

GAS DETECTION CONTROL PANEL CDG 6000-99

Operation and Maintenance Documentation
ID-E364-002GB

Edition I

This Operation and Maintenance Documentation describes CDG 6000-99 gas detection control panel which fulfills main requirements of the following Regulation of the European Parliament and of the Council (EU) and European Union

Directives:

LVD Directive 2014/35/EC related to electrical equipment for use within stipulated voltage limits;

EMC Directive (EU) 2014/30/EC concerning electromagnetic compatibility.

CDG 6000 gas detection control panel received Declaration of Conformity number 1/E364/2017/PL. You can download the Declaration of Conformity from the website www.polon-alfa.pl

Read this manual before installation and operation. Failure to observe the instructions in this manual may be dangerous or result in a breach of regulations in force.

The manufacturer Polon-Alfa S.A. accepts no liability for any damage resulting from usage inconsistent with the manual.

Note - The manufacturer reserves the right to introduce changes

Worn out product, not suitable for further use must be handed over to an electrical and electronic equipment waste collection point.



1. Introduction

1.1. Documentation structure

The Operation and Maintenance Documentation (OMD) describes CDG 6000-99 gas detection control panel (fig. 1.1).

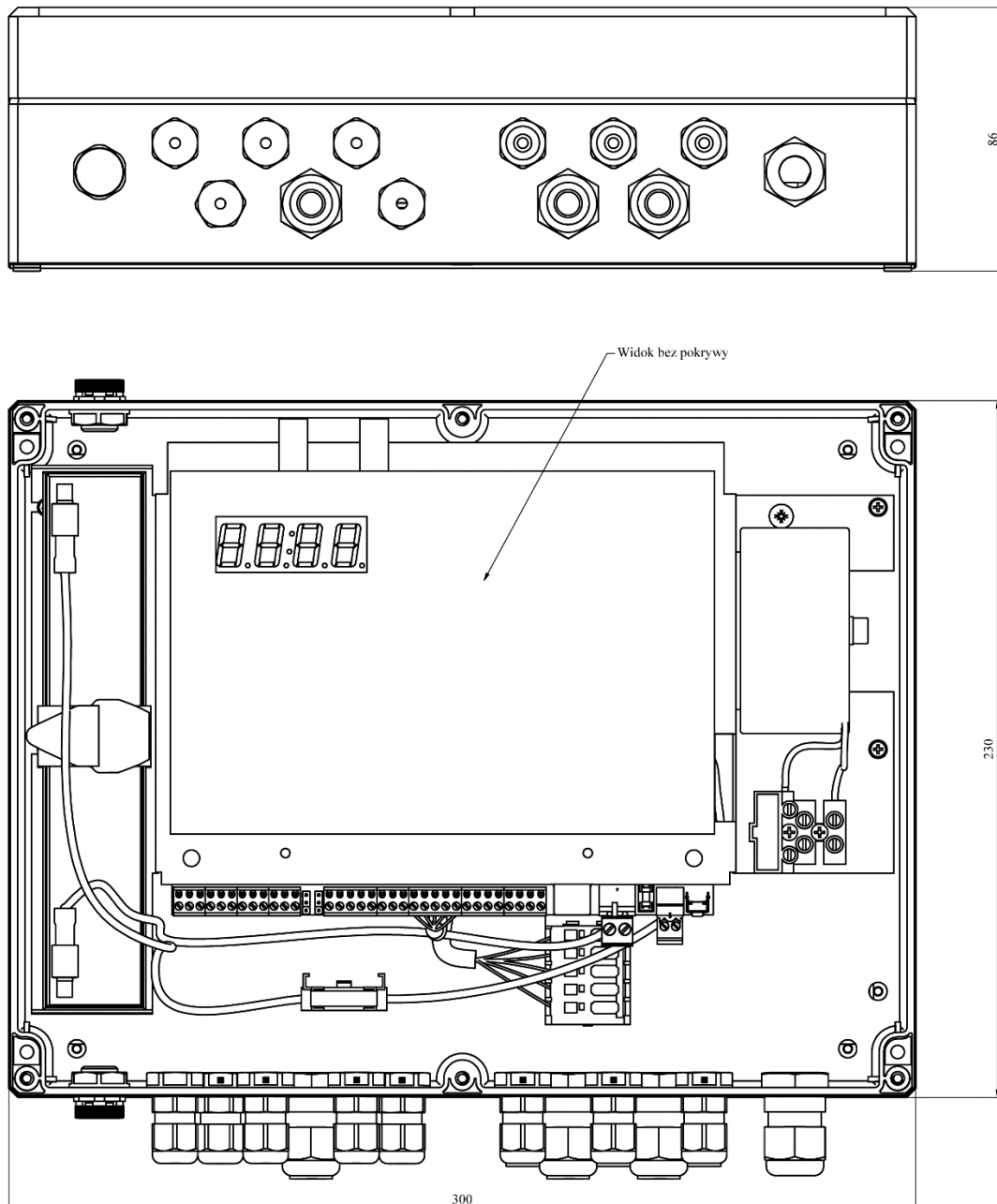


Fig. 1/1 CDG 6000-99 control panel

This OMD is intended for designers, installers and maintenance personnel of the CDG 6000-99 control panel. It includes information required for control panels installation, programming, servicing and operation.

1.2. Control panel purpose

CDG 6000-99 gas detection control panel (hereinafter referred to as the control panel) is a stationary microprocessor device for leakage detection of flammable gases and carbon oxide. The control panel can cooperate with up to 99 detectors simultaneously, has 4 control outputs for external devices, 4 inputs and control output for gas cut off valve.

The control panel is adapted for operation in rooms with low dustiness, within temperature range from - 10°C to +55°C and relative air humidity up to 80% at +55°C.

1.3. Safety conditions

1.3.1. Electric shock protection

CDG 6000-99 gas detection control panels are class II protection devices.

The insulation of the circuits supplying electrical power 230V/50Hz is reinforced and can withstand test voltage of 2800V whereas low voltage circuits insulation (below 42V) can withstand test voltage of 700VDC.

1.3.2. Installation and equipment safety

The distance between the low-voltage installation and the power and lightning protection systems should be compliant with requirements to prevent unwelcome interactions.

Protective grounding is recommended to assure system resistance to electromagnetic interference.

Standby batteries should be placed in the control panel at the end of installation.

Components of this unit are sensitive to heat. The maximum ambient temperature must not exceed +55°C. The air humidity in the rooms where the unit operates must not exceed 80 %. Do not place any objects on the device and protect the device from water getting into it.

1.3.3. Repairs and maintenance

The maintenance works and periodical inspections should be conducted by authorised employees of companies which have been authorised or trained by Polon-Alfa personnel. All repair works must be done exclusively by the manufacturer.

Polon-Alfa accepts no responsibility for the operation of devices maintained and repaired by unauthorised personnel.

1.3.4. Fuse replacement

When replacing fuses use only spare ones of the appropriate type and nominal value. Correct types and nominal values are described in chapter 8.1 of this instruction.

2. Control panel structure and assemblage

CDG 6000 control panel requires 12V 2.3Ah lead-acid battery for correct operation. The battery is placed inside the enclosure. Battery maximum external dimensions are as follows: 178 x 34 x 64mm.

The control panel can cooperate with PSG-6000 series gas detectors. The control panel detection line may include up to 99 detectors of different types.

Table 1: PSG-6000 series detectors selection.

Detected Gas	CNG (natural gas)	LPG (propane – butane)	CO (carbon oxide)	
Model	PSG-6001	PSG-6002	PSG-6003	PSG-6103
Sensor Model	MSG-6001	MSG-6002	MSG-6003	MSG-6003
Sensor Type	semiconductor	semiconductor	electrochemical	electrochemical
Sensor power supply	External 9-30V	External 9-30V	External 9-30V	From detection line

The detectors connected with the control panel may be powered with external power supply or 12V power supply line provided in the control panel for the user.

The control panel may additionally be fitted with MKA-60 module. This module expands the control panel capabilities with ACOM 6.0 functionality. This functionality allows for direct cooperation of the control panel with POLON 6000 fire alarm systems.

2.1. Components layout in the control panel

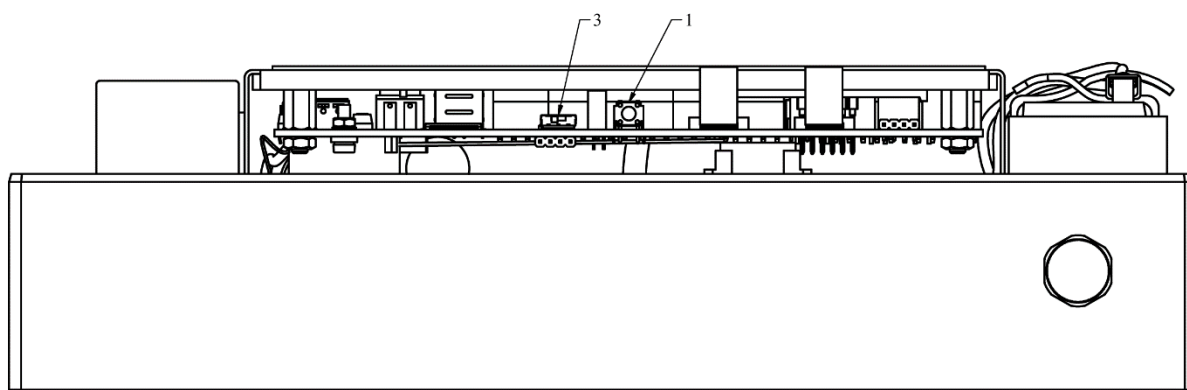


Fig. 2.1.1 CDG 6000-99 control Panel – top view

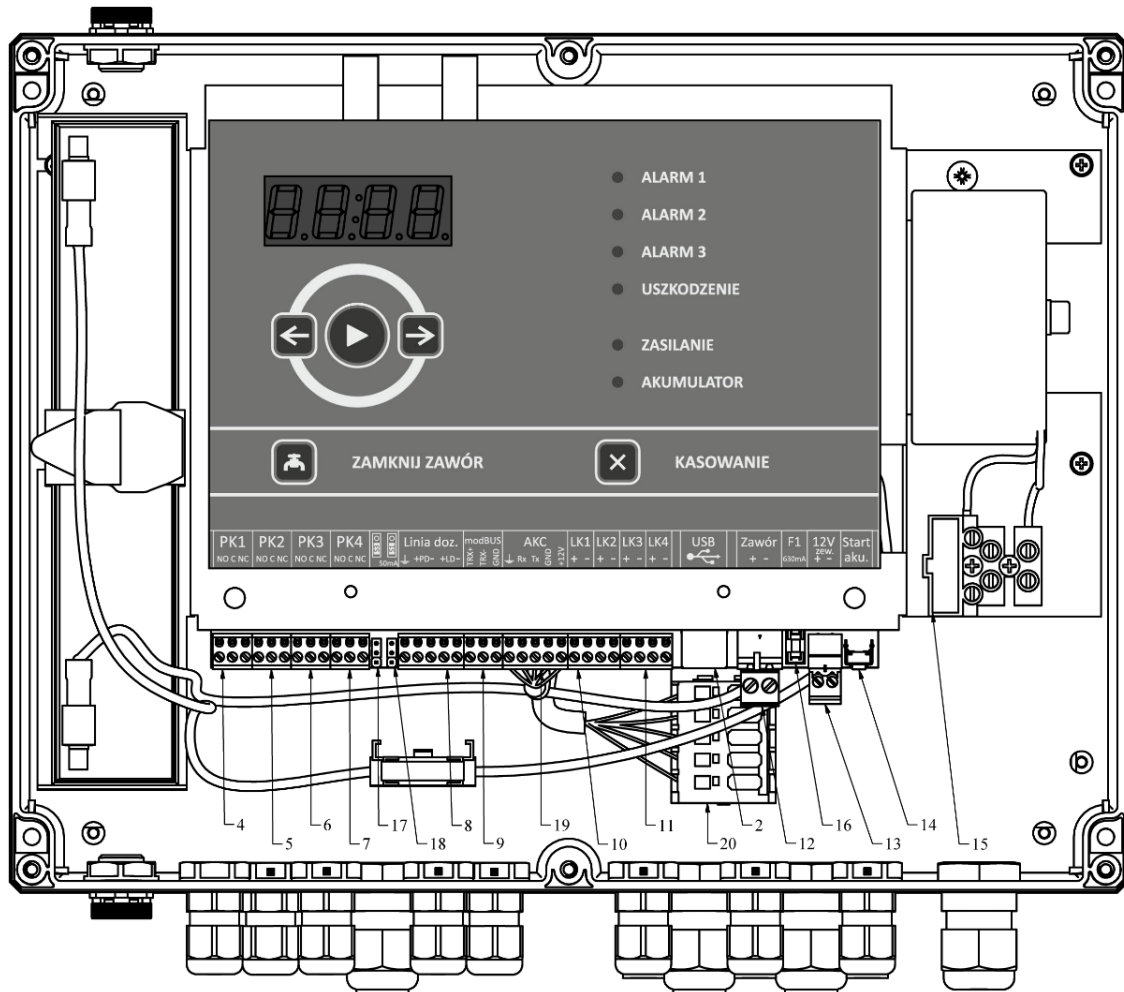


Fig. 2.1/2 CDG 6000-99 control panel

Component placement inside the control panel is depicted in figure 2.1.1 and 2.1.2:

1. RESET button
2. USB port
3. Microprocessor programming mode switch
4. PK1 relay connector
5. PK2 relay connector
6. PK3 relay connector
7. PK4 relay connector
8. Detector lines connector
9. Connector for connecting the control panel to the Modbus
10. LK1 and LK2 control lines connector
11. LK3 and LK4 control lines connector
12. Gas cut-off valve connector
13. External devices 12V power supply connector

14. "Battery Start" button
15. Control panel 230VAC power supply connector with F1 – 630mA fuse enclosure
16. External devices power supply output fuse 12V – 630mA
17. Detection line grounding control
18. S1 jumper that sets the detection line maximum load current
19. AKC-6000 connector
20. Connector for connection AKC-6000 with POLON 6000 system

3. Technical data

Table 3/1 Control panel technical specification

POWER SUPPLY PARAMETERS	
Mains power supply voltage	230 V AC +10% -15%
Frequency of primary power supply voltage	47 ÷ 63 Hz
Maximum current consumption from the mains	150 mA
Backup power source	12 V 2.3 Ah battery
Battery current consumption during standby (control panel)	< 100 mA
Current consumption of the POLON 6000 system addressable detection line	< 0.6 mA
INPUT PARAMETERS	
Input lines LK1-LK4	
Test current value (in supervision mode)	0.3 mA
Number of distinguishable input states	3 + 2 (short circuit and open)
Detection line	
Maximum number of detectors per detection line	99
Maximum detection line load current / maximum line conductor resistance depending on jumper setting:	
- jumper S1 (S2) in position 1-2	50 mA / 2 x 45 Ω
- jumper S1 (S2) in position 2-3	20 mA / 2 x 100 Ω
- jumper S1 (S2) in position 2-3	22 mA / 2 x 75 Ω
Maximum resistance of line conductors between elements:	40 Ω
Maximum allowable capacity of line conductors:	300 nF
Minimum insulation resistance of the system conductors:	100 Kw

AKC-6000	
Supply voltage of AKC-6000	12 V
Maximum load current	50 mA
Data transmission	Serial
OUTPUT PARAMETERS	
External power supply line:	
External power supply line voltage	12 V DC +5 % -5 %
Continuous current available from external power line	1 A
Relay outputs PK1-PK4	
Current-voltage load capacity of NO/NC contact	8 A / 250 V AC 8 A / 30 V DC
Shut-off valve control output:	
Output voltage	12 V
Maximum output current	11 A
Control pulse time (programmable)	0.2 to 1 second
Minimum time between control pulses (programmable)	10 to 60 seconds
ENVIRONMENTAL PARAMETERS	
Transport temperature	-25°C ÷ +55°C
Operating temperature	-10°C ÷ +55°C
Permissible operating relative humidity	80% at +55°C
STRUCTURAL PARAMETERS	
Housing tightness	IP 54
Dimensions (without mountings and feet) L x H x D	300 x 230 x 86 mm
Weight (without batteries)	< 2.3 kg

4. Functionality description

4.1. General description

CDG 6000-99 gas detection control panel is intended for signalization of gas leakages and gas concentration exceedance and allows for:

- exceedance detection for 3 gas concentration thresholds;
- automatic or manual cut-off valve closure;
- automatic control over 4 devices;
- devices state control;
- automatic control for own modules and control panel circuits;
- transfer of main information (alarm, fault, executive devices state) to parent systems, e.g. POLON 6000 system.

4.2. Main control panel states

4.2.1. Detection

In the detections state, the power supply indicator should shine continuously on the control panel. Alarm and fault indicators off. Current time shown on the display. Press arrow button to show current date on the display.

4.2.2. Alarm signalization

The control panel may signal three alarm stages. Current alarm stage is presented with ALARM 1 – 3 indicators. It is a sum of alarms from all detectors connected with the control panel. Alarm occurrence in any detector is conveyed with warning indicator light and continuous audible signal. Blinking indicator and intermittent sound signal informs about stored alarms.

Furthermore, the display presents detailed information on alarm stage for each detector. You can browse list of detectors signaling alarm with arrow buttons.



The figure above presents alarms presentation layout on the display. The first two digits are detector number. The A letter at the third position of the display informs that alarm information is displayed. Alarm stage is presented in the fourth display position with horizontal number segments. The current alarm is indicated with continuously lit line. The upper line refers to the first stage alarm, the middle line refers to the second stage alarm, and the bottom line refers to the third stage alarm. Alarms and faults are stored in the device until they are cleared by the user. The stored information can be cleared with RESET button on the user panel.

If the detectors are still in the alarm state during clearing, the alarm in the control panel will be repeated. In order to mute the sound signal press and hold the RESET button until a dot is displayed in bottom right corner. New fault occurrence will automatically trigger the sound signal.

Furthermore, the alarm and fault information is stored in non-volatile internal memory in the form of event log. The log stores all events with their occurrence date and time. The event log content is accessible using "Konfigurator CDG 6000" configuration application.

4.2.3. Faults signalization

CDG 6000-99 control panel is equipped with extensive device and connected external devices self-diagnostics system. Summary fault information is presented by FAULT indicator on the device panel. Furthermore, similarly to alarms, the full list of faults is accessible using the device display.

When the control panel signals current or stored alarm the information on alarms are always presented in the device display by default. In such a case use navigation button to toggle the screen to the faults list.



The figure presents an example of fault presentation in the display. The first two positions indicate the faulty element. The third position of the fault information is always filled with letter U. The fourth position denotes the fault code. The full list of faults is listed in the table.

Table 4.2.3.1 Fault codes

DETECTOR FAULTS			
Detector number		Fault code	Description
01-16	U	1	Detector base malfunction
		2	Detector base EEPROM memory fault
		3	Sensor does not respond or lack of sensor
		4	Last 30 days of sensor calibration validity left.
		5	Sensor calibration date passed.
		6	Defective sensor.
		7	The detector does not respond or lack of detector in the line.
		8	Sensor EEPROM memory fault.
		9	Incorrect sensor type.
		A	Burn-in during operation.
		b	shortcut insulator on,
CONTROL LINE FAULTS			
Line number		Fault code	Description
L1 - L4	U	1	Control line shorted
		2	Control line open
EXTERNAL DEVICES FAULTS			
Output number		Fault code	

P1 - P4	U	1	The device does not reach the expected state after switching it on.
		2	The device does not reach the expected state after switching it off.
BATTERY FAULTS			
A	U	1	Internal battery resistance exceeded.
		2	Charging time exceeded.
		3	Battery voltage too low.
		4	No battery.
CONTROL PANEL FAULTS			
S	U	1	No mains power supply.
		2	No power supply of 27V detection line.
		3	Broken 12V output fuse.
		4	Control panel internal memory fault.
		5	MKA module does not respond.
DETECTOR LINE FAULTS			
L	U	1	Undeclared components in the line.
		2	Changed components in the line.
		3	Line grounding.
		4	Loop line open.
		5	Line output short circuit.
		6	Loop input short circuit.
		7	Incorrect loop RC parameters.

4.2.4. Power supply state signaling

The control panel is fitted with two indicators which present the power supply state. The POWER SUPPLY indicator presents the mains power supply state. Continuous light indicates correct mains power supply, whereas intermittent light indicates no mains power supply.

The BATTERY indicator presents the internal battery state. Continuous light indicates battery operation of the control panel, whereas intermittent light indicates battery fault. Short flashes of this indicator inform about battery charging.

4.2.5. Detector localization

The control panel is equipped with a feature that localizes element in the line and activates signaling LED in the detector. To activate this feature double click the required element with the left mouse button in Detectors tab in the configuration dialog box. Activation of this feature is signaled with circle in brackets icon as depicted in figure 4.2.5.2. To switch this feature off double click the element again with left mouse button.

Put a magnet close to a detector near its label with magnet icon to display the number of this element in the line with letter L as depicted in figure 4.2.5/1.



Fig. 4.2.5.1 The control panel screen when a magnet is close to detector number 14.

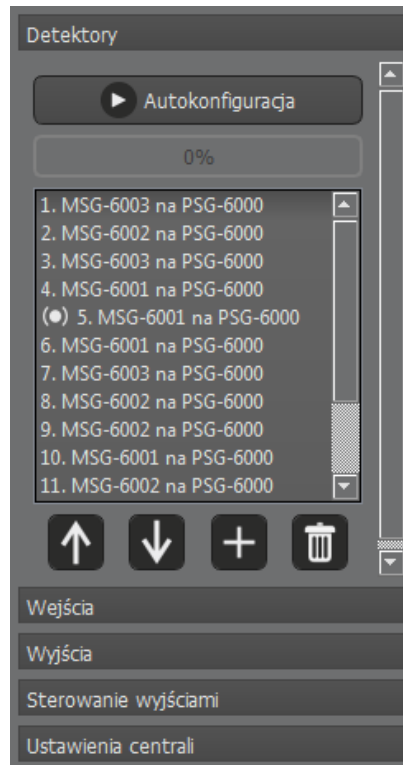


Fig. 4.2.5/2 Dialog box with localization icon next to detector number 1.

4.3. Control panel software version readout

In order to verify the control panel software version go to CONTROL PANEL STATE in the configuration utility. The dialog box display the same information as the control panel and the number of the device software version in its bottom left corner. The dialog display is presented in figure no. 4.4/1.

4.4. Viewing the operating status of the control panel

The configurator allows you to view the operating status of the control panel. The device must be connected via USB cable.



Figure 4.4/1 Tab displaying the control panel status

5. External circuits connection

5.1. Detector line

Name	Purpose
PD+ PD-	Detectors line end input
LD+ LD-	Detectors line input
E	Display input

The detectors for detected gases are connected with the CDG-99 control panel using specially designed detection line. Each detector is assigned with unique address. The control panel may therefore display state of each detector.

The detectors line may operate in two modes, as a radial or loop line. In the loop line mode, the line end is connected with the control panel. The system is thus able to operate correctly even with line breakage in one place.

The line is also immune to short circuits. The detectors are equipped with insulators which separate the short circuit in such a way to assure operability of the maximum number of detectors.

When connecting detector line wires to the control panel, pay utmost attention to the line polarity as well as correct cable screen connection with appropriate terminal.

5.2. Control relays outputs

Name	Purpose
NO	Normally open terminal (disabled)
C	Common terminal
NC	Normally connected terminal (enabled)

The control panel is equipped with four universal relay outputs for control devices. The relay outputs are potential-free and can handle direct and alternating current

5.3. Inputs

Inputs can receive alarms from external devices and control operation of devices controlled directly by the control panel. Inputs are parametric inputs. Apart from short circuit and opening detection, the inputs distinguish 3 resistance ranges. This allows for full input control which results in a connection with external device that is fully resilient to fault. Additionally, it is possible to erase events remotely using the input line, by applying the input resistance of 1 k Ω . It is necessary to remember to connect the resistance of (1,5 ÷ 12 k Ω) at the end of the line in order to supervise the input continuity. Otherwise, a fault will occur indicating a line break.

Resistance levels	Description
$R < 240\Omega$	Shortcut
$R = 750\Omega$	State 1 (active Y)
$R = 2k\Omega$	State 2 (active X)
$R = 6.3k\Omega$	State 3
$R = 12k\Omega$	Open

Each resistance range may be assigned with any system reaction. Inputs may cooperate with plain contact. Only shortcut and opening states are handled that mode.

Resistors are needed for full utilization of the control panel inputs. Figure 5.3.1 shows a method for connection of a single connector in external device. This connection assures control over wires in the case of short circuit or wires disconnection.

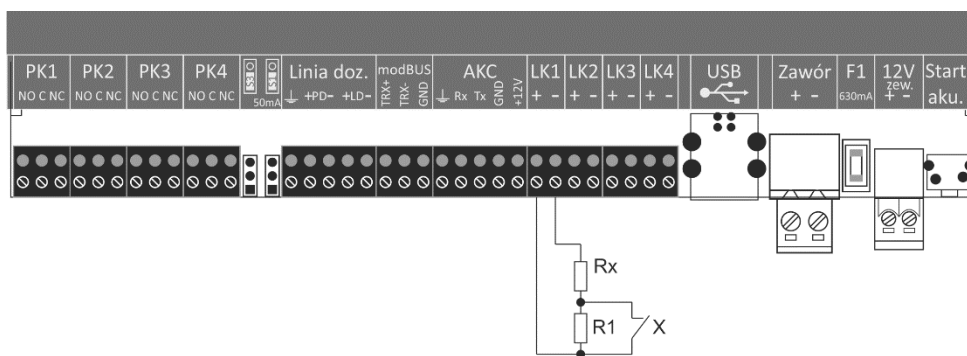
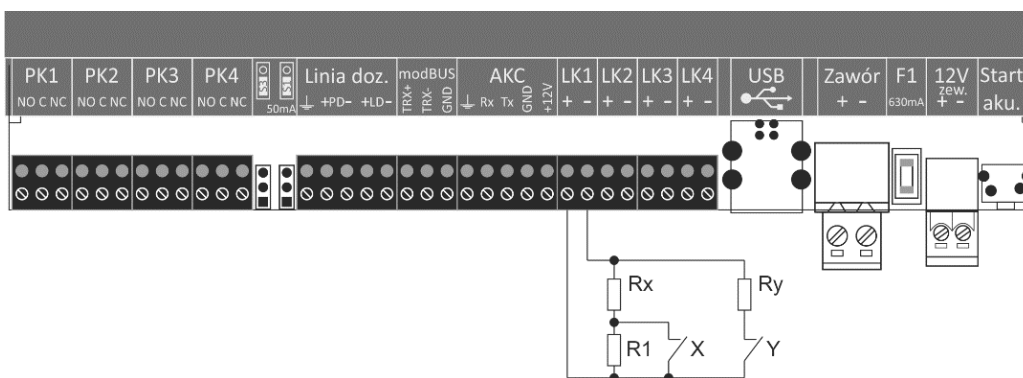


Figure 5.3/1 Connection of a single contact to a control input using resistors

Figure 5.3/2 depicts the connection of two contacts of an external device to one output. Such a connection makes it possible to detect three states of the monitored device.



5.4. Cut-off valve control output

The control panel is equipped with output for activation of cut-off valves. The output generates 12V pulse. The output is fitted with built-in protection that limits the maximum current to 11A. Pulse time may be programmed within the range from 0.2 to 1s.

The output is equipped with software protection against valve electromagnet damage. The protection limits the possibility of valve activation before the end of the defined pause time.

NOTE. The valve may be properly energized only with a functional battery connected to the control panel. Defective or discharged battery does not allow for proper control pulse generation.

5.5. Power supply output

The control panel is fitted with 12V power supply output for detectors and external devices. The maximum current of this output is limited to 500mA. The output is protected with a miniature fuse NANO² 630mA. The fuse state is controlled by the control panel; its failure is signaled as a fault.

5.6 Detection line of POLON 6000 input

The CDG 6000-99 control panel may directly cooperate with the POLON 6000 system. The use of an additional AKC-6000 module makes it possible to connect the gas detection panel to the POLON 6000 fire system detection line. The AKC connector is intended for making the connection. The power supply to the device has been limited in terms of current from 50mA. The following table describes the AKC connector.

Name	Purpose
+12V GND	Power supply for the AKC-6000 device
Tx Rx	Communication lines of the AKC-6000 device
E	Shielding terminal

5.7 Battery connectors

The CDG 6000-99 control panel requires lead-acid battery for its correct operation. No connected battery or a faulty battery results in fault signalization.

The battery in the control panel provides closing pulse for the cut-off valve. Inoperable battery prevents valve activation.

Use only original wire set equipped with fuse socket to connect the battery to the control panel.

Battery specification:
















Parameter	Value
Nominal voltage	12V
Capacity	2.3Ah
Maximum dimensions	length 180 x height 40 x width 60

The battery must be definitely disconnected for storage of the control panel.


6. Control panel configuration and programming

The CDG 6000-99 control panel is configured and programmed using *Konfigurator CDG6000* computer application.

Konfigurator CDG6000 features:


-  control panel parameters configuration, including:
 - saving the configuration in a file 
 - reading the configuration from a file 
 - sending the configuration to the control panel 
 - reading the configuration from the control panel 
-  reading the event log, including:
 - saving the log in a file 
 - reading the log from a file 
 - reading the log from the control panel 
 - printing the event list 
 - saving to a PDF file 
 - deleting the event list 
-  previewing the state and remote managing the control panel
-  setting and reading the control panel system date and time
-  using program context help.

The CDG-6000-99 control panel may be connected using USB port to a PC computer. Use USB cable with A plug at one end and B plug at the other end to connect the computer with the control panel. For longer distances between the computer and the control panel use so called active extension USB cable. Upon connection, the USB port of the CDG 6000-99 control panel should be displayed by the computer as USB Serial Port (COMxxx).

The application automatically detects the control panel connected with the computer and informs about it with highlighted icon  that is used to establish connection.

6.1. Control panel configuration

Create an empty configuration to start configuration of the control panel.

It is done using  icon. After it is pressed, a window appears that allows entering the name of the configuration. If there is no previous connection between the control panel and the computer, a window for selecting the control panel version (for 16 or 99 detectors) will appear. After accepting the settings, a new tab will be displayed:

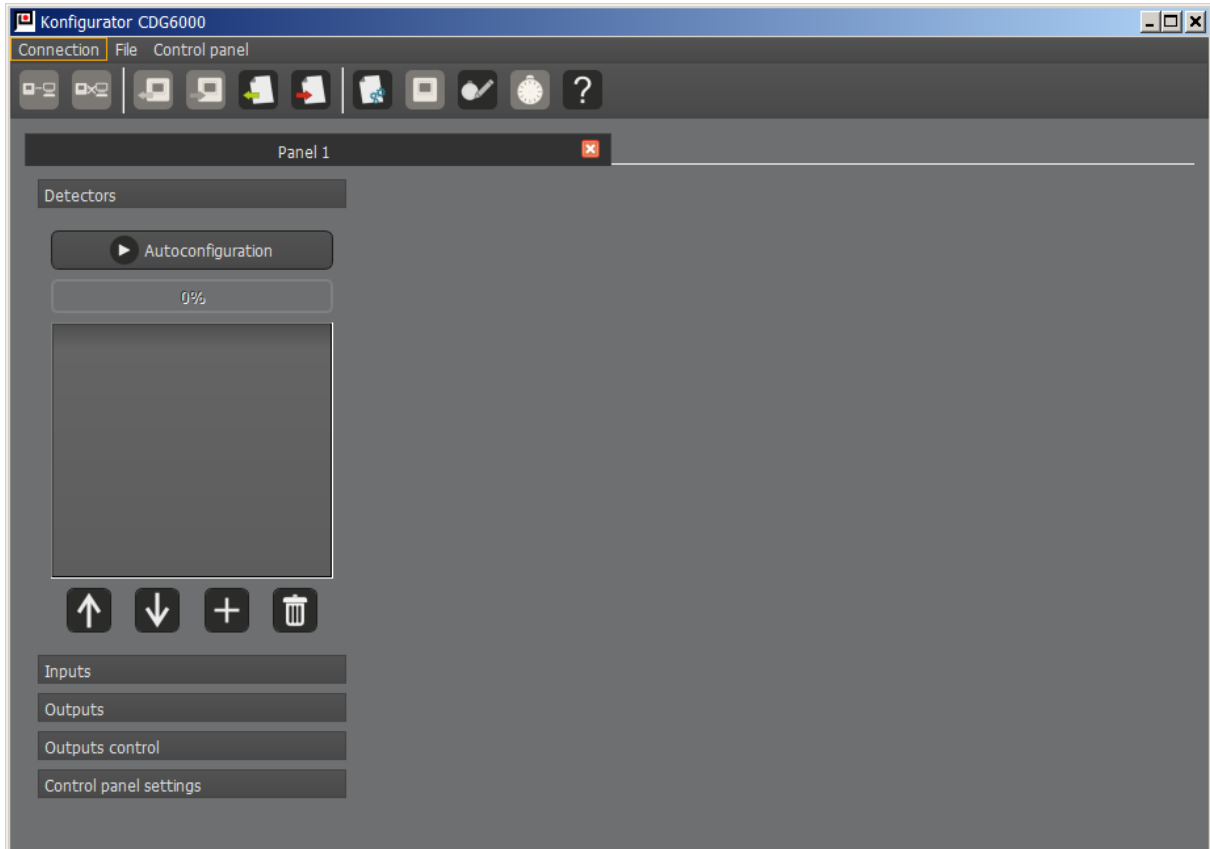


Fig. 7.1.1 Configuration dialog box.

When the configuration tab is visible icons for configuration read-out and write to disk are active. Furthermore, if communication with the control panel is established icons for configuration read-out and transfer to the control panel are also active.

The left side of the tab consists of menu with system elements available for configuration. Elements grouped in the following categories:

- Detectors
- Inputs
- Outputs
- Control
- Control panel settings
- Zones

NOTE!

When creating a configuration without a connected control panel, there is a possibility of data loss. It is essential to choose the right version of the control panel. Data loss is possible when a 99-element panel version is set up and 16-element panel version is connected. In such situation the configurator

truncates the data to 16 elements. If this happens, it is recommended that you reconfigure the elements.

6.1.1. Detectors configuration

To configure the detectors, you must perform line autoconfiguration. This procedure detects all detectors connected with the control panel. To start the automatic configuration press "Autoconfigure" button. This procedure continues until the "Autoconfigure" button becomes active again.

When the procedure is complete, all detectors connected to the control panel should appear in the list. When you click on an item, detailed detector information will be displayed on the right side of the window.

Also, for each detector it is necessary to set the required sensor type for it to work with. During operation, the control panel constantly checks whether there is a working sensor of the required type in each base.

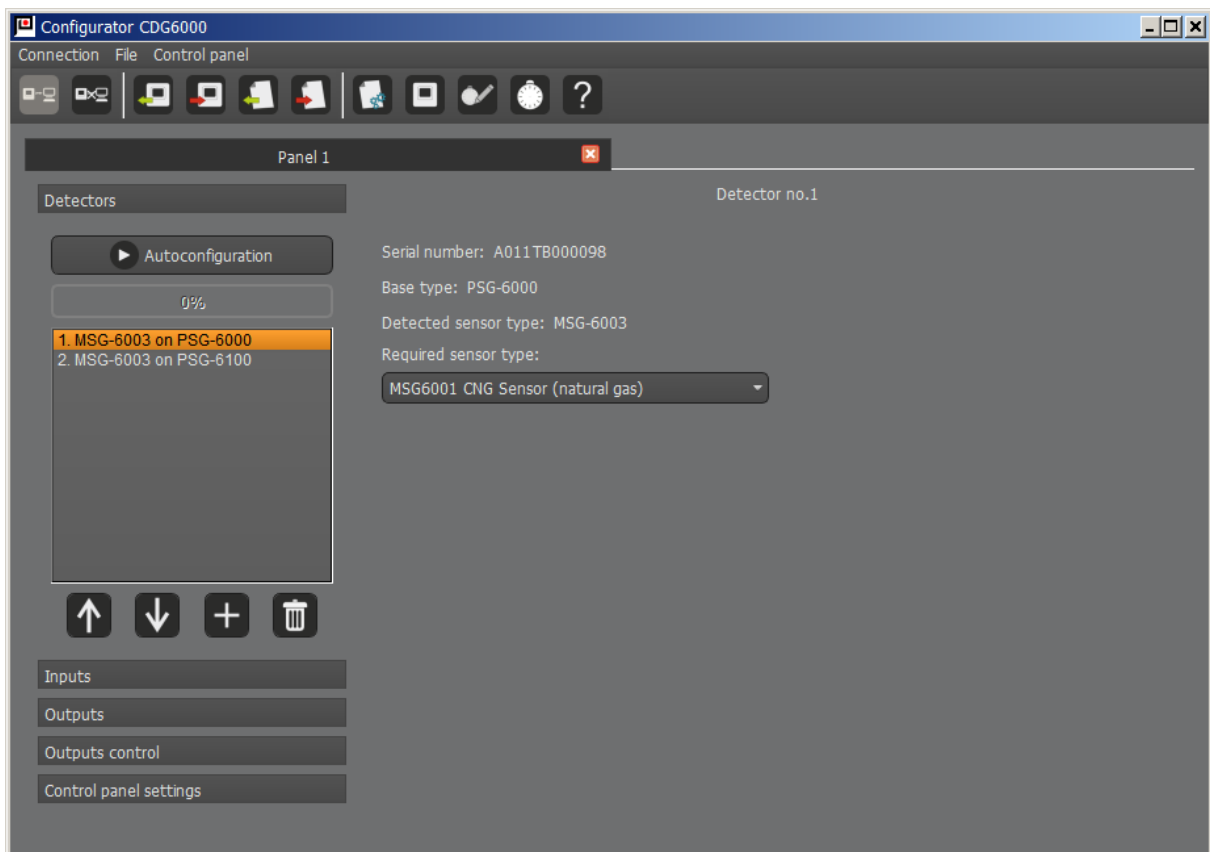


Fig. 6.1.1/1 Configuration dialog box with an example of detector list.

6.1.2. Inputs configuration

CDG-6000-99 control panel inputs can operate in 4 modes:

- State control
- Activation supervision
- Alarm input
- Remote erase of the event log.

The first mode allows for output state control in order to assign its states with relay activations. In this mode, the users decide only whether short circuit and opening states should result in fault signalization.

Activation supervision mode is intended to manage devices using the control panel. This allows for continuous control over external devices and for reporting information on their incorrect operation.

In order to control a device it must be equipped with contacts that feedback its state. An example of the connection is depicted in figures 5.3/1 and 5.3/2.

In the Activation supervision area, select an output to which the controlled device is connected.

In the activation supervision mode users select activation and deactivation delays. This time allows the device to change its state. The delay time is starts after each control relay state change. If the state of the device control output will not change within the delay time the control panel reports controlled device defect.

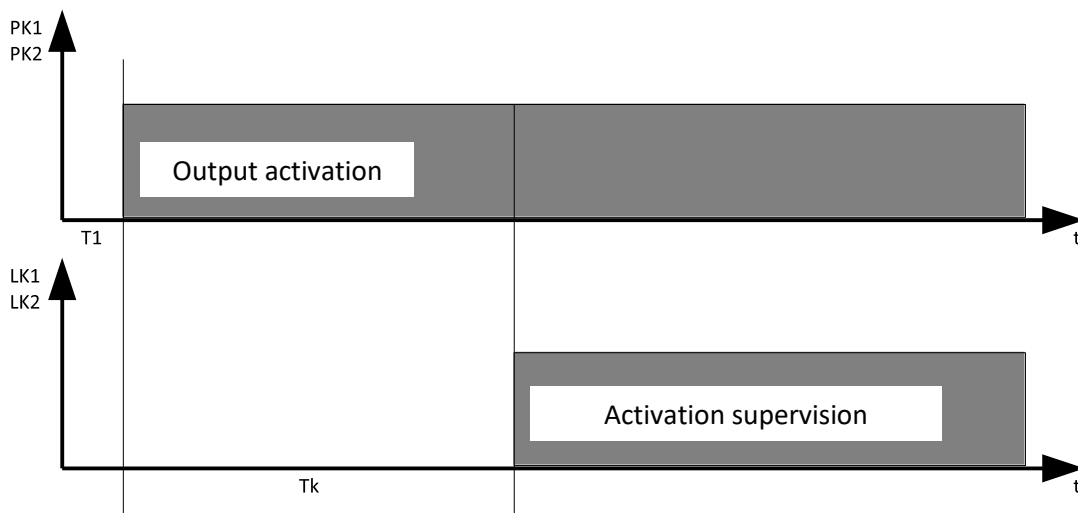


Fig. 6.1.2/1 PK1 and PK2 outputs activation control

Alarm input mode allows to accept alarms from external devices other than detectors connected through a detector line. In this mode, resistance levels are set for which the control panel should report different alarm levels. The alarms received from inputs exert influence on the general alarm state of the control panel.

The errors displayed on the control panel, in the remote event log deletion mode, are deleted by a pulse input load with resistance of 750 Ω . The duration of the deleting pulse should be 5 seconds and

it must not exceed 60 seconds. If the timeout occurs, the panel will report a short circuit error on the control line. In remote deleting mode the control input is supervised. The line ending should be loaded with a resistor from within the range of $2 \div 6,3 \text{ k}\Omega$.

6.1.3. Control outputs configuration

The CGD-6000-99 control panel is equipped with 4 relays. In addition to continuous activation the relay may operate in the following modes:

- time mode – allows for generation of a single impulse with defined length (activation time)
- impulse mode – the relay continuously generates impulses based on defined time parameters: impulse duration (activation time) and pause time
- finite pulse mode – the relay generates a defined number of pulses

Furthermore, it is also possible to set activation delay and deactivation delay.

The cut-off valve output is a special control output. The configuration tab for this output includes impulse time setting and minimal time between impulses setting.

NOTE. Cut-off valve control pulse settings must match valve manufacturer recommendations. Otherwise the cut-off valve may become inoperable or defective.

6.1.4. Configuring the controls

An independent control criterion can be set for each control output of the panel. Each criterion consists of one to four conditions that form scenarios of events that must be met for the output to be controlled. Each of the four events can be negated so that its absence is a condition for modulation the output. It is possible to specify whether the occurrence of one of the four events or all of the active events is required to meet the criterion.

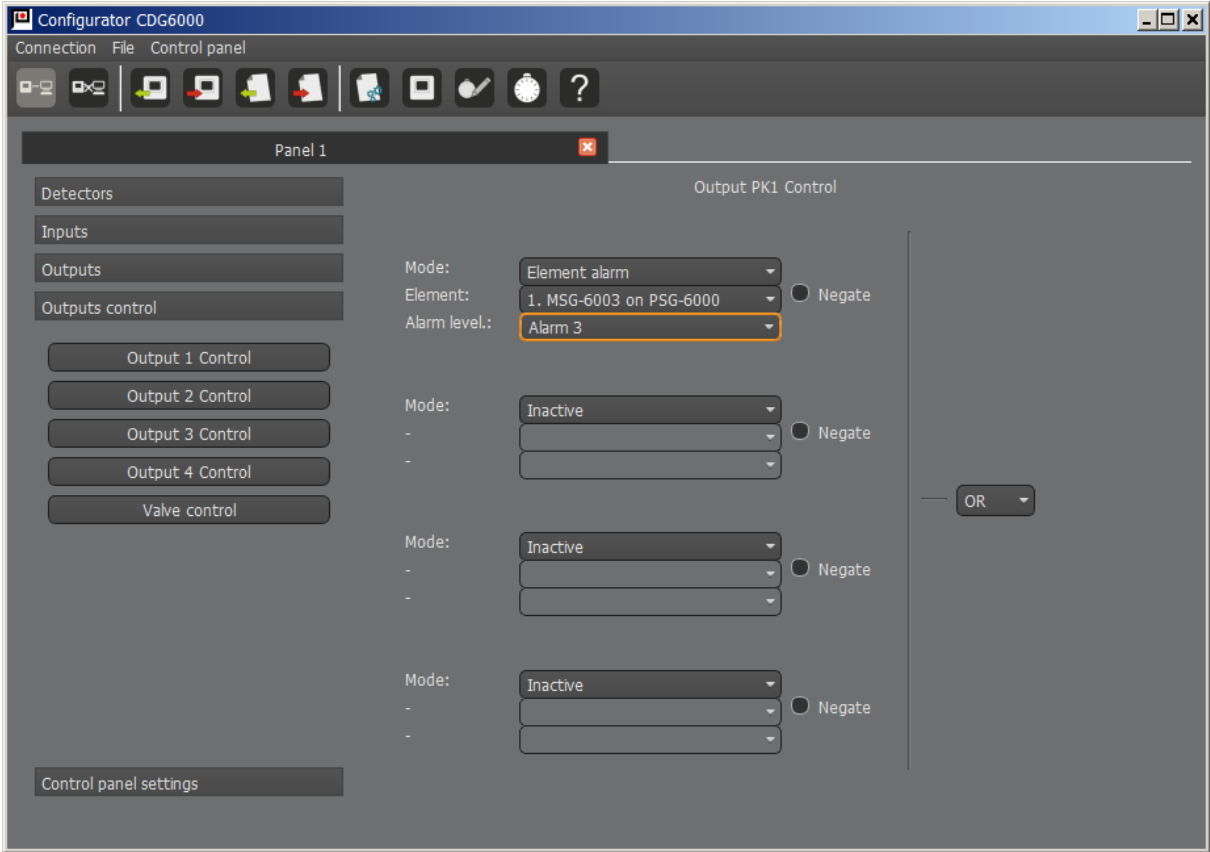


Fig. 6.1.4/1 Control panel outputs configuration dialog box

Table 6.1.4.1 Configuration options for control panel outputs

Event type	System element	Event genre	
Control line status	Inputs LK1 – LK4	Shortcut	Selected control line shorted
		Open	Selected control line open
		Device on	Device enabled state in the selected control line
		Device off	Device disabled state in the selected control line
		State change device	State for device state change in the selected control line
		Detection	State detection in the selected control line
		Alarm 1	State Alarm 1 in the selected control line
		Alarm 2	State Alarm 2 in the selected control line
		Alarm 3	State Alarm 3 in the selected control line
		State X	State Alarm X in the selected control line
		State Y	State Alarm Y in the selected control line
		State Z	State Alarm Z in the selected control line
Element alarm	Detectors 1 to 99	Alarm 1	Alarm 1 for the given detector
		Alarm 2	Alarm 2 for the given detector
		Alarm 3	Alarm 3 for the given detector
Element fault	Detectors 1 to 99	Any	Any fault of any detector
Control panel alarm	-	Alarm 1	Stage 1 alarm for the control panel
		Alarm 2	Stage 2 alarm for the control panel
		Alarm 3	Stage 3 alarm for the control panel
Stored control panel alarm	-	Alarm 1	Stored stage 1 alarm for the control panel
		Alarm 2	Stored stage 2 alarm for the control panel
		Alarm 3	Stored stage 3 alarm for the control panel
Fault	Elements	Any	Any fault of any element
	Control lines		Any fault of any control line
	Devices		Any fault of any device in activation control
	Battery		Any battery fault
	System		Any system fault
	Any		Any fault
Stored fault	Elements	Any	Any stored fault of any element
	Control lines		Any stored fault of any control line
	Devices		Any stored fault of any device in activation control
	Battery		Any stored battery fault
	System		Any stored system fault
	Any		Any stored fault
Group of detectors alarm	Detectors groups MSG-6001÷6003	Alarm 1	1 st level alarm for the selected detector group
		Alarm 2	2 nd level alarm for the selected detector group
		Alarm 3	3 rd level alarm for the selected detector group
Zone alarm	Zones 1÷99	Alarm 1	Alarm 1 for a given zone
		Alarm 2	Alarm 2 for a given zone
		Alarm 3	Alarm 3 for a given zone

Zone faults	Zones 1÷99	Any	Any fault for a given zone
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6.1.5. Control panel settings

6.1.5.1 Settings for detector lines and AKC-6000

Detector line may operate as a loop line or radial line. In the loop mode the line end is connected with loop input. This allows for correct detector line operation even when broken in one place. A single short cut in the line may also be separated by the adjoining elements without any communication failure.

The AKC-6000 module allows for the CDG 6000-99 control panel operation as a line element for the POLON 6000 system. This operation type is permissible when the control panel is fitted with AKC-6000 module and "AKC-6000 module: active" option is selected in the "Detector line and AKC-6000 settings" tab.

6.1.5.2 Password for deletion

To prevent deletion of events stored in the control panel by unauthorised persons this feature may be protected with access password. To protect the deletion with password select option "Activate deletion access password". Next, using drop-down menus, set the required sequence of the control panel keys.

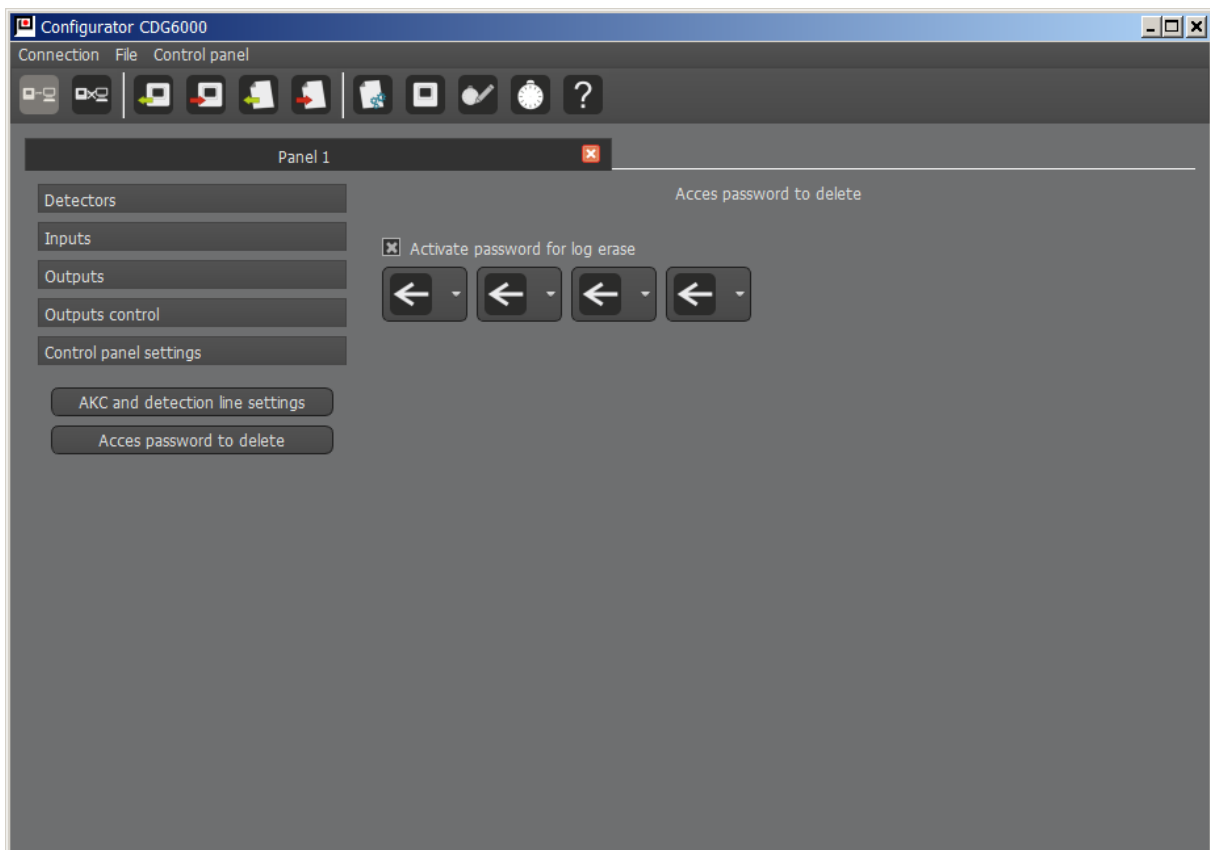


Fig. 6.1.5.2/1 Control panel settings – password protection.

6.2. Zone configuration

Configurator v1.6 introduces an additional possibility of modulation from defined zones. These setting can be found in the “Zones” tab. The setting window is shown in Figure 6.2/1.

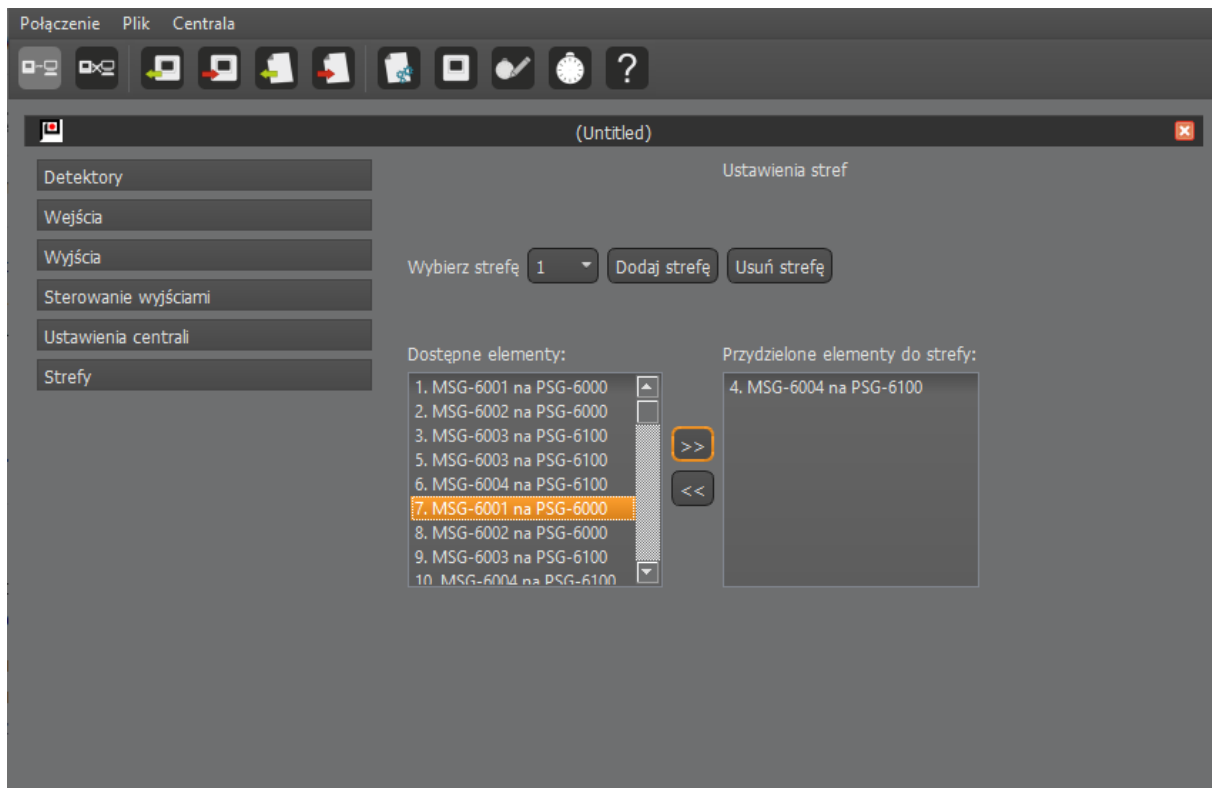


Figure 6.2/1 control panel settings view

Several steps are required to assign detectors to a zone. Select a zone from the drop-down list or click the “Add Zone” button. Then select the desired elements from the elements in the “Available elements” list. Moving detectors to the “Elements assigned to zone:” list is done by clicking the button with the arrows pointing to the right (the button with the orange border in Figure 6.2/1)

To remove elements from a zone, select the detectors in the “Elements assigned to zone:” list and click the button with the arrows pointing to the left.

The “delete zone” button moves all detectors assigned to that zone to the list of available elements. If the selected zone is last on the list, it will be deleted.

The number of zones is limited to the number of defined detectors.

6.3. Event log

All CDG 6000 control panel circuits are controlled. All faults are reported and recorded in the event log. The event log contains up to 5000 events. After saving 5000 events, the oldest events are overwritten by new ones.

The event log may be read using the **Konfigurator CDG600** application.

After selecting the following icon:  an event log tab is displayed:

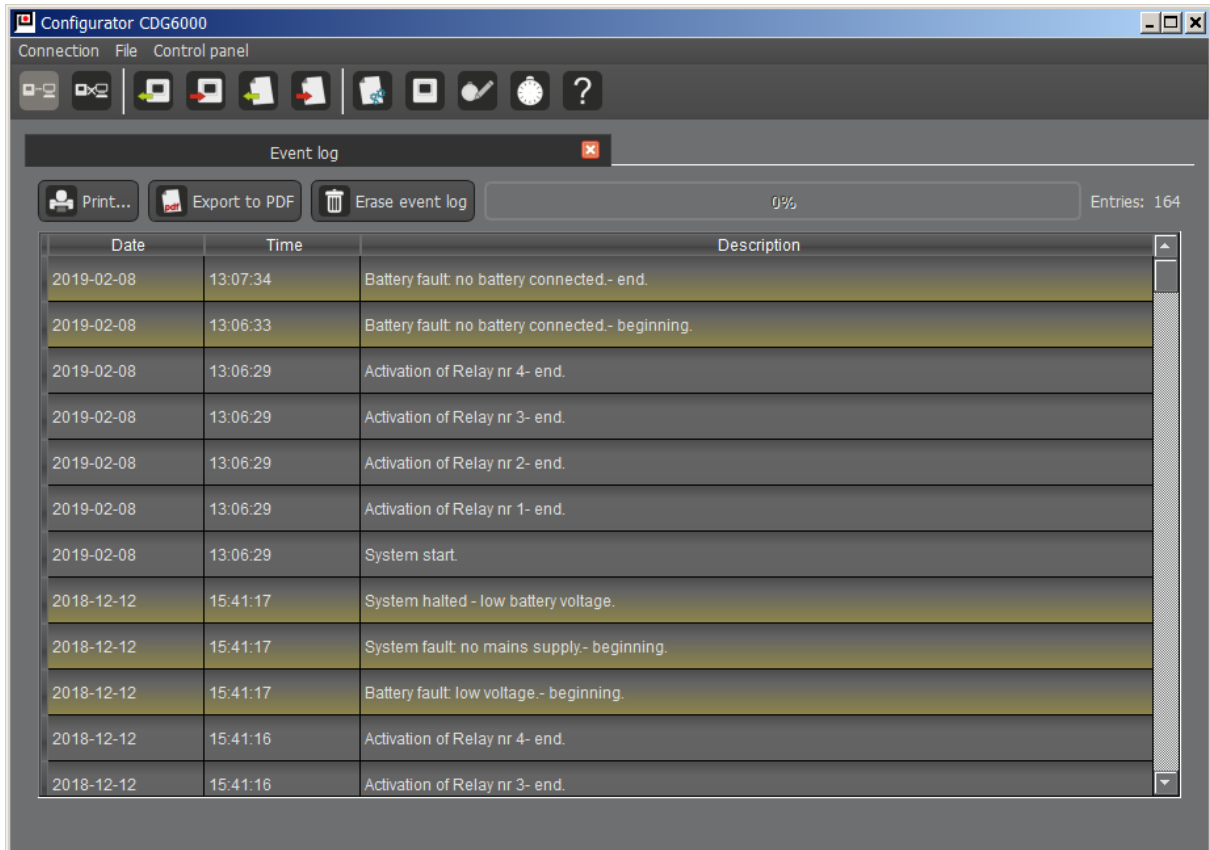


Fig. 6.3/1 Event list read from the CDG 6000-99 control panel

Use the following icon to read the log from the control panel



The log may be saved to disk



Read the log from disk using the following icon



6.4. System time

In order to set the control panel date and time the following icon should be selected:

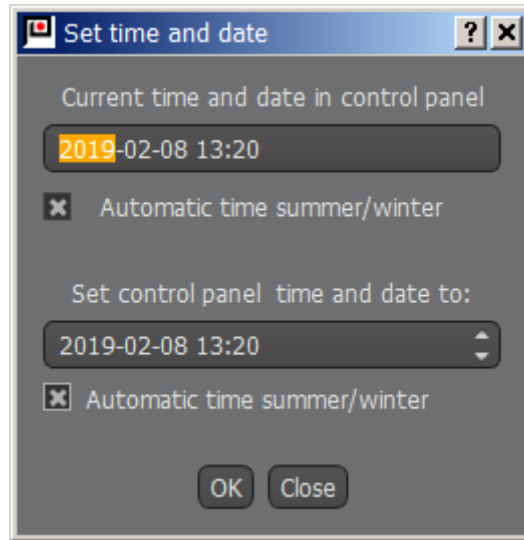


Fig. 6.4/1 Time setting dialog box.

6.5. ModBus/RTU protocol

The device enables communication with control and supervision systems using the RS485 serial transmission standard with Modbus protocol. All settings for the Modbus protocol can be found in the “Detector line and AKC Settings” tab.

The view of the configurator window is shown in a Figure 6.5/1. By default, communication via the protocol is disabled. The configurator also enables unblocking remote deletion of log entries and selecting the device address from the range of 1÷64. Transmission parameters are presented in the table below.

Parameter	Data
Transmission mode	Asynchronous
Baud Rate	115200 Bit/s
Expression length	8 Bits
Parity	None
Stop bits	2

From the configurator version v.1.6 and panel software version v.3.3 it is possible to modify the data transmission settings. The modification possibilities are shown in the table below.

Parameter	Possible settings
Baud rate	9600 Bit/s
	19200 Bit/s
	115200 Bit/s
Parity	None
	Even
	Odd

Changing the above parameters in an older software version will not affect its functioning, the control panel will still have the original transmission settings.

Access to data from the gas detection panel is possible by using the following functions: read coils, read holding registers, read input registers and write single register, which are a part of the Modbus protocol. Detail how to use the functions are presented in the following subsections.

A connector on the front of the control panel is provided for connecting the device. Connect to the pins described as A- and A+. The location of the connector is shown in figure number 2.12

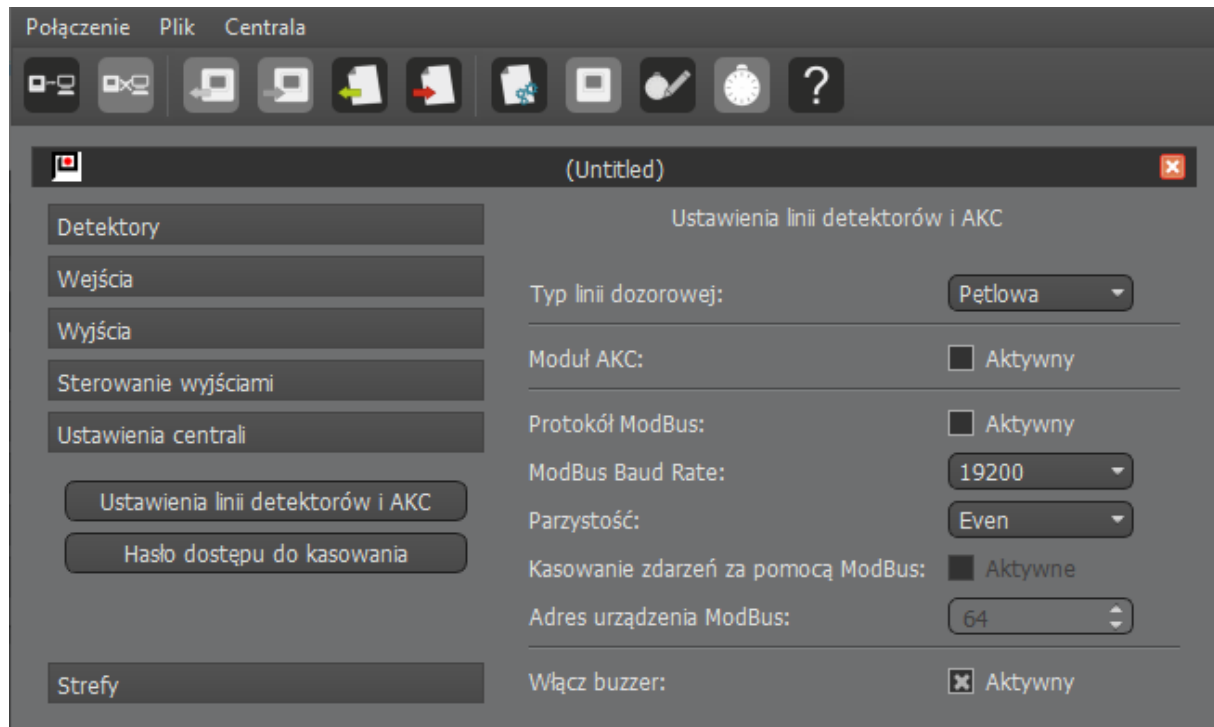


Figure 6.5/1 View of the configurator tab with Modbus protocol, line and AKC settings

6.5.1. Relay status redout function

Using the read coils function (0x01), the gas detection panel can read the states of 4 relays and the state of the output controlling the gas cut-off-valve. According to the Modbus v1.1b protocol, the relays are numbered from 0 to 3. The addresses of the relay outputs are shown in the table below.

Address	Relay outputs
0x00	PK1
0x01	PK2
0x02	PK3
0x03	PK4
0x04	Valve control

Returned value 1 means that relay contact are on. Similarly, 0 means that they are off.

NOTE!

When controlling a gas shut-off valve, a value of 1 is sent from the start of the control pulse until the set time required for the valve to cool down.

6.5.2. Function of reading out the states of the control panel and detectors

The READ HOLDING REGISTERS function (0x03) provides access to panel and detectors states. The returned information is divided into 2 parts: the state of the control panel and the states of the detectors.

The gas detection panel allows you to read 2 bytes of control panel status information. This information is located at the zero address of the register. The fault codes of the gas detection panel are listed in the table 6.4.2/1. The following register positions contain two-byte detector status information. The address of the first detector is located in register number one. The detector fault codes are shown in the table 6.5.2/2

Table 6.5.2/1 Fault codes of the CDG-6000-99 control panel

Code	Status of the control panel
Fault	
1	Internal resistance of battery exceeded
2	Battery charging time exceeded
4	Battery voltage too low
8	No mains power supply
256	No battery
512	No power supply to supervision line
1024	12 V output fuse fault
2048	Failure of the control panel internal memory
4096	AKC module not responding
Alarms	
8192	1 st level alarm
16384	2 nd level alarm
32768	3 rd level alarm

6.5.3. Reading the states of the control inputs

The gas detection panel makes it possible to read the states of control inputs through the READ INPUT REGISTERS (0x04) function. The feedback provides the states declared in the device configuration. Table n. 6.5.3/1 shows the codes for the possible states of the inputs.


Table 6.5.3/1 CDG-6000-99 panel control inputs status codes

Code	Control input status
0	Short circuit
1	Break
2	Device on
3	Device off
4	Device status change
5	Supervision
6	Alarm 1
7	Alarm 2
8	Alarm 3
9	Status X
10	Status Y
11	Status Z

6.5.4. Remote deletion of events

The gas detection panel allows you to remotely delete events by using the WRITE SINGLE REGISTER (0x06). In order to use the option, a value of 1 must be entered in register number 19. This functionality has to be unlocked from the configurator level.

6.5.5. Help

Pressing button:  results in starting help module for **CDGKonfigurator** application. This module offers information on the **CDGKonfigurator** application operation as well as the control panel setup.

7. Installation

7.1. Control panel fixation

The CDG 6000 control panel may be wall mounted using four rawplugs with diameter of 6mm (fig. 8.1.1),

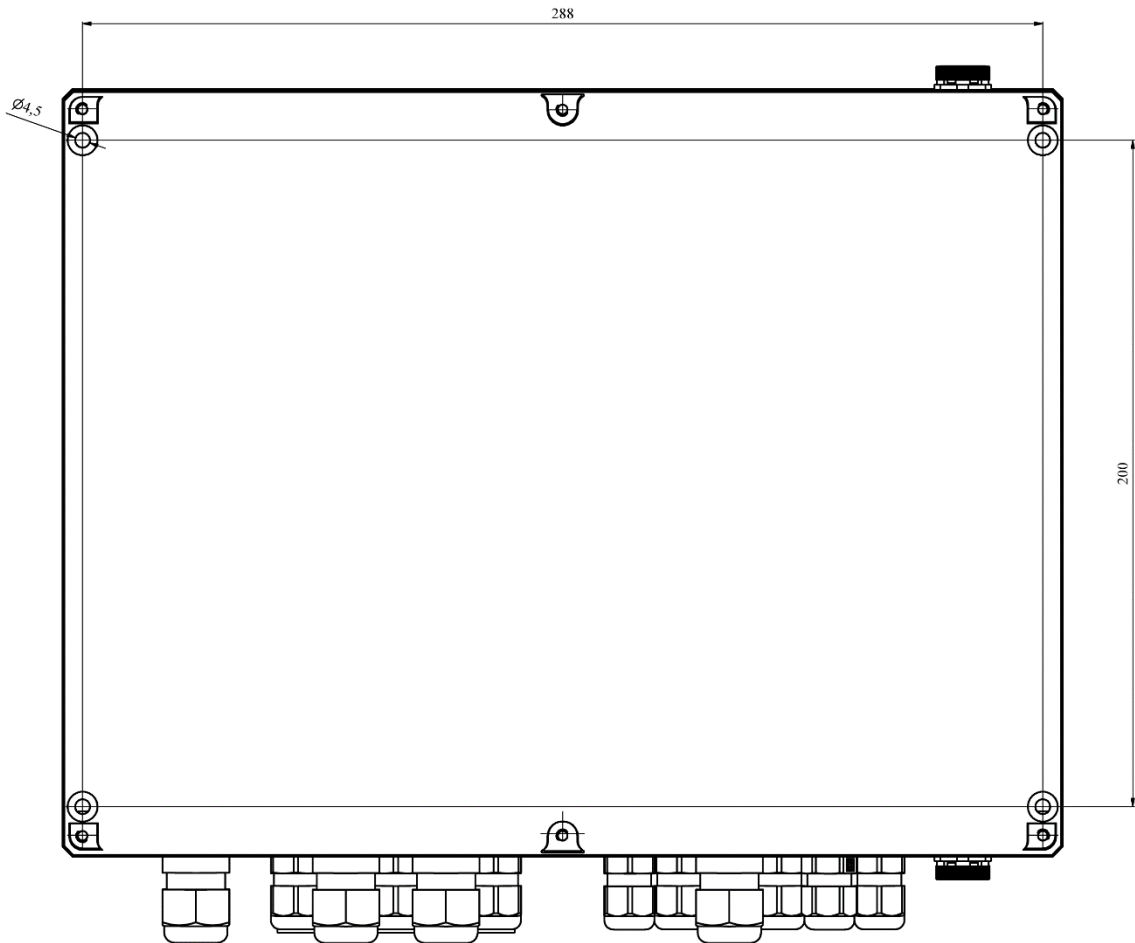


Fig. 7.1/1 CDG 6000-99 control panel fixation

7.2. Input and output circuits connection terminals

The control panel modules are fitted with terminals for external installation wires connection. Both surface-mounted and flush-mounted installation wires may be inserted into the control panel. They are routed through separate circular holes with glands for electrical power network and for low-voltage wires.

Mains power supply

Electrical block with designations L N is intended for 230V / 50Hz mains connection.

Back-up power supply

Two colour wires are intended for the batteries cluster connection. The red wire, connected with the positive battery terminal, is protected with car fuse (19mm) and its value is provided in chapter 8.1.

8. Operation and maintenance

8.1. Proper use regulations

Reliable operation of the control panel depends on maintaining appropriate working conditions, supply voltage, and condition of batteries, as well as carrying out periodic tests.

Periodic test should be carried out by an authorized maintenance technician contracted by the user to maintain the system. Any damage that occurs should be reported to the maintenance technician immediately.

When replacing fuses attention should be paid to their nominal values.

Do not replace a blown fuse with a spare one of higher nominal value to avoid device damage.

The following fuses are used in the CDG-6000-99 control panels:

Control panel board:

- | | |
|--------------|--|
| - F1: 1,25mA | type: miniature NANO ² fuse – external power supply circuit |
| - F2: 3.15mA | type: standard fuse – control panel supply circuit |
| - F3: 3A | type: miniature NANO ² – battery charging circuit |

Battery (red line):

- | | |
|-----------|---------------------------------|
| - F4: 15A | type: 19mm car fuse, 15A – blue |
|-----------|---------------------------------|

8.2. Periodic inspections and maintenance regulations

Clean battery terminals every half a year.

The batteries charging state should be inspected at least once a year. To do this switch the mains voltage off for approximately 2 hours, then switch it back on and check whether the rechargeable batteries cluster will be recharged within 5 hours.

Efficiently operated control panel subject to regular periodic inspections does not require any special maintenance. It is recommended to periodically clean the outer surface of the panel.

9. Packaging, storage, transportation

9.1. Packaging

The control panel is placed in individual packaging which limits the possibility of free movement and eliminates damage during handling and transportation.

The following information provided on the packaging:

- manufacturer name or marking,
- control panel name and type,
- control panel ground.

The packaging shall bear the following inscriptions: "CAREFULLY BRITTLE", "TOP", "DO NOT KNOCK OVER", "PROTECT AGAINST MOISTURE" or corresponding inscriptions according to the PN-EN ISO 780: 2001 (PN-85/0-79252) standard.

9.2. Storage

The control panel shall be stored in enclosed spaces with temperature of +5 °C to +40 °C and relative humidity from 40% to 80%, free of vapors and corrosive gases. During longer periods of control panel storage, connect it to the power supply for 1 hour every 6 months to test its correct operation.

The control panel should not be exposed to heat, solar and heating devices radiation during storage.

9.3. Transportation

The control panel in the packaging according to chapter 9.1 must be transported in roofed means of transportation, taking into consideration transport indications provided on the package and protected from sudden shocks and ambient temperatures outside the range of -25°C to +55°C.

10. Cooperation with AKC-6000 digital communications adapter

10.1. Mounting the AKC-6000 inside the device

The design of the control panel allows the AKC-6000 to be mounted inside of it. The installation diagram is shown in figure 10.1.1

To install the AKC-6000 in the CDG-6000-99 you must:

- unscrew the screws (11) and pull off the cover (10)
- loosen the mounting screws (8) and pull off the cover (10)
- unscrew and pull off the cover of the AKC-6000 (7)
- insert the connector (2) into the mounting plate (4)
- screw the plate to the CDG-6000-99 with the screws (3)
- connect the AKC-6000 to the CDG-6000-99 using the cables supplied, according to the descriptions (for more information, refer to the AKC-6000 manual section on installing the device)
- fix the AKC-6000 (5) to the plate (4) with the screws (6)
- assemble the device by performing steps 1-3 in reverse order

The wiring diagram for connecting the AKC-6000 to the gas detection panel is shown in Figure 10.1-2. Make connections according to the descriptions on the devices.

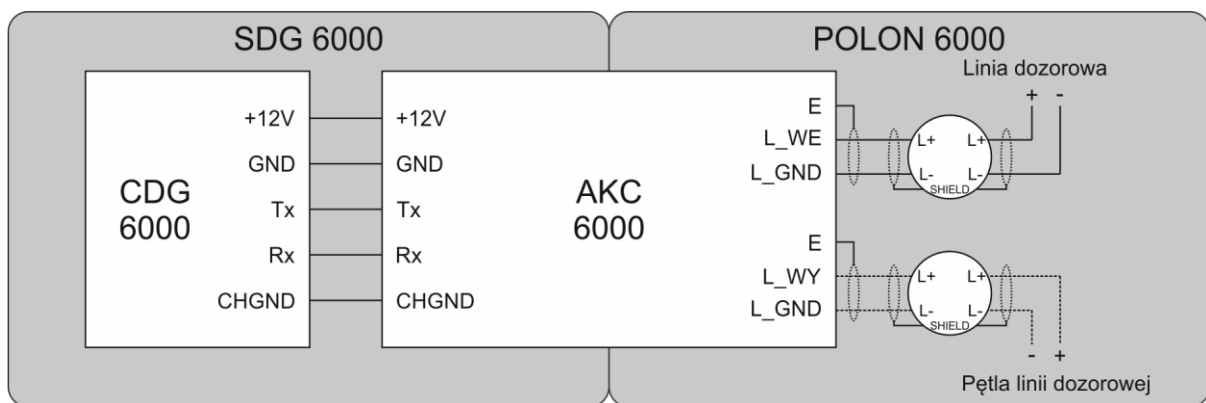


Figure 10.1/2 Wiring diagram for connecting AKC-6000 to SCG-6000-99 control panel

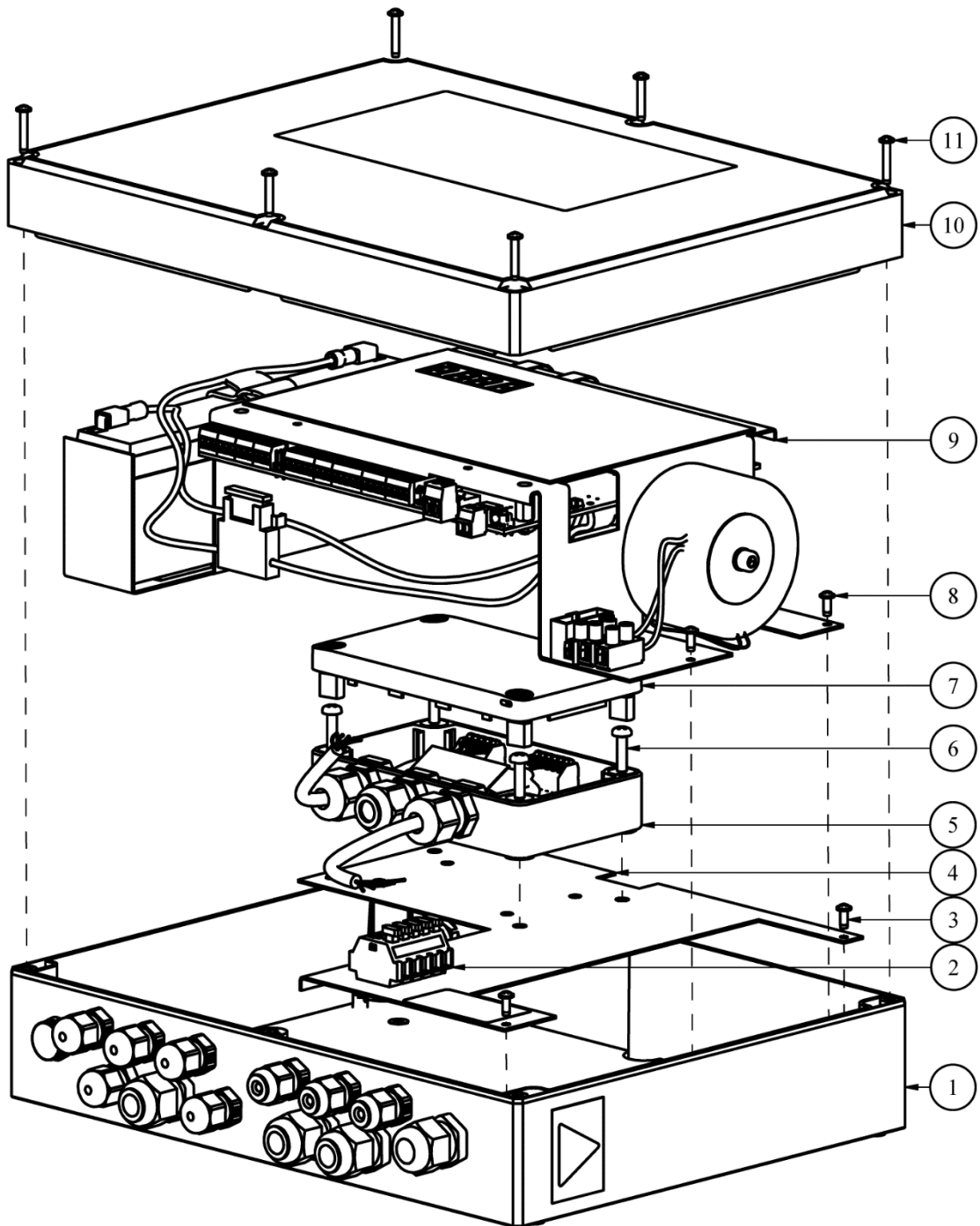


Figure 10.1/1 Diagram for installing AKC-6000 in the CDG-6000-99 gas detection panel

11. Instructions for testing correctness of the control panel operation

11.1. Works to be carried out before start up

- line installations for detectors, power supply, external devices control, etc. according to the design
- assembly of the control panel
- control panel input lines connections apart from 230V mains installation wires

11.2. Electrical connections check

- testing correct connections of the detector lines wires in the control panel according to the correct polarity +, -
- testing connections of terminating resistors in the last sockets of the detection lines
- battery insertion
- connection of 12V battery according to the correct polarity labelling +,- on the connector and battery terminals

11.3. Start Up

- connection of the power supply. **WARNING! Dangerous voltage!**
- reading faults detected by the control panel and troubleshooting potential errors in the installation
- setting optimal control panel configuration parameters using features described in chapter 6
- testing performance of the executive devices cooperating with the control panel

After system start-up, it is advisable to test and possibly set the current date and time and to clear the event memory.

The works may be considered completed if the above-mentioned activities have been carried out and correct functioning of all system devices and control panel operation in the supervised state (without fault signaling) has been found. The system can be handed over to the user in such a condition.