of channel ① for calibrating.

- You are entering the calibration start screen of the selected channel (→ next figure).



Only channels allowed in the system are displayed.



- ① - Channel number
- ② - Sensor type
- ③ - Start Manual Calibration
- ④ - Start One man Calibration

Sensor LT

Provides info about expected lifetime of the sensor head (% value of span gas signal related to the master calibration).

MG

(Measured Gas) - Gas to be detected

ZG

Zero gas that should be used for calibration

SG

Span gas that should be used for calibration

SG Value

Concentration of the span gas to be used for calibration (for example 50% LEL)



- (4) Use control push buttons to select **One man Calibration** and press **[ENTER]** to confirm.
 - You are entering the calibrating screen.

- (5) Apply zero gas for a minimum one minute and then span gas on the sensor location typically for 2 minutes.



Different time may be required depending on the specific T90 of sensor on use.

- (6) Check the obtained measured gas values.
- If the values are **within** a defined limit a **[OK]** symbol is displayed.
 - If the values are **outside** a defined limit an **[E]** symbol is displayed.



In case of an error **[E]** you can only cancel the calibration. There is no choice to accept.



- (7) If a new sensor is used select **[Master Cal.]** (Initial calibration).
- This will write calibration values as the initial values. Any further calibration values will be compared with the initial to define conditions of the sensor head.
 - Expected sensor lifetime is calculated from the initial values.



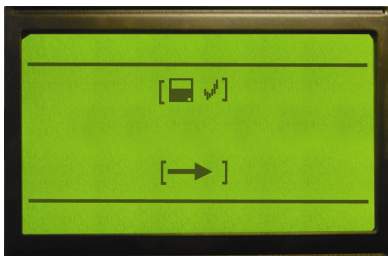
For selecting and changing calibration parameters use **[UP]**; **[DOWN]** and **[ENTER]**.





Use **[ENTER]** to confirm any value.



Use **[ESCAPE]** to return to upper menu.



- (8) Use control push buttons to set values or return to the menu.
-  – To save all changes.
 -  – To cancel all changes and return back to the calibration menu.

6. Configuration Software



Warning!

When opening the instrument's housing care must be taken of high voltage danger from relay contacts and main power supply.

Only authorized person should be authorized to open the instrument. The AC mains source shall not be subjected to voltage variations exceeding the limits as specified in this Manual.

The AC mains source shall be free of any surges and sudden voltage changes due to heavy electrical loads and disturbances as caused by inductive or capacitive loads, false contacts and strong electromagnetic interference.

Do not penetrate the housing of the power supply with screw drivers or small parts. Care must be taken with screws falling into the power supply!

In addition to the above, if the GasGard XL is supplied by a direct voltage (DC) source, the supply cable must be properly shielded.

6.1. Installation and Start

For software installation just insert installation CD into computer and run the installation file "**Install.exe**". Installation procedure will guide you through the installation process automatically.



Shortcut on the computers desktop is created automatically.

Hardware requirements	: PC, 512MB RAM, CPU 1.5 GHz or higher
System Requirements	: Windows 2000, Windows XP, Windows 7
Software Requirements	: Java 6 SE or higher

6.2. Using of Application

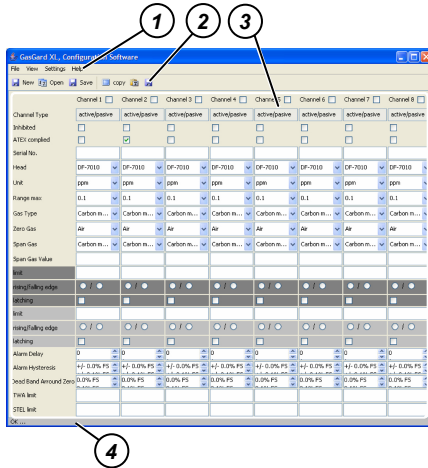


Fig. 11 Applications Main Screen

The applications main screen contains 4 basic parts:

- Menu Bar (1)
- Toolbar (2)
- Main Screen (3)
- Status Bar (4)

Menu Bar

In the menu bar there are four pull down menus to provide all functions for using the application:

- File
- View
- Settings
- Help

File

In the file menu you can receive or send a configuration to device unit, load or save a configuration from/to a file, print and exit the application.

View

In the view menu you can switch between 4 basic screens and show/hide toolbar and status bar.

For easy access customer can show particular screen clicking on the icon on the toolbar.

You can chose these options:

- Channels

-
- Outputs
 - Calibration
 - Logs.
-

Settings

In the settings menu there are the options “Connection type” and “Service function”.

Application can communicate with devices by the serial or USB port. You have to choose one port to use for communication.

The option “Service Function” offers to set language, device address, IP address and mask.

Dialog window also show information about firmware version.

Help

In the help menu you can find some help for using the application.

6.3. Multilingual System

The configuration software is a multilingual software.

Choose individual language from menu “Settings” and “Language”.



If you need any additional local language for configuration software please contact MSA or the next MSA representative.

6.4. Setting Up Channels

The screenshot shows the 'GasGard XL, Configuration Software' window. The interface includes a menu bar (File, View, Settings, Help) and a toolbar with buttons for Channels, Outputs, Calibration, Upload, Download, Open, and Save. The main area is a table for configuring eight channels. Each channel has a 'Channel Type' dropdown (set to 'active/passive'), 'Inhibited' checkbox, 'ATEX complied' checkbox, 'Channel Tag' text field, 'Head' dropdown (set to '4..20 mA'), 'Unit' dropdown (set to 'ppm'), 'Range max' dropdown (set to '0.10'), 'Gas Type' dropdown (set to 'Acetalde...'), 'Zero Gas' dropdown (set to 'Air'), 'Span Gas' dropdown (set to 'Acetalde...'), 'Span Gas Value' text field, 'Sensor Current' text field, 'Alarm Delay' spinner (set to '0'), 'Alarm Hysteresis' spinner (set to '+/- 0.0% FS'), 'Dead Band Around Zero' spinner (set to '0.0% FS'), 'TWA limit' text field, and 'STEL limit' text field. The table also includes 'AI' and 'AO' sections with status indicators and control buttons. The bottom of the window shows 'OK ...'.

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
Channel Type	active/passive	active/passive	active/passive	active/passive	active/passive	active/passive	active/passive	active/passive
Inhibited	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ATEX complied	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Channel Tag								
Head	4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA	4..20 mA
Unit	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Range max	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Gas Type	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...
Zero Gas	Air	Air	Air	Air	Air	Air	Air	Air
Span Gas	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...	Acetalde...
Span Gas Value								
Sensor Current								
AI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alarm Delay	0	0	0	0	0	0	0	0
Alarm Hysteresis	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS	+/- 0.0% FS
Dead Band Around Zero	0.0% FS	0.0% FS	0.0% FS	0.0% FS	0.0% FS	0.0% FS	0.0% FS	0.0% FS
TWA limit								
STEL limit								

Fig. 12 Setting Up Channels

The window displays all eight channels status and allows for their configuration

Upload Button - Allows to upload the configuration from GasGard XL.

Download Button - Allows to download the configuration to the GasGard XL.

Open - Press to open GasGard XL configuration saved on the hard disc.

Save - Save the GasGard XL configuration to the hard disc.

6.6. Channel Calibration

	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	Channel 6	Channel 7	Channel 8
Channel Type	Passive	Passive	Passive	Passive	Passive	Passive	Passive	Passive
Tag								
Gas Value								
Life Time								
Gas Type								
Zero Gas								
Span Gas								
Span Gas Value								

Start Start Start Start Start Start Start Start

ZG / 4 mA OK OK OK OK OK OK OK OK

SQ / 20 mA OK OK OK OK OK OK OK OK

Save As Master Save As Master Save As Master Save As Master Save As Master Save As Master Save As Master Save As Master

Accept Accept Accept Accept Accept Accept Accept Accept

Fig. 14 Channel Calibration

7. Maintenance

The Control Unit does not require any special maintenance, except for cleaning and periodic functional checks.

For SIL 2 sensor applications (Safety Integrity Level) the calibration intervals must be reduced appropriately.

Check the calibration of the sensor(s) connected to the input(s) of the Control Unit every 3 months or earlier if dangerous conditions have been detected, according to the working conditions of the plant.

Use the appropriate span gas as specified in the Calibration Data Sheet.



Clean the housing with soft clothes only. Do not use any solvent or other cleaning agents that may damage the integrity of the housing

8. Technical Specifications and Certifications

8.1. Technical Specifications

Power Supply	100 VAC - 255 VAC, 50/60 Hz, 100 W min. cross section 0.75 mm ² , 2.5 A (externally fused) 24 VDC ±20 %, max. 4 A (externally fused)
Wire Connection	0.75 mm ² up to 2.5 mm ²
Alarm Thresholds	ALARM 1 (Warning) adjustable from 5 to 100 % f.s. *) (80 % LEL for ATEX version) ALARM 2 (Alarm) adjustable from 5 to 100 % f.s. (80 % LEL for ATEX version)
Electronic Speed of Response	< 1 sec to reach 100 % f.s.
Span/Zero Drift	< ±0.5 % f.s. ±1 digit/month
Accuracy/Repeatability	< ±1 % f.s. ±1 digit
Relays maximal load (except fault relay)	AC load : 5 A/250 VAC, DC load : see Fig. 15)
Fault relay maximal load	AC load : 8 A/250 VAC, DC load : see Fig. 16)
Operating Temperature	-10 °C – +50 °C
Storage Temperature	-20 °C – +75 °C
Ambient Humidity	Up to 90 % RH non condensing
Ingress Protection	IP 56
Dimensions (WxHxD)	515 mm x 277 mm x 129 mm
Weight	5 kg 8 kg (with battery)

*) f.s. – here and further means “full scale”

Passive channel board (pellistors)

Sensor Power Supply	constant current 80 - 430 mA
Input Signal	mV bridge signal
Cable length limit	max. cable resistance is 18 [Ohm] / 1 Wire. (It is equal to copper cable 1.5 km length with conductor cross section = 1.5 mm ²)
Connection Modes	3 wires

Active channel board (4 - 20 mA)

Sensor Power Supply	18-32 VDC, current up to 500 mA (3 wires connection mode)
Input Signal	4 – 20 mA
Cable length limit	Depend on sensor technical specification. Internal board resistance is 230 [Ohm].
Connection Modes	2, 3 wires

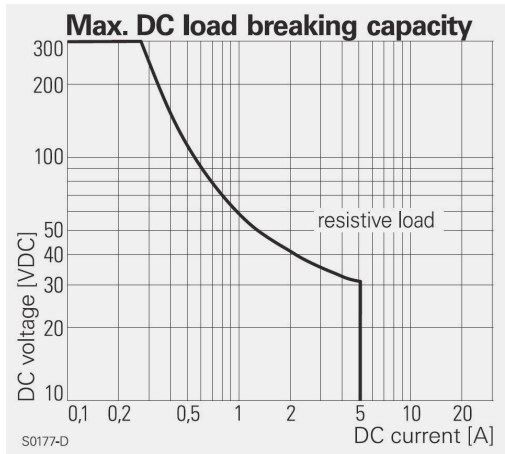


Fig. 15 Max. relay DC load (except fault relay)

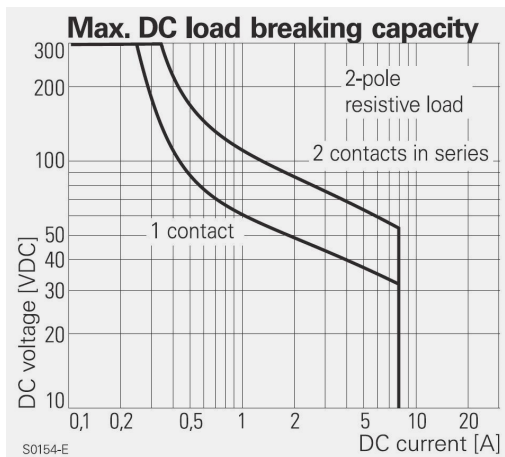



Fig. 16 Max. relay DC load (fault relay)

8.2. Marking, Certificates and Approvals according to the Directive 94/9/EC [ATEX]

Manufacturer	: MSA Europe GmbH, Schlüsselstrasse 12, CH-8645 Rapperswil-Jona Switzerland
Product	: GasGard XL
Type of Protection	: see Remote Sensor The Control System must be installed outside of the hazardous area.
Standards	EN 60079-29-1:2007 EN 50104:2010 EN 50271:2010 EN 50402:2009
Marking	:  II (1)G Remote sensor has to be connected with intrinsic safe supply to the GasGard XL II (1)G (2)G
EC-Type Examination Certificate	: FTZU 07 ATEX 0066 X
Quality Assurance Notification	: 0158
Year of Manufacture	: see label
Serial No.	: see label
National Certification	: FTZU 08 E 0009
Standards	: EN 45544-1:1999 EN 45544-2:1999

8.3. Special conditions for safe use according to SIL 2

8.3.1. Safety relevant parameters:

HFT	0
Type	B
Structure	1001
PFD	$4,86 \times 10^{-3}$
SFF	94,8 %
MTBF	≥ 33572 h
λ tot	≤ 29786 fit
MTTR	= 72 h

8.3.2. The following conditions have to be considered by the user for safe use:

1. The test interval for the alarm and fault relays has to be done once per year
2. The alarm conditions of the GasGard XL must be periodically checked together with the typical gas calibration checks
3. The relays must be energized under normal conditions
4. The relays contacts must be protected with a fuse rated 0.6 of the nominal specified relay contact current.
5. The system fail relay contacts must be safety related processed for warning purposes
6. In case of failure of any component the repair or replacement must be completed within 72 hours
7. Only modules with the HW, SW versions specified in the table below may be used
8. An inside temperature of GasGard XL above 50 °C has to be avoided
9. External power supplies must fulfil, as a minimum, the requirements according to directive 2006/95/EC

8.3.3. Permitted Hardware / Software Versions of the following Modules:

Module	HW Version	SW Version
Main Board	11 A	01-05-01 01-05-02 02-00-09
Display Board	20 A	01-04-01 01-04-05
Channel Board mV	17 A	01-04-01
Channel Board Active	20 A	01-04-01 01-05-04
Channel Relay board	16 A	01-02-01
Sensor Extension Board	11 A	-

9. Ordering Information

Please ask for the separate ordering sheet.

9.1. Controller

Description	Part No.
GasGard XL [incl.: housing, power supply 100 W, designed for up to four channels, common relays, without channel boards]	10090372
GasGard XL [incl.: housing, power supply 100 W, designed for up to eight channels, common relays, without channel boards]	10083905

9.2. Accessories/Spares

Description	Part No.
Sensor Extension Board (for channels 5 - 8)	10081676
Channel Relay Board	10081677
Channel Board 4 - 20 mA	10081674
Channel Board mV (passive pellistors)	10081675
Power Supply 100 Watt	10081678
GasGard XL, manual	10081908
EMC Filter (to be used with ext. 24 VDC supply)	10081680
Back-up battery pack (2.2 Ah)	10081772

9.3. Spare Parts

Description	Part No.
Display Board	10081679
Housing (bottom part with inserts)	10081773
Lid for housing with touch pad and gasket (w/o screws)	10081774
Flat ribbon cable (Main Board to Display Board)	10081775
Backup battery cable	10081776
Set of Lid fixing screws	10081909
Set of internal fixtures	10085392
Spare battery for Main Board	10085435
Main Board (channel 1 – 4)	10085436
Battery holder	10085393
Power Supply Holder	10085394
Set of mounting screws	10081777
Set of fuses (10 pcs of T4 A/250 V, 10 pcs of T250 mA/250 V)	10089912
Spacers for relay channel board [set of 6]	10089913

Appendix A – Sensor List

A-1 List of sensors compatible with GasGard XL

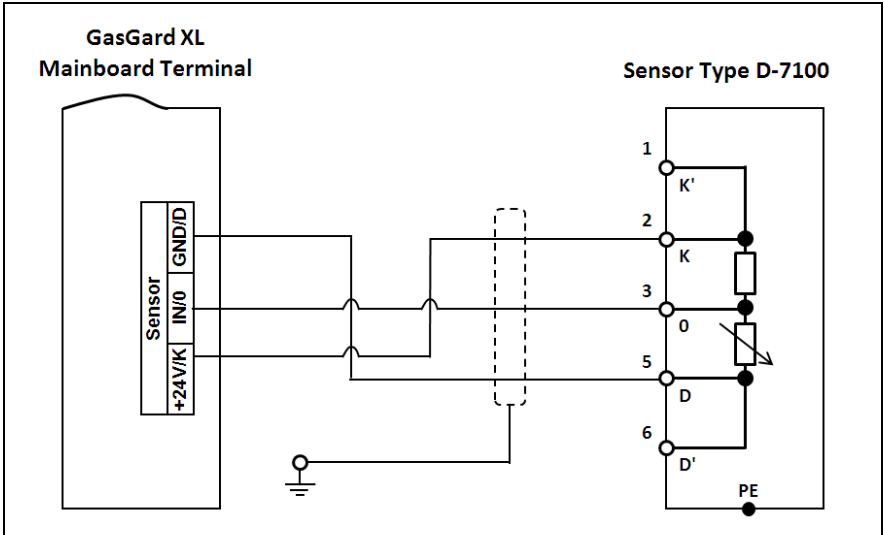
Passive sensors	4 – 20 mA Transmitters
D-7010 *)	DF-7010 *)
D-7100 *)	DF-7100 *)
D-715 K *)	DF-8250 *)
D-7152 K *)	DF-8510 *)
D-7711 K *)	DF-9200 *)
D-7711 K-PR *)	DF-9500 *)
Series 47K-ST	GD-10 *)
Series 47K-HT	SafEye *)
Series 47K-PRP	DF-8603 *)
D500S	DF-8201 *)
	ULTIMA X (2-wire)
	ULTIMA X (3-wire)
	ULTIMA X IR
	RG-3LCD *)
	FlameGard
	Standard 4-20 mA transmitter
	DF-7500
	DF-9500C
	Chillgard M-100
	PrimaX
	PrimaX IR
	Ultima MOS-5 (Ultima 5)
	Ultima MOS-5Hart (Ultima 5H)
	Ultima MOS-5E (Ultima 5E)
	FlameGard 5 MSIR-H (FG 5MSIRH)
	FlameGard 5 MSIR (FG 5MSIR)
	FlameGard 5 UV/IR (FG 5UVIR)
	FlameGard 5 UV/IR-H (FG 5UVIRH)
	FlameGard 5 UV/IR-H2 (FG 5UVIRH2)

FlameGard 5 UV/IR-E (FG 5UVIRE)
UltraSonic IS-5 (Usonic IS5)
UltraSonic EX-5 (Usonic EX5)
Ultima OPIR-5 (UltimaOPIR)

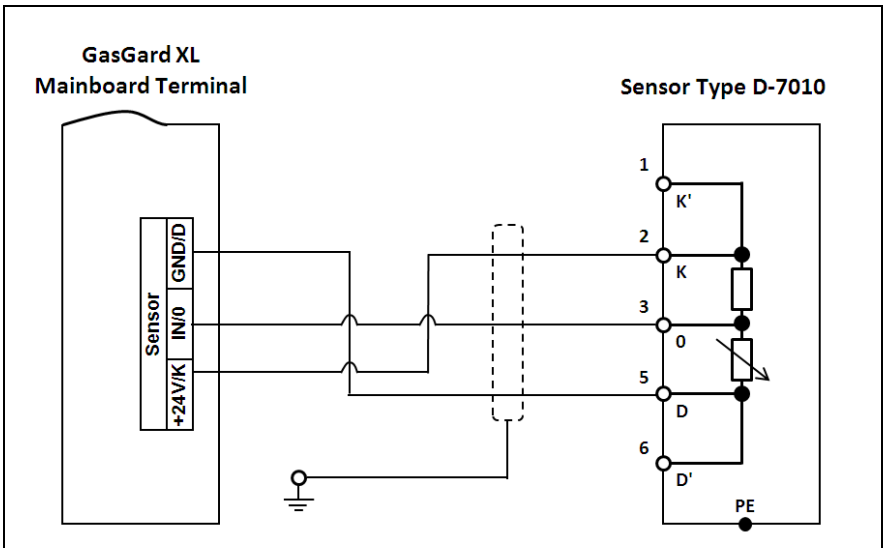
*) Products marked by an asterisk are no longer part of the MSA product portfolio, but they still can be operated by the GasGard XL.

Appendix B – Wiring Diagrams

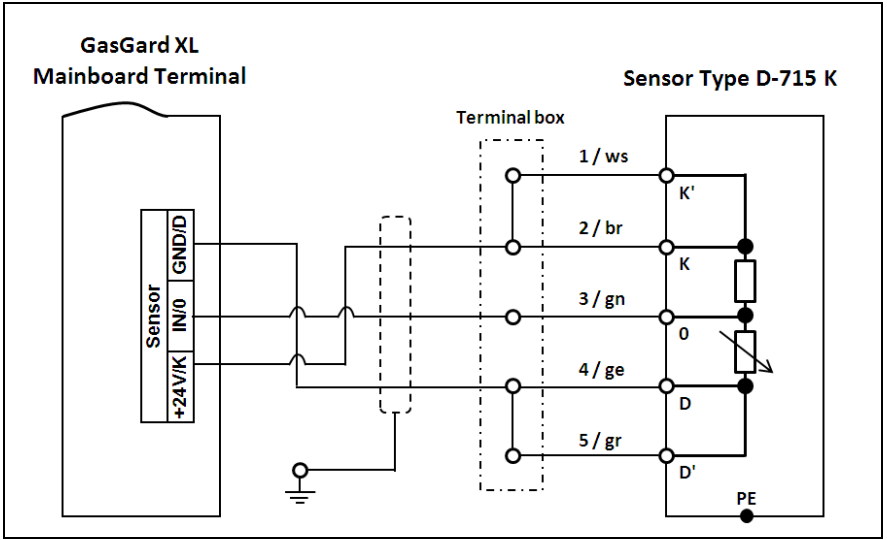
B-1 Sensor type D-7100



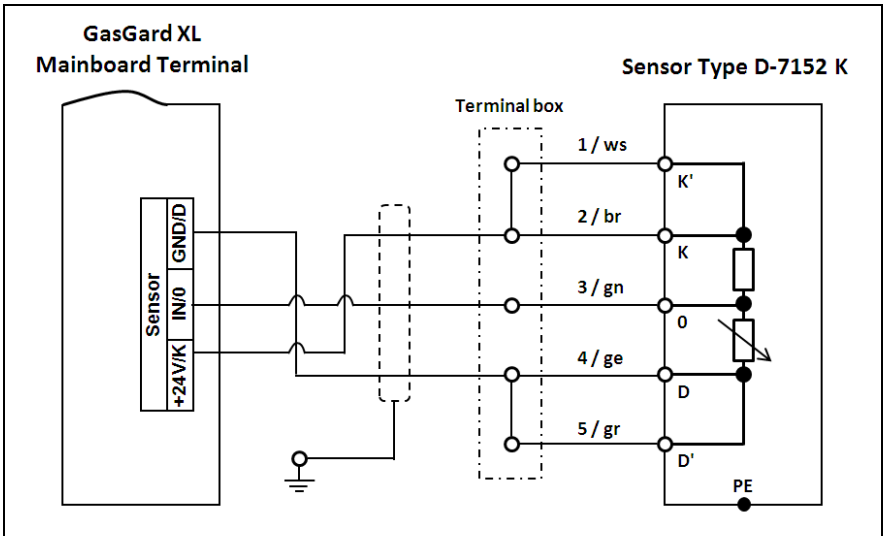
B-2 Sensor type D-7010



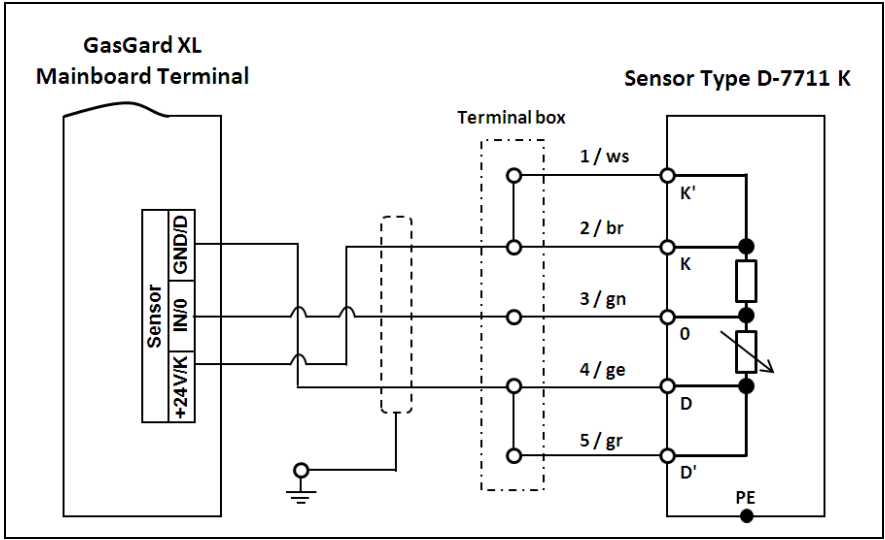
B-3 Sensor Type D-715 K



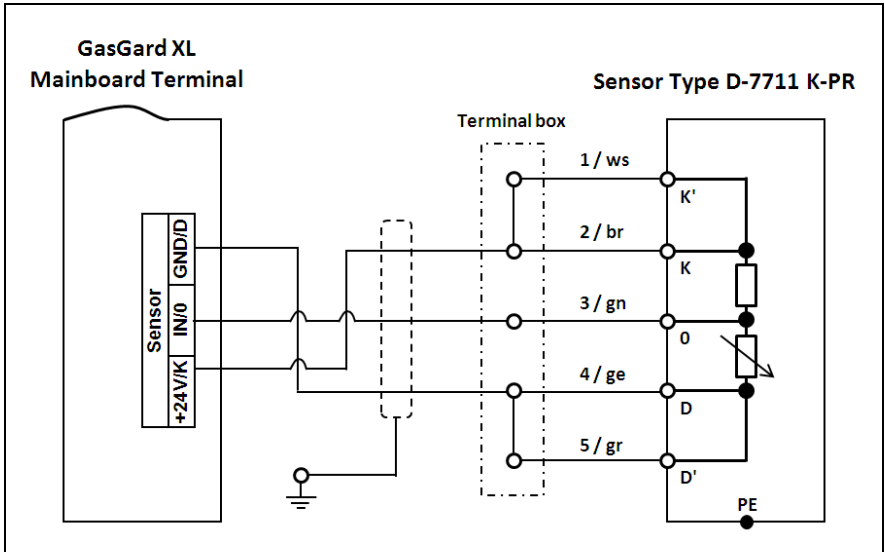
B-4 Sensor Type D-7152 K



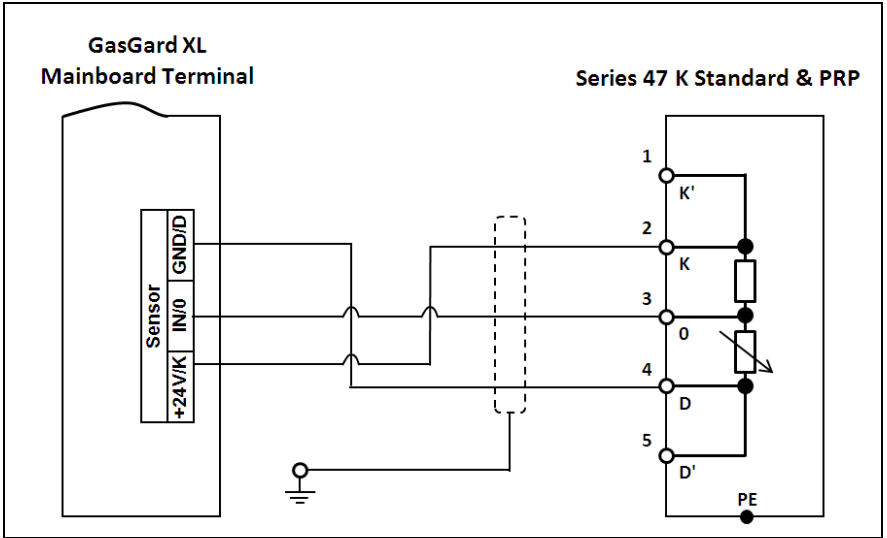
B-5 Sensor Type D-7711 K



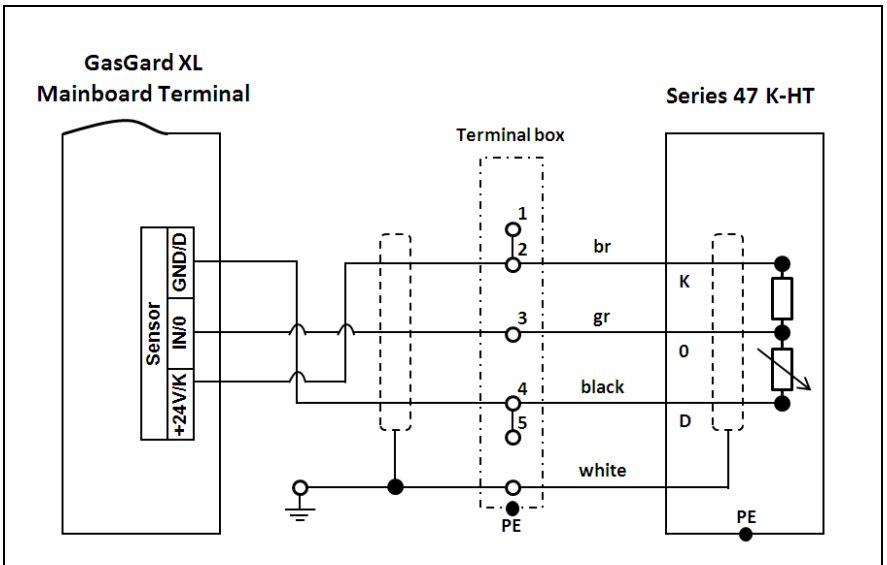
B-6 Sensor Type D-7711 K-PR



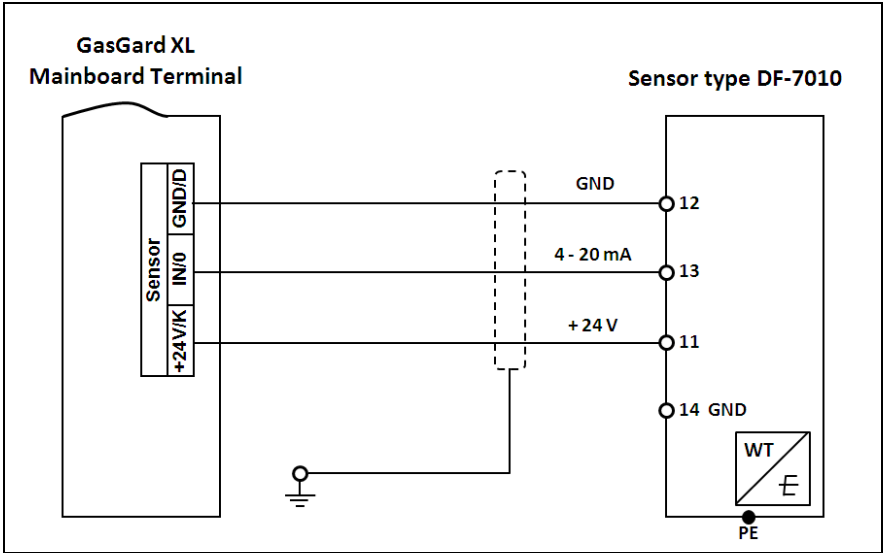
B-7 Series 47 K Standard & PRP



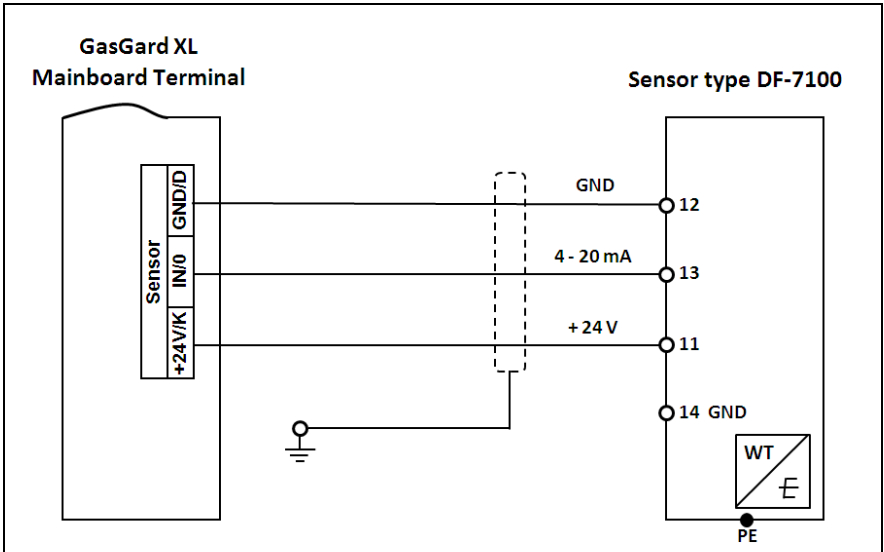
B-8 Series 47 K-HT



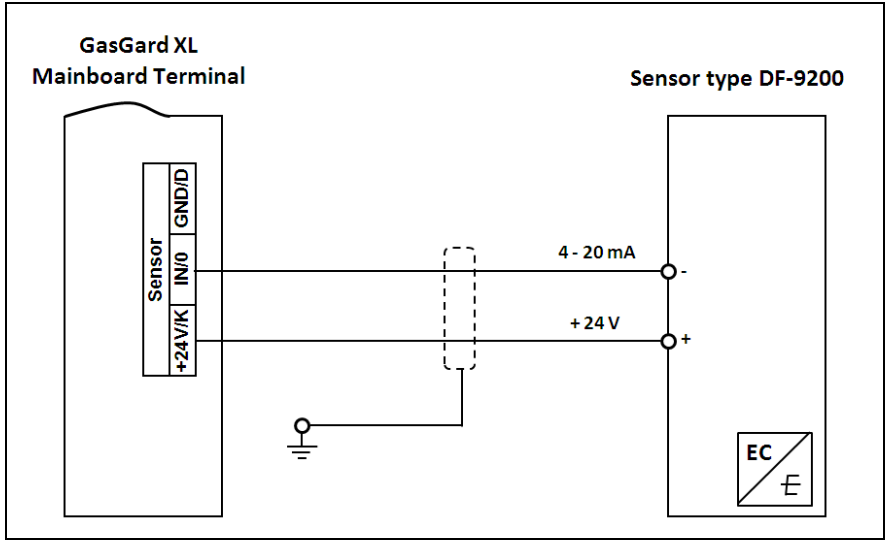
B-9 Sensor Type DF-7010



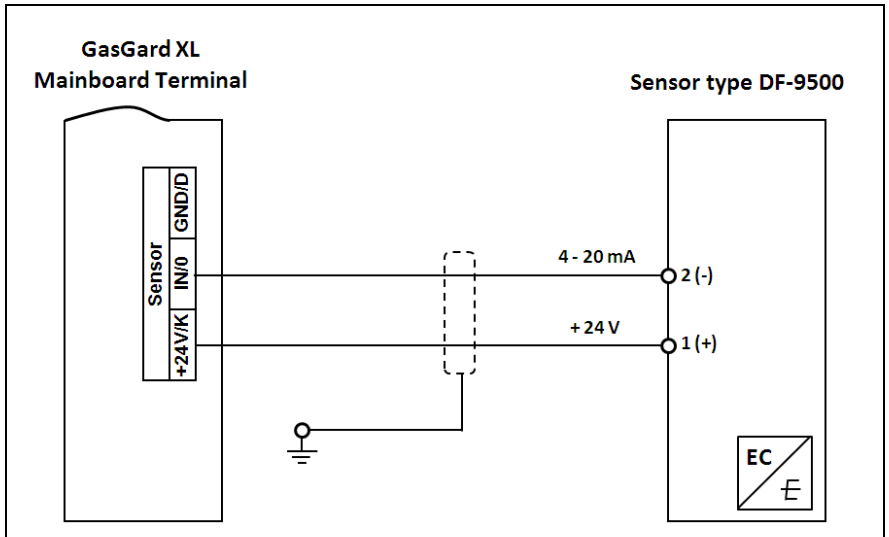
B-10 Sensor Type DF-7100



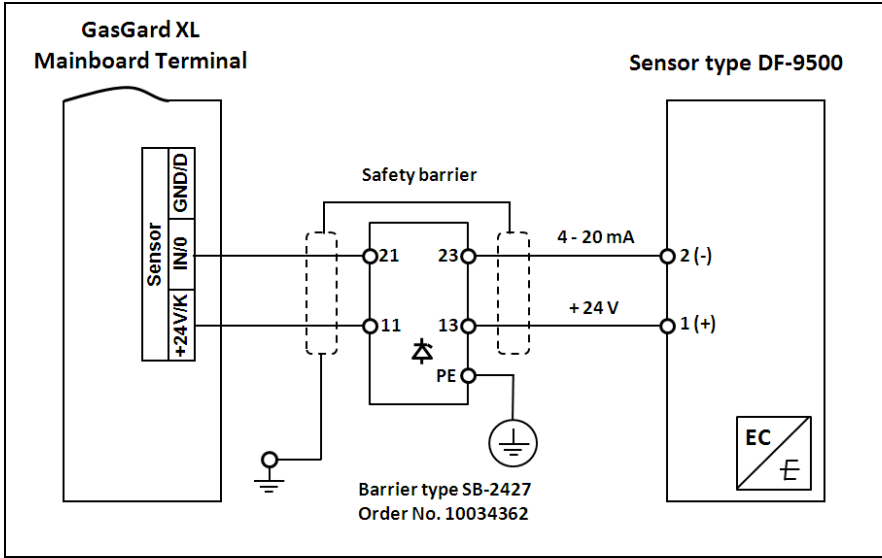
B-11 Sensor Type DF-9200



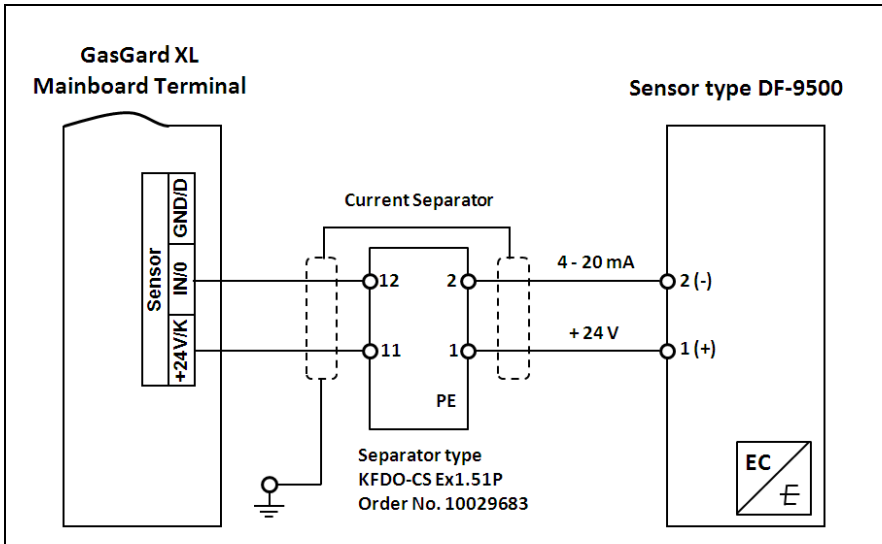
B-12 Sensor Type DF-9500



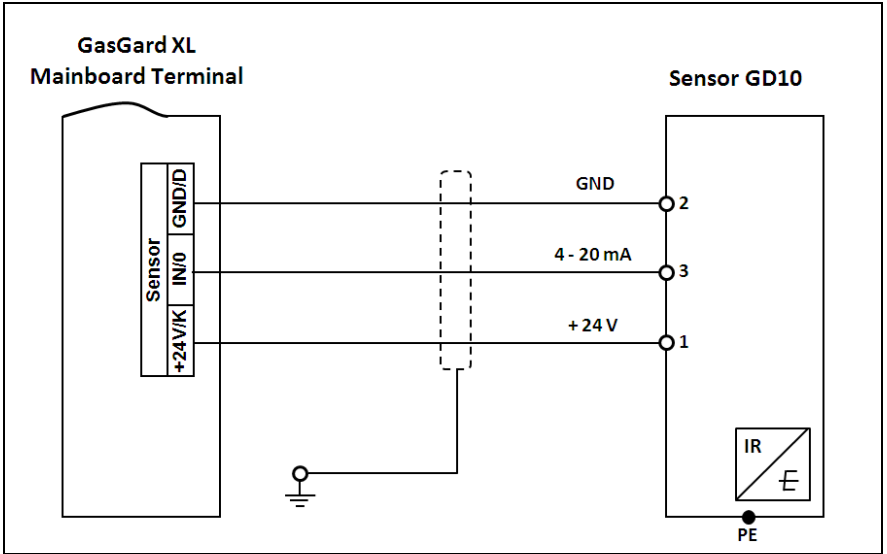
B-13 Sensor Type DF-9500 with Safety Barrier



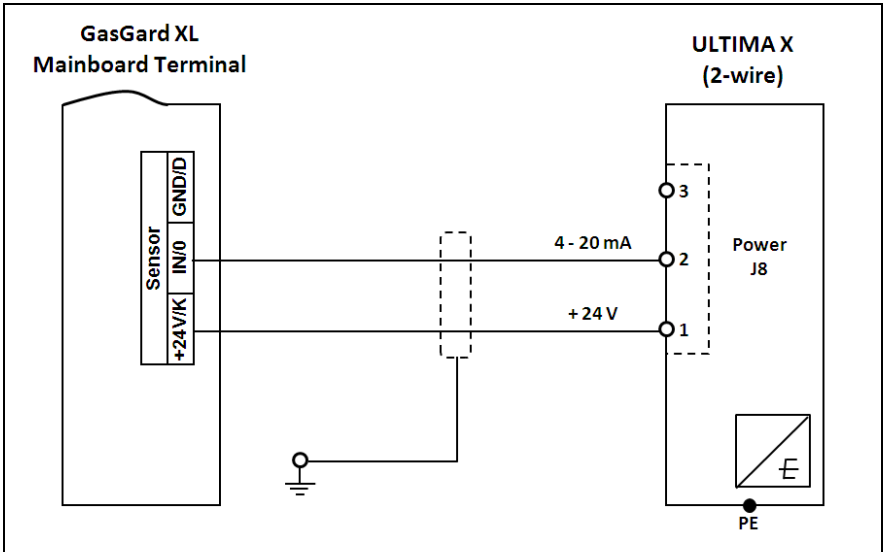
B-14 Sensor Type DF-9500 with Current Separator



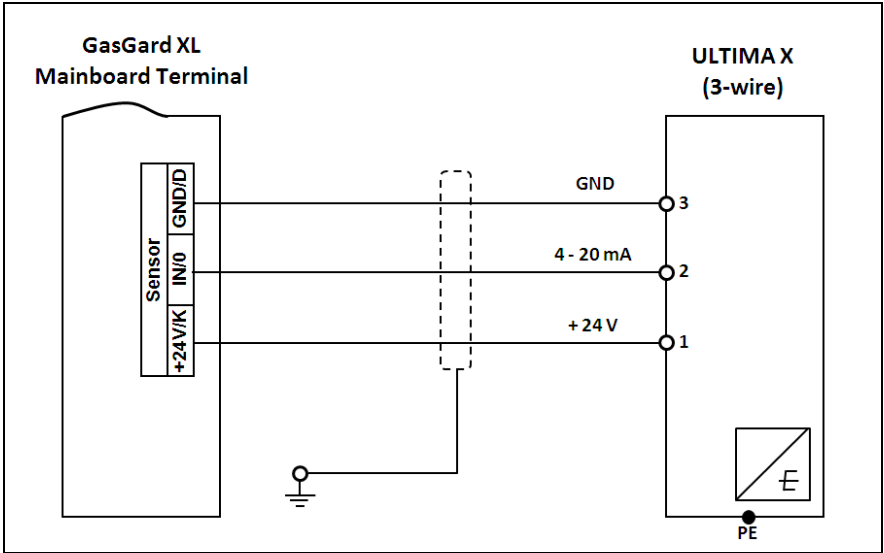
B-15 Sensor GD10



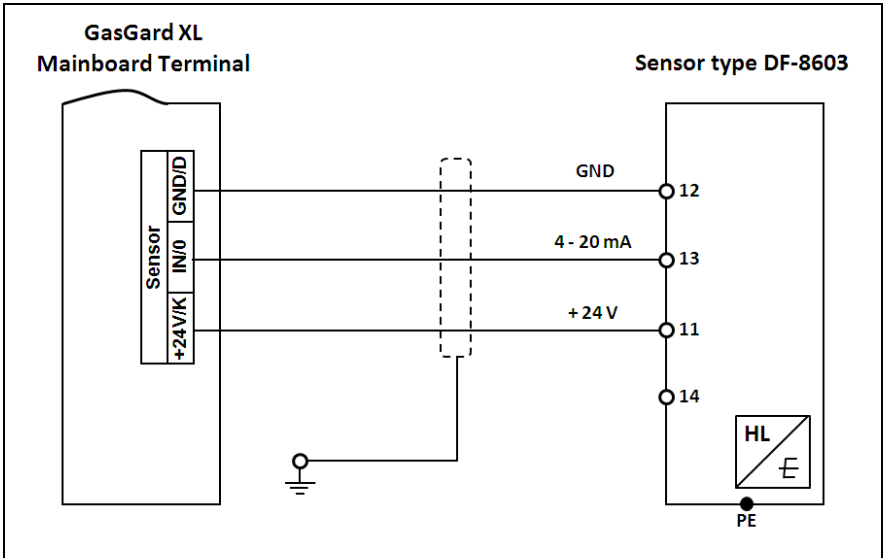
B-16 ULTIMA X (2-wire)



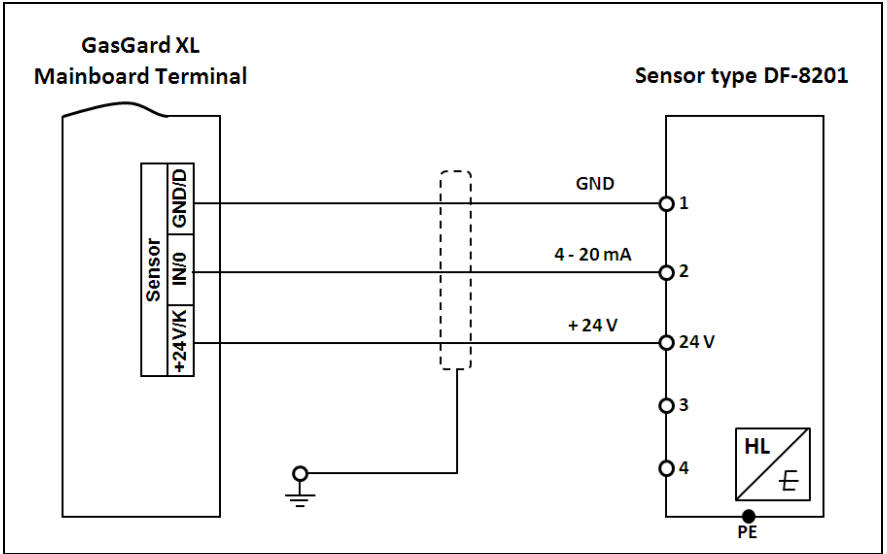
B-17 ULTIMA X (3-wire)



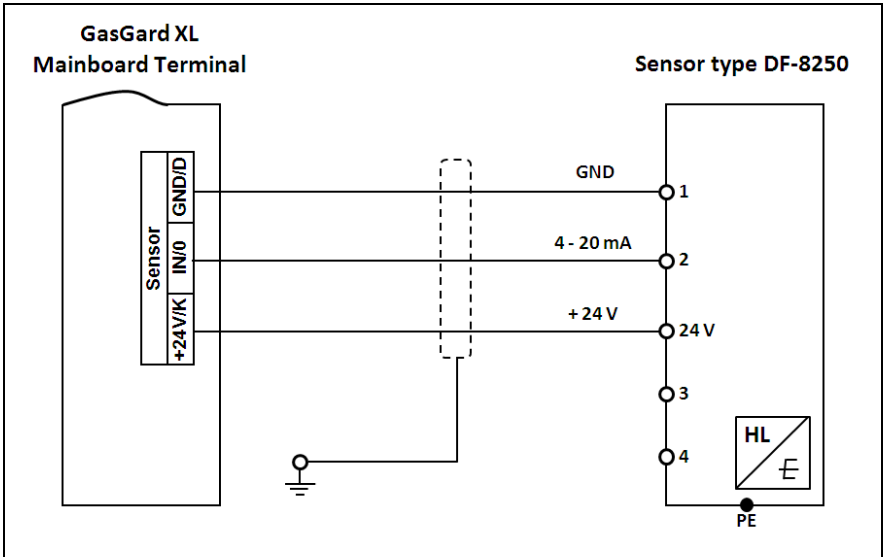
B-18 Sensor Type DF-8603



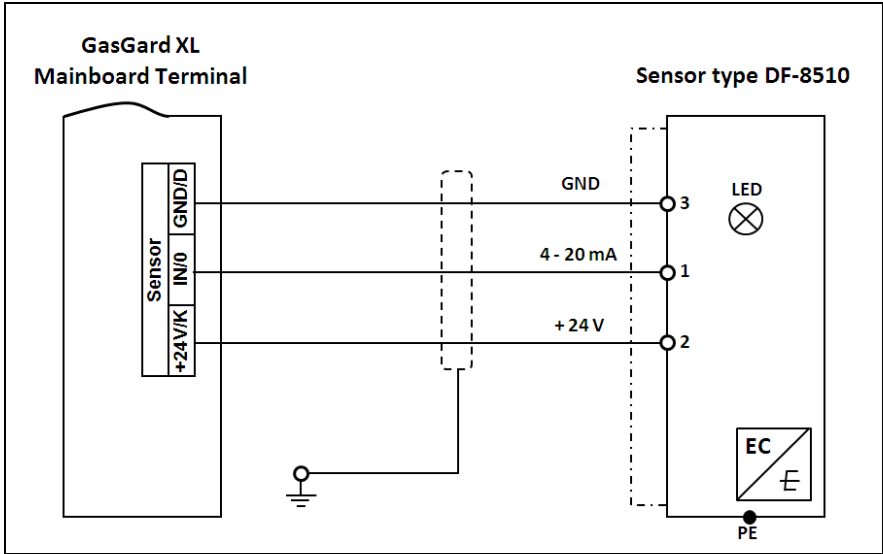
B-19 Sensor Type DF-8201



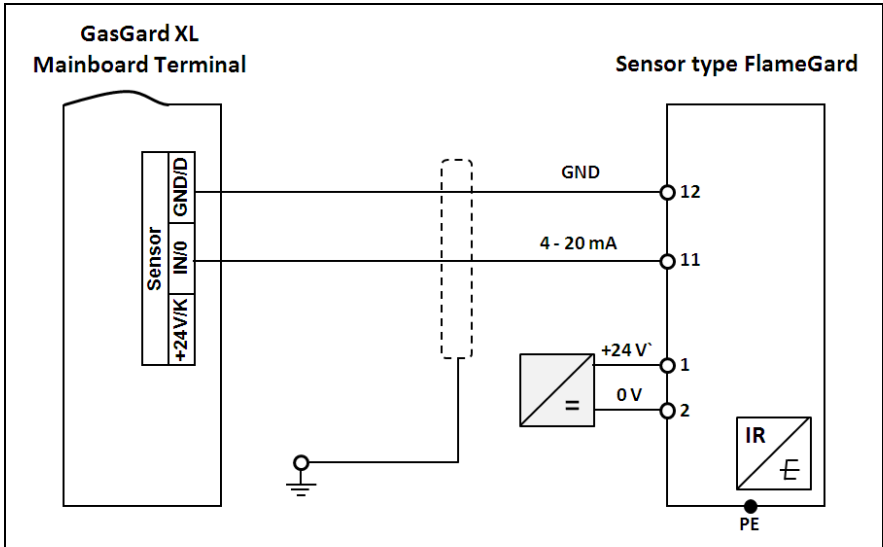
B-20 Sensor Type DF-8250



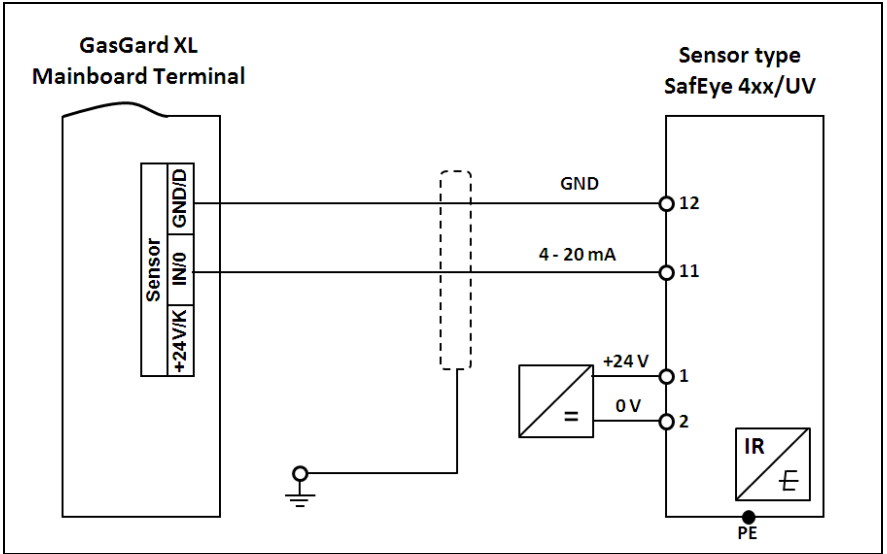
B-21 Sensor Type DF-8510



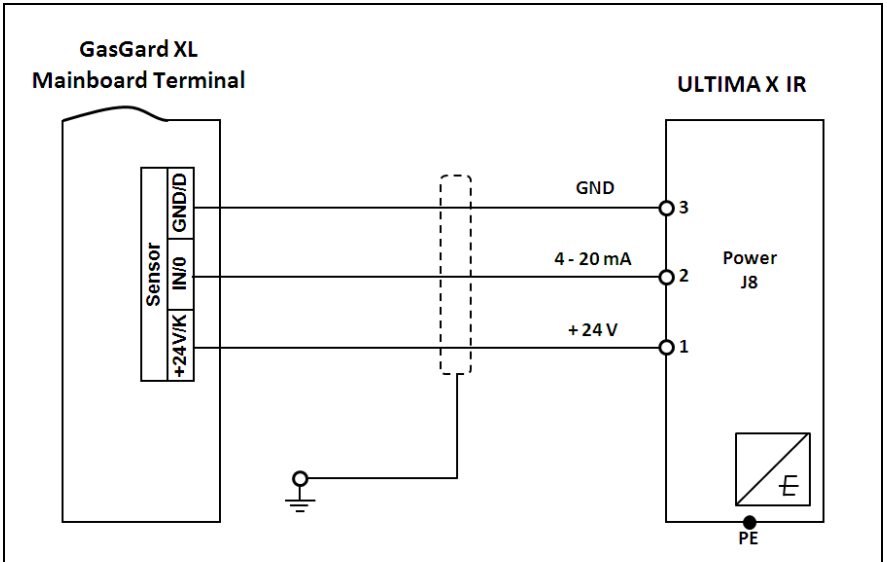
B-22 Sensor Type FlameGard



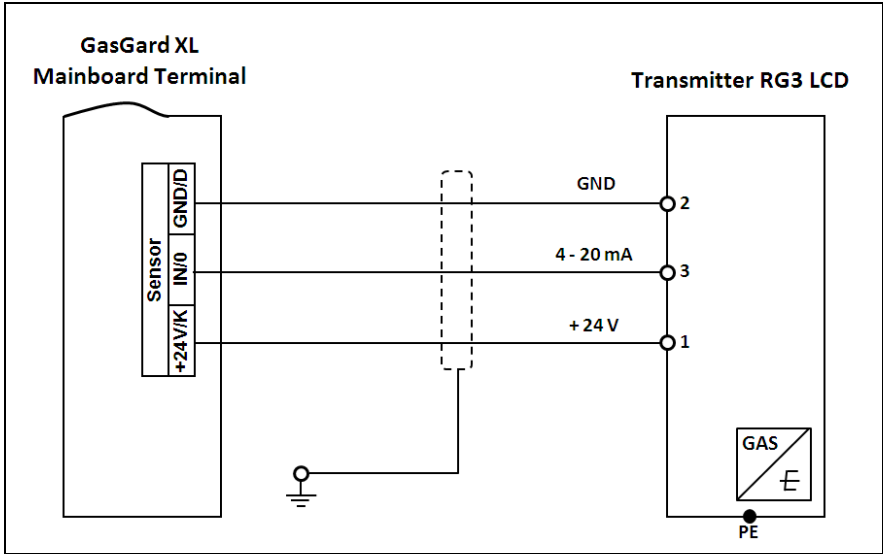
B-23 Sensor Type SafeEye 4xx/UV



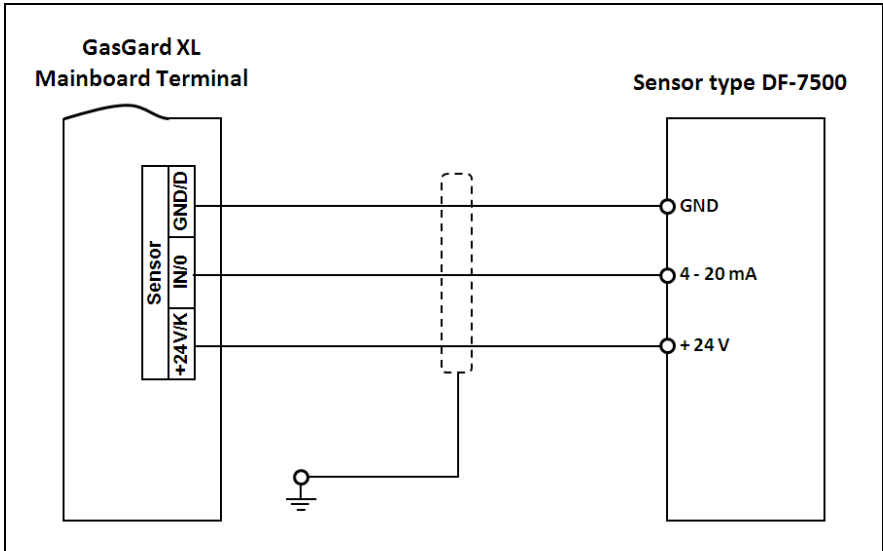
B-24 Sensor Type ULTIMA X IR



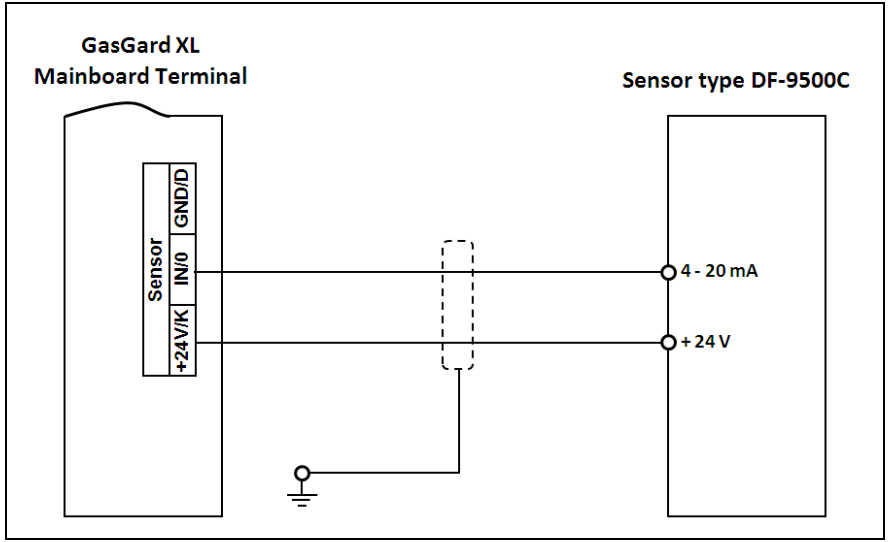
B-25 Transmitter RG3 LCD



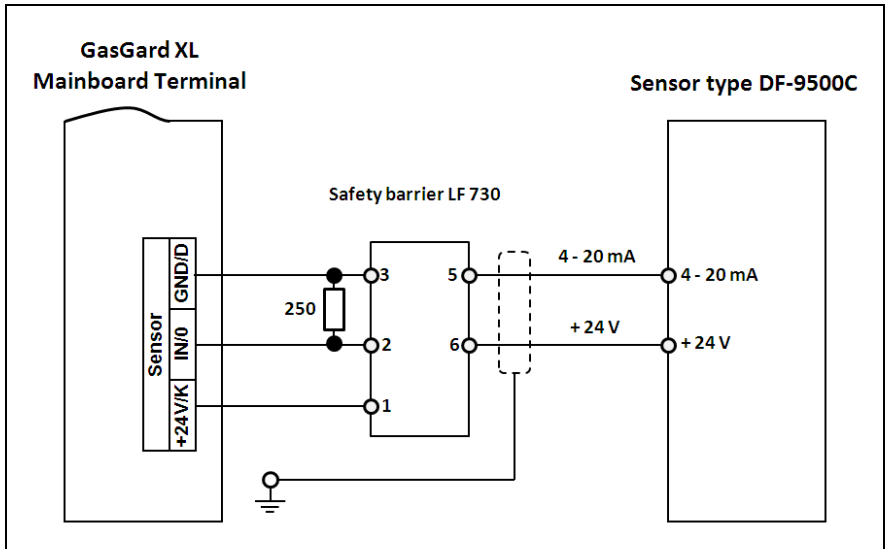
B-26 Sensor Type DF-7500



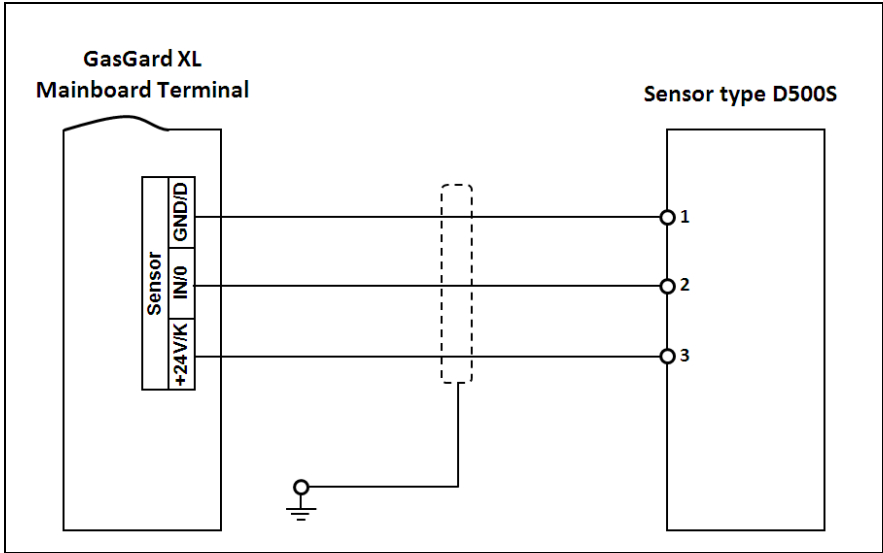
B-27 Sensor Type DF-9500C



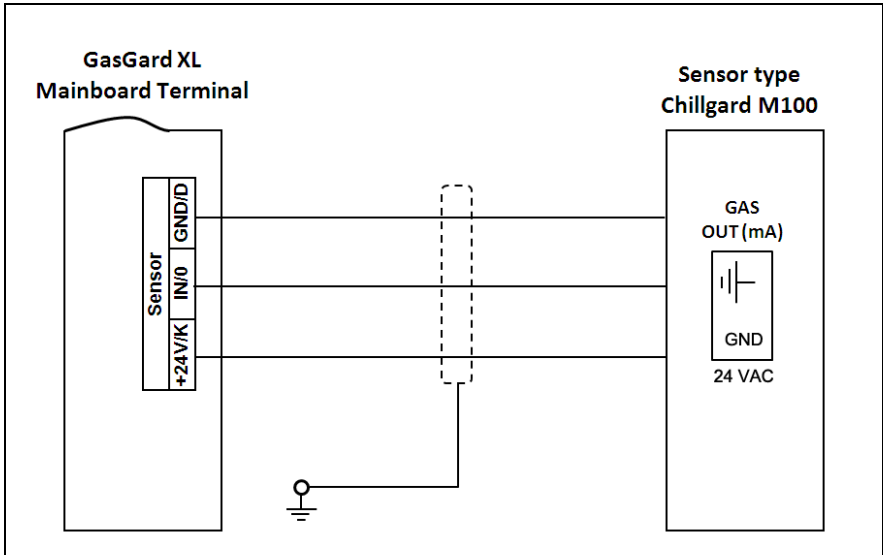
B-28 Sensor Type DF-9500C



B-29 Sensor Type D500S



B-30 Sensor Type Chillgard M100



Appendix C – Individual Relays Connection

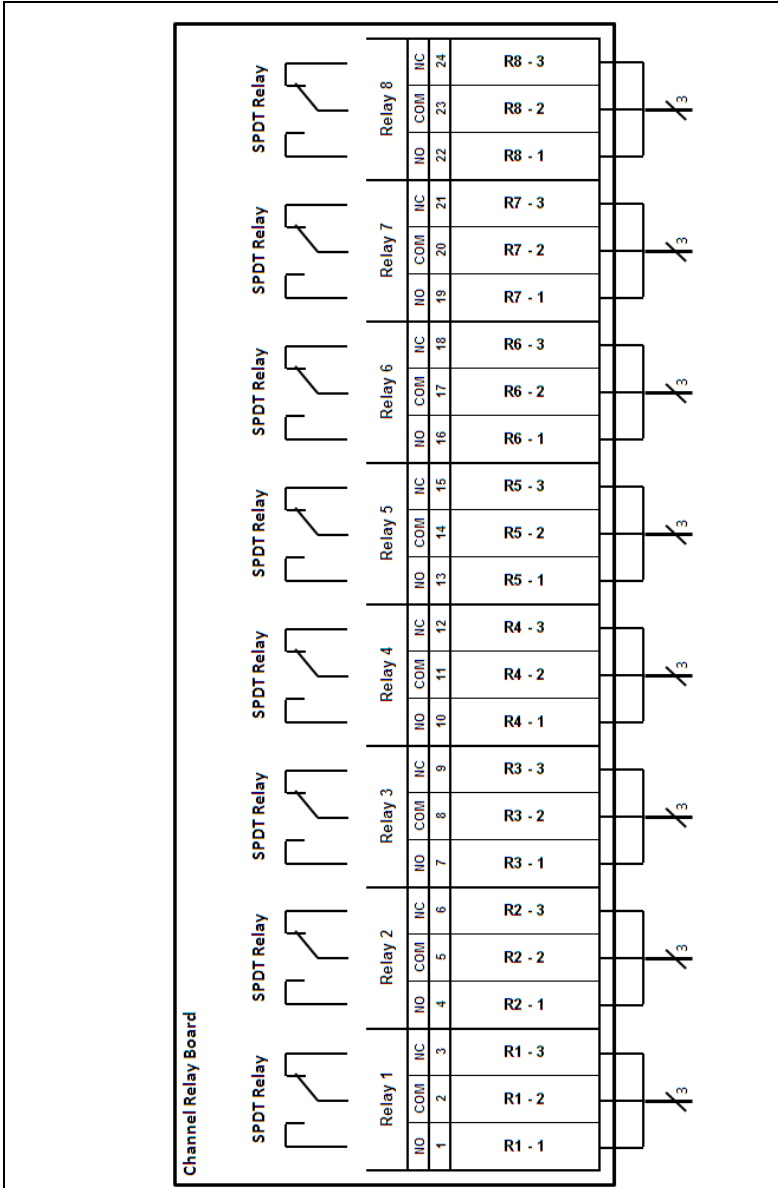
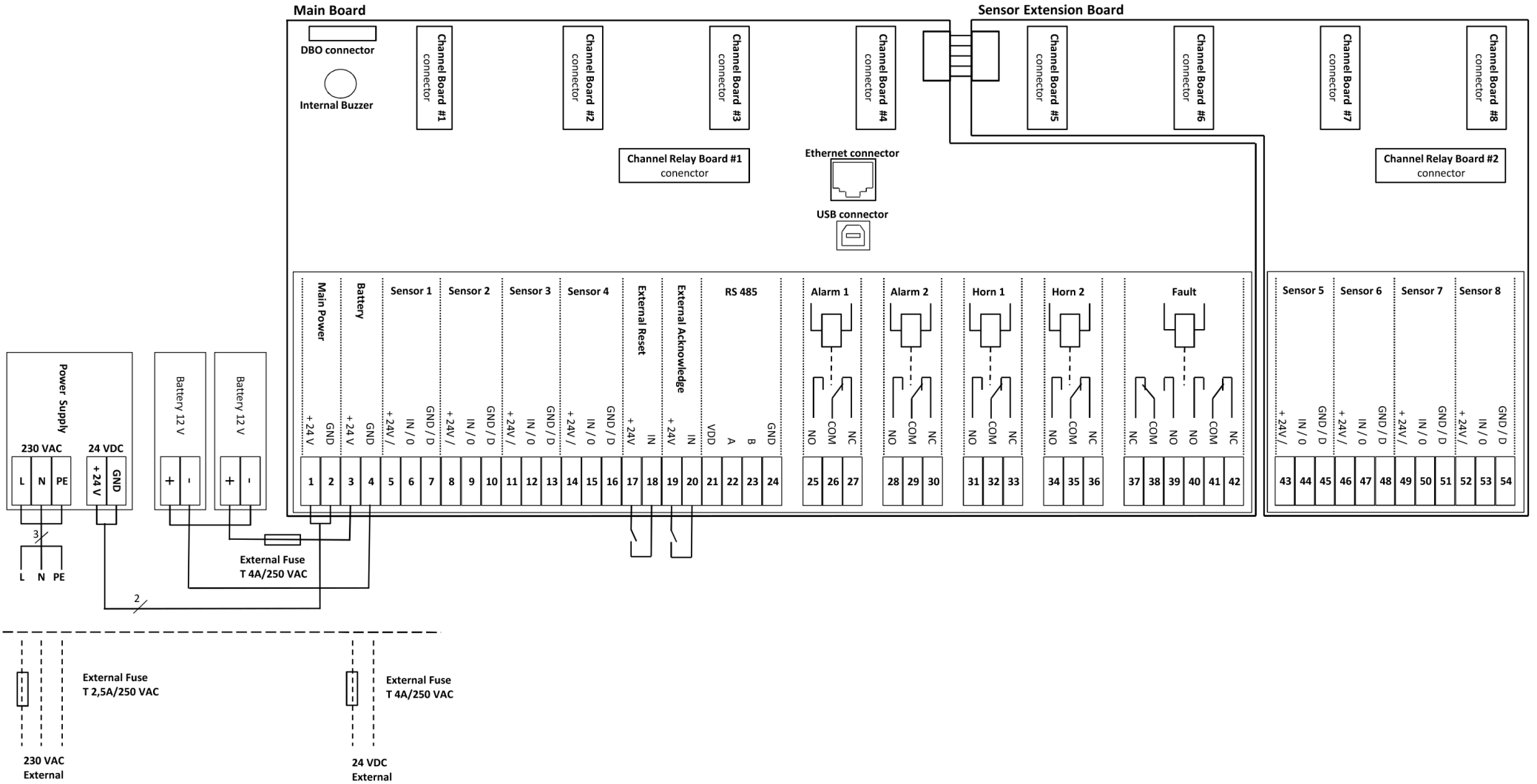


Fig. 17 Individual Relays Connection

Appendix D – Terminal Connectors

GasGard XL

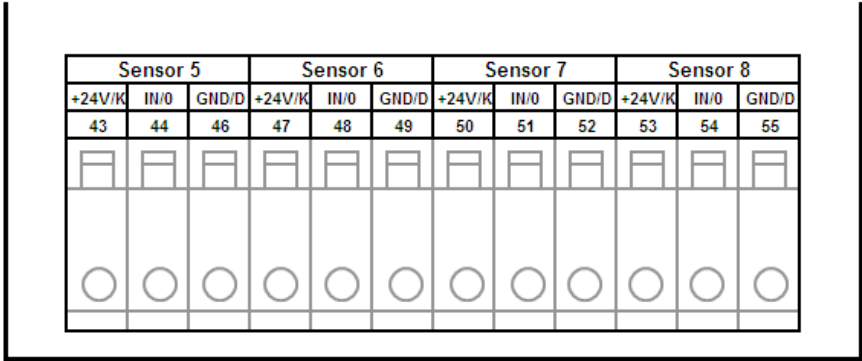


Main Board

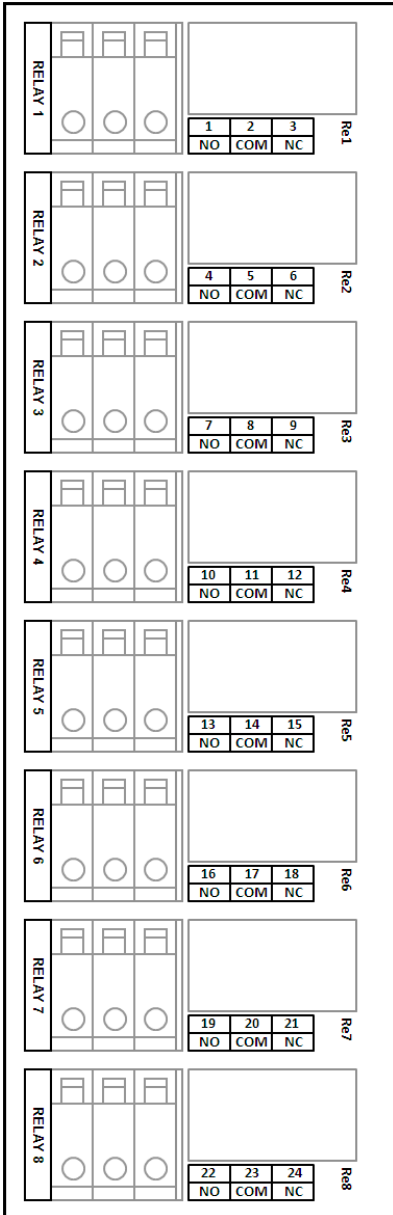
Main		Battery		Sensor 1			Sensor 2			Sensor 3			Sensor 4			Reset		Acknowledge		RS485			
+24V	GND	+24V	GND	+24V/K	IN/D	GND/D	+24V/K	IN/D	GND/D	+24V/K	IN/D	GND/D	+24V/K	IN/D	GND/D	+24V	IN	+24V	IN	VDD	A	B	GND
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Alarm 1			Alarm 2			Horn 1			Horn 2			Fault					
NO	COM	NC	NO	COM	NC	NO	COM	NC	NO	COM	NC	NC	COM	NO	NO	COM	NC
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7	5	6	7

Sensor Extention Board



Channel Relay Board



Appendix E – List of User Configurable Parameters

Parameter Name	Valid Range
Channel Tag	10 chars
Sensor Type	Selected from the list (42 entries)
Sensor Range	Selected from the list (23 entries)
Sensor Dimension	Selected from the list (6 fixed entries + 1 user entry)
User Dimension	6 chars
Measuring Gas	Selected from the list (118 entries)
Zero Gas	Selected from the list (4 entries)
Span Gas	Selected from the list (118 entries)
Span Gas Value	0 ... FS
Passive Sensor Current	(80 ... 430) [mA]
Sensor Alarm 1 Level	0 ... Range
Sensor Alarm 2 Level	0 ... Range
Alarm 1 activation (flame detectors)	True / False
Alarm 2 activation (flame detectors)	True / False
Alarm 1 edge	Raising / Falling
Alarm 2 edge	Raising / Falling
Alarm 1 latching	True / False
Alarm 2 latching	True / False
Sensor Inhibition	True / False
Sensor ATEX	True / False
Alarm Delay	(0 ... 180) [sec]
Alarm Hysteresis	(0,0 ... 2,0) [%FS]
Zero Masking	(0,0 ... 5,0) [%FS]
STEL alarm level	0 ... Range
TWA alarm level	0 ... Range
Relay Board activation	True / False
Relay State	NE / ND
Relay Control conditions	Main Power Off, Low/Fault Battery, A1, A2, STEL, TWA, Fault
Relay Voting	(1 ... No Of Selected Conditions)

Menu Language	Selected from the list (12 entries)
System Password	1 ... 9999
Calibration Password	0 ... 9999
Reset Password	0 ... 9999
Battery Back-Up	True / False
Date Format	dd.mm. / mm.dd.
Time Settings	Year, Month, Day, Hour, Minute
Modbus RTU - Address	1 ... 247
Modbus RTU - Speed	Selected from the list (5 entries)
Modbus RTU - Parity	Odd / Even
Modbus TCP - Address	255.255.255.255
Modbus TCP - Mask	255.255.255.255
Modbus TCP - Gateway	255.255.255.255

Notes

For local MSA contacts, please visit us at **[MSAsafety.com](https://www.MSA.com)**