

Alarm Control Panel

CA-5

Program Version 2.10

Satel 

GDAŃSK

INSTALLER MANUAL





WARNINGS

In order to avoid the risk of electric shock, read carefully this manual before proceeding to installation. Any connections should be made in deenergized state only (i.e. with power supply disconnected).

For safety reasons, the alarm system should only be installed by qualified personnel.

Telephone terminals of the panel should be connected to **PSTN (analog) lines only**. Connecting to ISDN lines may cause damage to the equipment.

As the alarm system may contain hazardous items, its components should be kept out of reach of unqualified personnel.

In the event of service operations consisting in fuse replacement, they must only be carried out after disconnecting the supply voltage. For the replacement, use only the fuses which have identical parameters as the original ones.



It is recommended that the manufacturer's required housings and power supply units be used.

Making any construction changes or unauthorized repairs is prohibited. This applies, in particular, to modification of assemblies and components.

CAUTION!

It is impermissible to connect a fully discharged battery (with voltage on unloaded terminals less than 11 V) to the alarm panel. To avoid hardware damage, the fully discharged or never used battery should be precharged with the use of a suitable charger.

The batteries used in the alarm systems contain lead. The used-up batteries must not be thrown away, but disposed of as required by the existing regulations (European Directives 91/157/EEC and 83/86/EEC).

DECLARATION OF CONFORMITY		
Product: CA5P – control panel CA-5 mainboard	Manufacturer: SATEL spółka z o.o. ul. Schuberta 79 80-172 Gdańsk, POLAND tel. (+48 58) 320-94-00 fax. (+48 58) 320-94-01	
Product description: Mainboard for CA-5 control panel intended for use in intruder alarm systems.		
This product meets the essential requirements and is in conformity with following EU Directives: LVD 73/23/EEC+93/68/EEC EMC 89/336/EEG + 91/263/EEC, 92/31EEC, 93/68/EEC R&TTE 1999/5/EC (network connection, TBR21)		
This product is compliant with the following harmonized standards: LVD: EN 50131-1:1997; EN 50131-6:1997; EN60950:2000, EN60335-1:1994/A1:1996 Annex B EMC: EN 55022:1998; EN 61000-3-2/-3; EN 50130-4:1995, EN 61000-4-2/-3/-4/-5/-6/-11 R&TTE: TBR 21(1998)		
Gdańsk, Poland	06.05.2004	Head of Test Laboratory: Michał Konarski 
Latest EC declaration of conformity and product approval certificates can be downloaded from web site www.satel.pl		

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1. GENERAL

The CA-5 alarm control panel is an advanced, microprocessor-based device designed for burglary and assault signaling systems. It is characterized by a high programming flexibility, which facilitates its use in systems which have to meet special requirements. The device is equipped with a reliable, pulse-type power supply of high efficiency, and with a telephone communicator (dialer). It is designed to be operated by means of keypads connected with a four-wire cable, and is capable of being programmed by means of a computer and the DLOAD10 program working in the WINDOWS environment.

2. BASIC FUNCTIONAL CAPABILITIES

- **5 zones** with programmable operating modes.
- Compatibility with any detectors (NO, NC) in various configurations (without resistance, EOL or 2EOL).
- **3 signal outputs** serving the following purpose:
 - one high-current alarm output OUT1 (protection 1.1 A);
 - two OC type programmable outputs OUT2, OUT3 (current-carrying capacity 50 mA), designed for direct control of the functioning of relays.
- **Switching-mode power supply** of **1.2 A** capacity, fitted with overloading and short-circuit protection.
- **2 power supply outputs** for detectors and keypad – with a protection of 350 mA.
- Built-in **telephone communicator** for:
 - sending information to a monitoring station, using one of the two telephone numbers;
 - remote programming from a computer fitted with modem.
- Built-in port **RS-232 (TTL) (RJ socket)** enabling the control panel to be directly programmed from the computer.
- Operation by **6 users** (6 access codes, including that of the Master).
- **Service access code** (control panel programming) which enables the system parameters to be changed and some of the user functions called up.
- Operating the control panel from **keypads**, which offer the following features:
 - real-time status display for all of the control panel armed zones;
 - a number of system arming procedures (full; silent; with no-exit bypassing);
 - capability to control the locks, lighting and other equipment;
 - capability to activate the PANIC, FIRE and HELP alarms;
 - functional check of the mains and emergency power supply.
- Electronic control systems:
 - battery condition with optional isolation of discharged battery;
 - fuses and wiring condition, and keypad presence;
 - presence of voltage on the telephone line.
- Non-volatile **memory for the last 255 events**.
- Non-volatile memory for all parameters and the last control panel status – return to the status from before power supply was disconnected.

3. CONTROL PANEL CHARACTERISTICS

3.1 ZONES

The CA-5 control panel has **5 zones**, all of them on the mainboard. The control panel accepts any detectors connected in the NC, NO, EOL, 2EOL/NC, and 2EOL/NO configuration. The 2EOL configuration allows the control panel to simultaneously control the detector and its tamper circuit while using one pair of wires.

The zones can serve the following **functions** in the system:

- 0 – **ENTRY/EXIT** (monitors entry to and exit from the facility by the user; having detected entry into the facility, it actuates the mechanism of interior zone alarm delay)
- 1 – **INTERIOR DELAY** (if there is no entry into the facility, it works as the instant zone)
- 2 – **INSTANT** (triggers alarm instantly after violation when the control panel is armed)
- 3 – **COUNTING** (to 2 violations throughout the monitoring time as determined by the entry delay – the second violation will trigger alarm)
- 4 – **24H PANIC** (armed 24 hours; makes it possible to connect panic buttons)
- 5 – **24H FIRE** (armed 24 hours; triggers the fire alarm)
- 6 – **24H TAMPER** (armed 24 hours)
- 7 – **ARMING/DISARMING, ALARM CLEARING** (makes it possible to connect remote control set)
- 8 – **PERIMETER** (armed from starting the exit delay countdown)
- 9 – **ENTRY/EXIT FINAL** (having detected the end of violation of this zone, the alarm control panel will end the exit delay countdown and enter the armed mode)
- 10 – **DELAYED**

The number of zone function corresponds to the number programmable in the FS 26–30 service functions to determine the type of zone reaction.

The reaction time for each zone can be programmed from 0.016 s to 4.08 s (FS 16–20).

For the zones types 0, 1, 3, 9 and 10, individual **delay times** can be set (FS 31–35).

For each zones, it is possible to determine six codes of events to be sent to the monitoring stations (FS 57, FS 58, FS 60, FS 61, FS 80 and FS 81).

The zones can be selectively bypassed with the user function 4, while bypassing of the 24h zones is only possible by using the service code.

See also: SETTINGS LIST, section „Zones”.

3.2 OUTPUTS

The CA-5 is fitted with 3 signal outputs (OUT1, OUT2, OUT3) and 2 power supply outputs (AUX and KPD).

The OUT1 output (high-current, 1.1 A polymer fuse) is a specialized alarm output. It is intended for connecting an audible siren. This output has two terminals: **+OUT1** and **–OUT1**. Activation of the output is effected by shorting the -OUT1 terminal to the common (basic output polarization).

The +OUT1 terminal serves the function of a power supply output with 1.1 A polymer fuse. The control panel monitors the fuse condition and signals output overload.

The OUT1 output can be assigned to selected control panel zone (FS 41 – 45). The selection applies also to other BURGLARY ALARM outputs.

The low-current OUT2 and OUT3 outputs (OC, up to 50 mA) are programmable and each of them can serve one of the following functions:

- 0 – **NOT USED**

- 1 – **BURGLARY ALARM** (with the operating time equal to zero, the output is active until clearing the alarm, e.g. visual indication)
- 2 – **KEYPAD ALARM**
- 3 – **READY STATUS** (active when none of the zones is violated)
- 4 – **ARMED STATUS**
- 5 – **INDICATOR OF AC, BATTERY OR TELEPHONE LINE TROUBLE**
- 6 – **AC LOSS INDICATOR**
- 7 – **BATTERY TROUBLE INDICATOR**
- 8 – **TELEPHONE LINE TROUBLE INDICATOR**
- 9 – **GROUND START SIGNAL** (the signal of 2-second duration which occurs before "lifting the handset" by the control panel and which is required by a specific type of telephone exchange)
- 10 – **TELEPHONE LINE RELAY** (description see p. 17)
- 11 – **MONO SWITCH** (control type, activated for a specified time period with the user function 7)
- 12 – **BI SWITCH** (control type, switched over permanently with the user function 8)
- 13 – **RESETTABLE POWER** (deactivated with the user function 9 for a time period programmed as the output cutoff time – minimum 4 seconds)
- 14 – **DURESS ALARM** (signals disarming or alarm clearing with the use of a "duress" code)
- 15 – **MONITORING ACKNOWLEDGEMENT** (activated by the control panel for 3 seconds after correctly ending communication with the monitoring station)
- 16 – **PARTIALLY ARM STATUS** (active when the armed mode is on with zones bypassed)

The number of output function corresponds to the number programmable in the FS 48 and FS 50 service functions to determine the output function.

The OUT2 and OUT3 outputs in the active state will short-circuit the terminal to ground.

It is possible to alter the way of work of outputs. You can change polarization of the terminals -OUT1, as well as OUT2 and OUT3 (FS 84 options 1, 2 and 3). By selecting the „*Polarization OUTn reversed*” option (*n – output number*), the terminal will be shortened to the common in its inactive state and cut off in the active state.

The following parameters can be programmed for the outputs:

- alarm signaling time (FS 47)/cutoff time of FS 49 and FS 51 outputs,
- burglary alarm signaling delay (FS 46, FS 82 and FS 83).

The output OUT1 is designed to signal the burglary and fire alarms. The installer can select the identical signaling mode for the fire alarm and for the burglary alarm (FS 84 option 4), however, the signaling delay (if any) will only apply to the burglary alarm.

The installer can activate the signaling of arming/disarming and alarm clearing on the OUT1 output (FS 84 option 5).

The power supply outputs for the detectors (AUX) and keypad (KPD) have a common polymer fuse, limiting the current consumption from the power supply by the external devices to 350 mA.

All the outputs are protected against inductive loads and impulse interference.

3.3 LED KEYPAD

In the LED keypad basic information concerning the system status is provided by means of light emitting diodes LED (for detailed description, see the user manual). Displayed are the status of zones and system (supervision, alarm), information on power supply status, detection of emergency situation and operation in programming mode.

The way of keypad operation should be determined when programming the control panel (FS 6–8). Provision is made for bypassing some functions (for instance, the option to trigger special alarms, quick arming) and determining which audible signals are to be transmitted by the keypad. It is possible to signal the exit delay or the entry delay times, zone violation with the „chime” option, and alarm signaling.

The keypad illumination can be turned on permanently or activated automatically by pressing any key, or, alternatively, by violating any zone when the system is in the armed mode.

The keypad has an individual NC type tamper contact (TMP), which opens after opening the enclosure or separating it from the base, and which is to be included in the system tamper circuit. The control panel checks the keypad for its presence in the system through the data bus (DTA signal control).

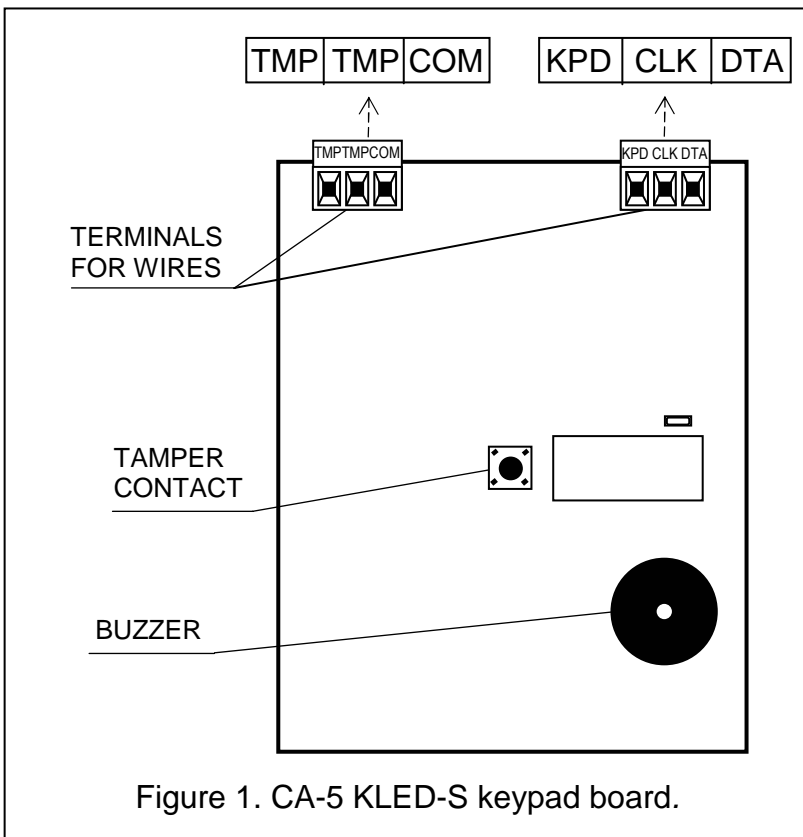


Figure 1. CA-5 KLED-S keypad board.

Description of terminals:

- TMP** – tamper contact terminals
- COM** – common (ground)
- DTA, CLK** – keypad data bus
- KPD** – power supply input (+12 V)

WIRE CONNECTIONS	
KEYPAD	CONTROL PANEL
KPD	KPD
DTA	DTA
CLK	CLK
COM	COM
TMP	Tamper contact terminals
TMP	Tamper contact terminals

3.4 LCD KEYPADS

The LCD keypad performs identical functions as the LED keypad. Additionally, it enables the event log to be scrolled through, which is not available in the LED keypad. The liquid-crystal display (2x16 characters) facilitates the system communication with the user and the installer.

The LCD keypad can be connected in parallel with the LED type keypads, or with other LCD keypads. There are two versions of LCD keypads available (CA-5 KLCD-L and CA-5 KLCD-S), which differ in dimensions and size of the display.

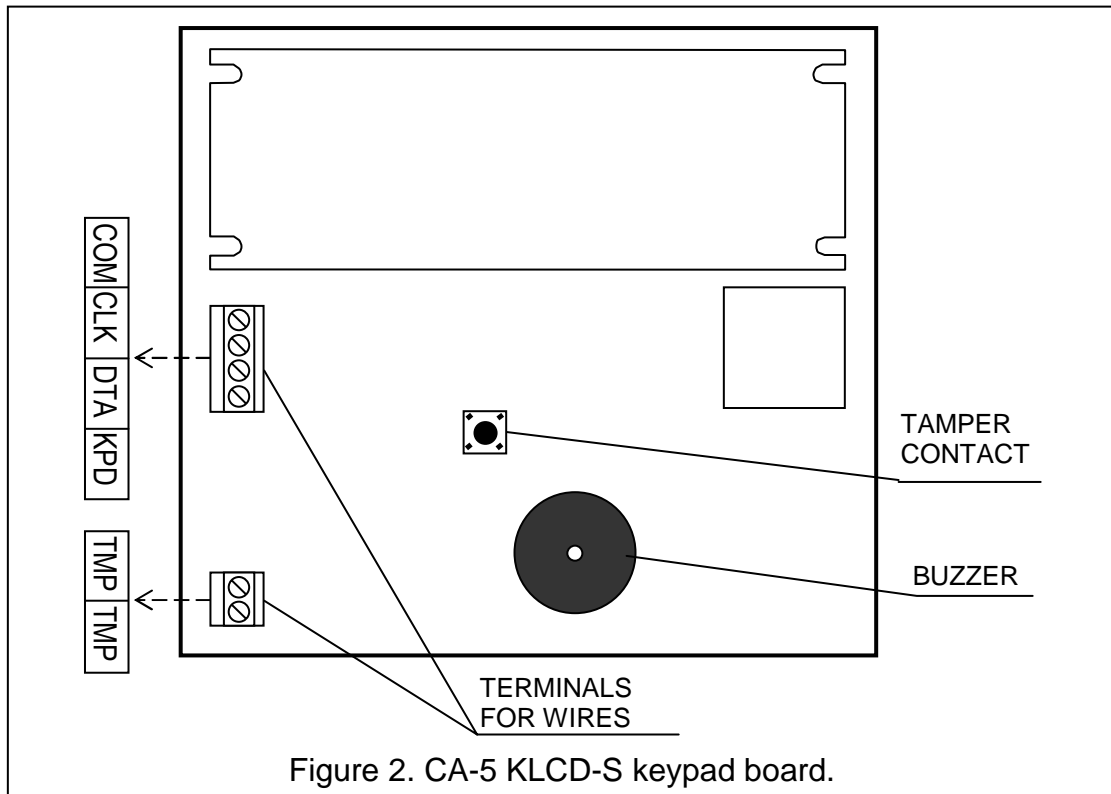


Figure 2. CA-5 KLCD-S keypad board.

3.5 MONITORING

The CA-5 control panel can transmit information on the system status to a monitoring station to one or two telephone numbers in various transmission formats.

The control panel will dial the second number of the station when the first number is busy or the station does not confirm reception of the code. No matter which number is reached by the control panel, all events are transmitted.

Note: In order to make monitoring possible when the control panel is in the downloading mode, it is necessary to terminate communication by using the „Quit communication” command in the „Communication” menu of the DLOAD10 program.

It is possible to send information on the events concerning arming/disarming, zones (alarms, tamper), as well as system events. Information can be sent to the station in one of the fifteen transmission formats (including the Contact ID).

Owing to analysis of the commutation signals, the CA-5 control panel controls the process of establishing connection with the station, which in case of high occupancy of the line considerably reduces the time between occurrence of the event and sending the information to the monitoring station. Repeated dialing attempts are made immediately on detecting the busy signal, as a result of which the connection is established many times faster than through the devices which wait for a specific signal during a pre-determined time and only repeat the dialing attempt on detecting that the signal has not occurred.

3.6 MONITORING – PERSONAL NOTIFICATION

The CA-5 panel monitoring function can be used for telephone notification of events taking place in the security system (e.g. alarm or AC power failure). Short audible signals, characteristic of transferring data to the monitoring station, will be heard in the telephone handset.

In order to initiate telephone messaging by means of audible signals, the alarm control panel must be programmed as follows:

1. Enter the control panel service mode.
2. Call in the FS 76 function and delete all the monitoring codes.
3. Using the FS 52 & FS 53 functions, program the telephone numbers to which the audible information on events is to be sent. If the first number is busy, the control panel will dial the second number.
4. Select the „0 no handshake” data transmission format in the FS 54 & FS 55 functions („13: Ademco Slow without confirmations”).
5. By means of the FS 56 function, set any four-character control panel identifier, e.g. 1111.
6. Assign codes to the events which are to be reported by the control panel, e.g. using the FS 57 function program the zone alarm codes.
7. Enable monitoring – FS 10 Option 1.

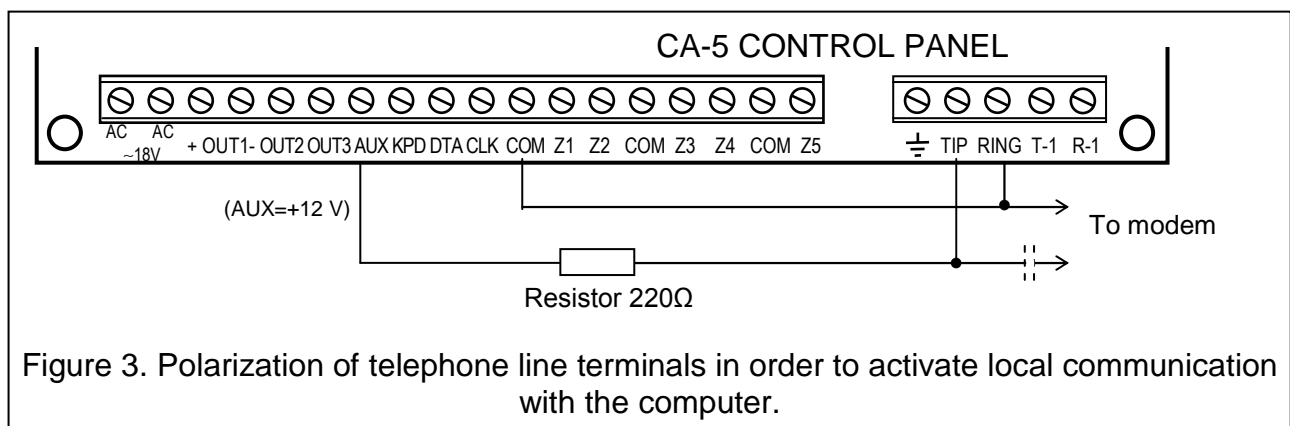
3.7 REMOTE PROGRAMMING – DOWNLOADING

In order to facilitate its programming, the CA-5 control panel has been equipped with a **DOWNLOADING** feature, which enables a computer to be used for programming and control of the security system. The programming may be effected directly through the control panel RS-232 port (with TTL standard signals) or by means of a modem through the telephone line terminals TIP and RING.

3.7.1 MODEM

Interfacing with the computer by means of the **modem** can be performed in two ways: either in the *remote mode* (by means of the telephone cable network), or in the *local mode*. In both cases the computer must be equipped with a modem.

The local mode of programming can be entered by connecting the modem directly to the properly polarized TIP and RING telephone terminals of the control panel (see Figure 3). The telephone line must be disconnected from the control panel.



Note: Some modems require a capacitor (of at least 1 μF) to be connected in the circuit to separate the constant voltage polarizing the control panel telephone input.

Having initialized the modem in the DLOAD10 program (see section STARTING THE CONTROL PANEL) and having selected from the **Communication** menu the **→Modem** command, and then the **→Local connection with...** command, activate the FS 77 service function in the control panel. When the communication is established, download the control panel data and then proceed to download the events, program parameters, etc.

The remote mode of programming can be reached by establishing the telephone connection between the service computer and the control panel. Initialization of the communication through the **telephone line** is possible in three modes:

1. The computer calls the alarm control panel, which, having answered the call, exchanges communication passwords with the computer. If they are correct, the control panel confirms reception of the remote programming order, hangs up and calls the computer back to the number pre-programmed in the control panel. Before calling back, the control panel notifies the monitoring station on starting the programming process.
2. The computer calls the control panel and, after handshaking, the control panel proceeds directly to data exchange. This simplified mode of establishing connection can be reached, when no computer telephone number is entered on the control panel. The monitoring station will be notified after communication with the computer is ended.
3. Establishing communication on the control panel side by means of the 0 function called by the master user or the service. Having called the function, the control panel dials the computer telephone number pre-programmed with the FS 4 service function and, after completion of the programming, notifies the monitoring station.

Initialization of the connection by the computer can be disabled.

In order to reduce the telephone connection costs, the transmission can be repeatedly suspended. In case of a new connection, the control panel does not inform the monitoring station of the remote programming, as this is only done before the first call-back. Instead, after receiving the communication termination command, information on completion of the remote programming is sent to the station. After suspending communication on the computer side, the control panel is waiting four hours for a call, even when the automatic call answering function is disabled. If the communication is not terminated with the "end" but with the "suspend" command, the information on terminating the communication is registered in the event memory and, after four hours, sent to the monitoring station.

Communication with the computer requires:

- The following to be programmed in the control panel:
 - **FS 2:** control panel password (the identifier which allows the program to recognize the security system).
 - **FS 3:** computer password (the identifier which allows the control panel to recognize computer authorized for communication).
 - **FS 4:** computer telephone number (it is not necessary but provides higher protection against unauthorized access by the telephone line).
 - **FS 5:** number of rings before answer (where the communication is to be initialized from the computer).
 - **FS 11 option 1:** if the DWNL function is to be initialized from the outside (by the service computer).
- Cable connection (telephone or local) of the control panel with the computer modem.
- Launching the DLOAD10 program and initializing the modem operation.
- Setting identical communication passwords, options and number of rings in the security system with those pre-programmed in the control panel.

3.7.2 RS-232 PORT

The alarm control panel can be programmed through the **RS serial port** by means of a special cable. In order to begin programming, enter the **Communication** menu and select →**Local connection with...**, then select the control panel type →**CA5 – RS-232**. Start the FS 78 service function in the control panel. Conformity is required between the communication passwords of panel and computer (FS 2 and FS 3) programmed in the control panel and included in the DLOAD10 program data.

4. INSTALLATION OF THE CONTROL PANEL

4.1 DESCRIPTION OF MAINBOARD



The control panel mainboard contains electronic components sensitive to electric charges. Prior to installation, these charges must be removed. During installation, avoid touching any elements on the control panel mainboard.

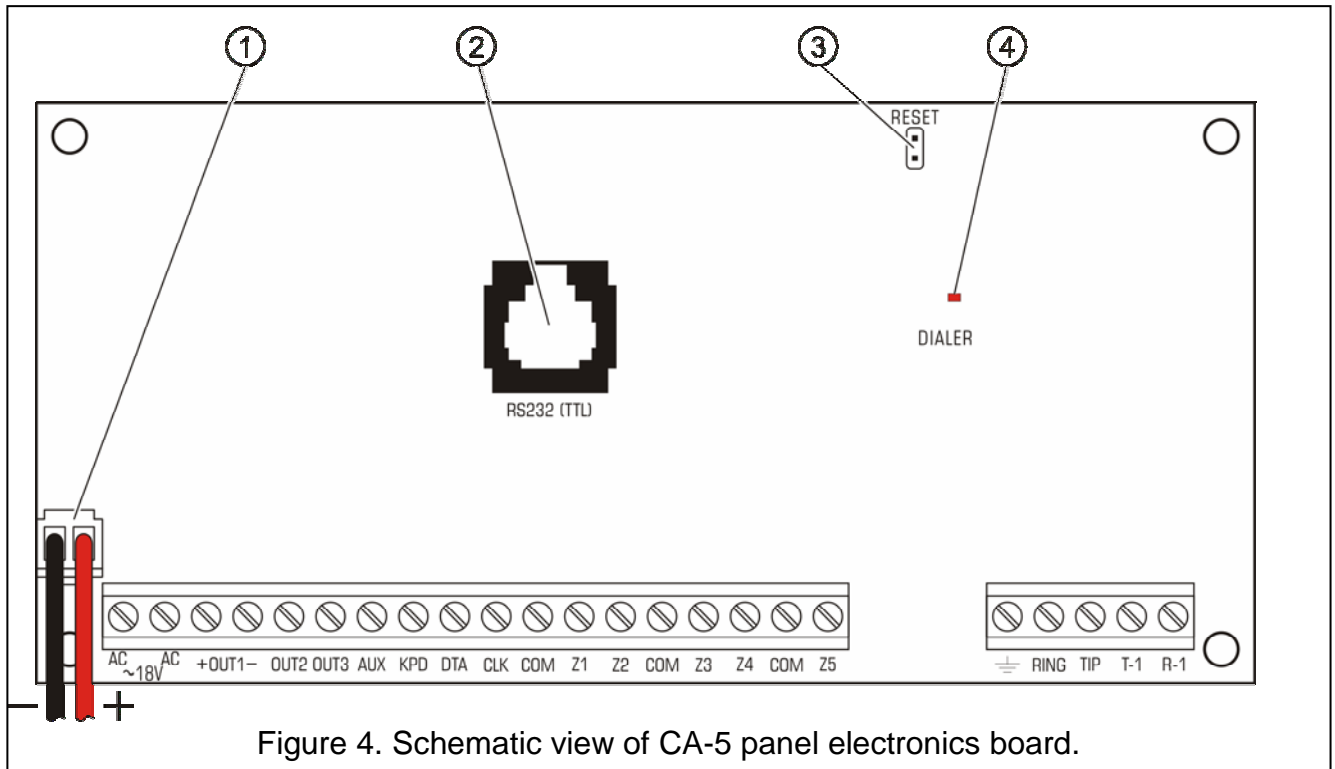


Figure 4. Schematic view of CA-5 panel electronics board.

Explanations for Fig. 4:

- Emergency power supply cables – connect the red one to the battery terminal “+” and the black one to the battery terminal “-“. The battery circuit is protected with a 2.5 A polymer fuse.
- RJ** socket to connect the control panel RS-232 port with the computer COM port - the **RS-232 (TTL)** port is intended for programming the alarm system parameters from the computer. As the control panel sends and receives a TTL standard signal (0 V, +5 V), the RS port of the panel and the COM port of computer must be connected with a special cable manufactured by SATEL. The cable includes a converter changing the signal into a standard corresponding to the RS-232 port in the computer (-12 V, +12 V). The data can be transmitted through the cable in both directions. For programming, a cable available in the kit designated DB9FC/RJ-KPL is required.

Notes:

- The socket may only be used when programming the panel. Never leave the RS cable permanently attached.
- Do not short or touch the pins with your fingers.
- Prior to connecting the cable, the installer should remove the electrostatic charge, e.g. by touching a grounded equipment (faucet, heater, etc.) with the top of his hand.

- *It is recommended that the cable be connected first to the control panel connector, and then to the computer connector.*
3. The **JP1 „RESET”** pins – make it possible to start the service mode without entering any service code. This function can be disabled by the installer with the software means (see: FS 9 – Option 1).
 4. The **„DIALER”** LED – it is lit up during telephone messaging by the control panel, and blinks during pulse dialing.



Next to the LED is situated an adjustable resistor. Its setting should not be changed, since it would cause incorrect work of the dialer (loss of the capability of dialing in the DTMF system and monitoring in the „Ademco Ex” and „Contact ID” formats).

BOARD TERMINALS:

AC	– module power supply inputs (18 V AC ± 10%)
Z1 to Z5	– zones
OUT1	– signaling output (current-carrying capacity 1.1 A)
OUT2, OUT3	– control panel programmable outputs (current-carrying capacity 50 mA)
DATA, CLK	– keypad bus terminals
KPD	– keypad power supply output (+12 V)
AUX	– detectors power supply output (+12 V)
COM	– common (0 V)
	– protective terminal – ground (connect to protective circuit only)
TIP, RING	– external telephone line terminals
T-1, R-1	– internal telephone line terminals (telephone set connection)

The **AC** terminals are intended for the supply of **alternating** voltage from the mains transformer. The control panel power supply is suitable for operation with the input voltage of 18 V AC ± 10%. The control panel is fitted with an advanced pulse-type power supply of high energy efficiency and operational reliability, the correct functioning of which requires, however, that the input voltage at the **maximum load** of the transformer by the control panel never drop below **16 V AC**.

The control panel power supply (current efficiency **1.2 A**) is fitted with:

- voltage stabilization system (the voltage value of 13.6 V–13.8 V DC is factory set during production process and should not be changed);
- battery status monitoring system with optional disconnection of the battery if discharged - during testing the processor reduces the power supply voltage to about 10.5 V and the consumers are powered from the battery. The testing takes place every 4 minutes and lasts for less than twenty seconds. If the battery voltage drops down to about 11 V, the control panel will report a trouble. In case of the voltage fall to 9.5 V, the control panel will cut off the battery in order to prevent it from being completely discharged and damaged.

Attention should be paid so as not to cause overloading of the control panel power supply in the security system. It is advisable to make a **load balance** for the power supply. The total current inputs for the consumers (detectors, keypads) and the battery charging current may not exceed the power supply capacity. In case of a higher electric power demand, an additional power supply can be used for some of the security system consumers (e.g.: APS-15, APS-30 manufactured by SATEL). Table 1 (at the end of this manual) shows

an example of estimated balance of current consumption by the system, and an example of battery selection.



The CA-5 mainboard enables an electric shock protection circuit (grounding) to be connected. The protective cable terminal is designated by the \perp symbol. The „neutral” wire of the 230 V AC mains supply must not be connected to it. If the site has no separate electric shock protection circuit, this terminal must be left free.

The telephone line must be a four-wire line so that the control panel can be connected before the other devices (telephone, telefax, etc.).

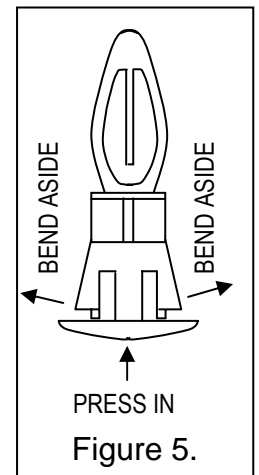


Do not send telephone signals and alarm system signals by one multicore cable. This may result in a damage to the system in case of a high-voltage punch-through from the telephone line.

The CA-5 control panel should be installed in enclosed spaces with a normal humidity of air. It can be mounted in the CA-6 OBU housing with a transformer designed for operation with the control panel power supply, which permits installation of a battery with **7 Ah** capacity. Before the housing is secured to the base, it is necessary to mount inside the housing plastic distance plugs, which are intended for subsequent installation of the mainboard. In case the plugs tend to slip out, the catches fixing the plug in the housing need to be slightly bent aside (Figure 5). When inserting the plug press in the central part of the head firmly in so that it is blocked in the housing.

It is advisable to make sure that the plug, when pressed, does not slip out from the opening. During installation of the housing, be careful so as not to damage the wires which will be passed through the hole in its back panel.

When the housing is secured, you can install the control panel mainboard and proceed to making the connections.



4.2 CONNECTION OF POWER SUPPLY

It is required that the control panel be permanently connected to the mains power. Therefore, prior to starting the work on the system cabling, make yourself familiar with the electrical installation of the site and select a circuit which is permanently alive to power the control panel. The circuit is to be protected with an appropriate fuse.




The control panel is power supplied from the 230 V AC mains. Carelessness or wrong connection may result in electric shock and pose a threat to life!

Therefore, exercise particular caution when connecting the control panel. In the process of installation and connection of the control panel, the cable to be used for mains supply must not be alive!

Description of electrical connections to the CA-6 OBU housing.

The AC power supply unit encased in the plastic box is fully electrically isolated from the metal housing.

- Connect the 230 V alternating voltage leads to the transformer terminals marked **“AC 230 V”**.
- Connect the output voltage wires of the transformer secondary winding to the **“AC~18 V”** terminals on the control panel mainboard.

- Connect the wire of the electric shock protection circuit to the terminal block provided next to the transformer and marked with the ground symbol . This circuit should also be connected to the control panel protective terminal.

STARTING PROCEDURES FOR THE CONTROL PANEL POWER SUPPLY.

1. Connect the emergency power supply wires to the corresponding battery terminals (the red one to the battery plus, the black one to the minus). **The control panel will not start on connecting the battery alone** (without the mains power connected), however, it will keep on working in case of the ~230 V AC voltage trouble, provided it was started before.
2. Switch on the ~230 V AC mains supply – the control panel gets started.

Connection of the power supplies in the prescribed order will permit correct functioning of the power supply unit and the control panel electronic safety devices, thus avoiding damage to the security system elements caused by possible installation faults.

IMPORTANT:

- *Never switch on the control panel power supply until all the remaining connections are completed.*
- *If it is necessary to completely disconnect the control panel power supply, the 230 V alternating voltage should be disconnected first, then the battery. Re-connection of the power supply is to be performed in the above mentioned order (the battery first, then the 230 V alternating voltage).*



As the control panel has no isolating switch to disconnect the mains supply, it is important that the owner or the user of the security system be informed on how the system is to be disconnected from the mains (e.g. by indicating the fuse which protects the control panel supply circuit).

4.3 CONNECTION OF KEYPAD

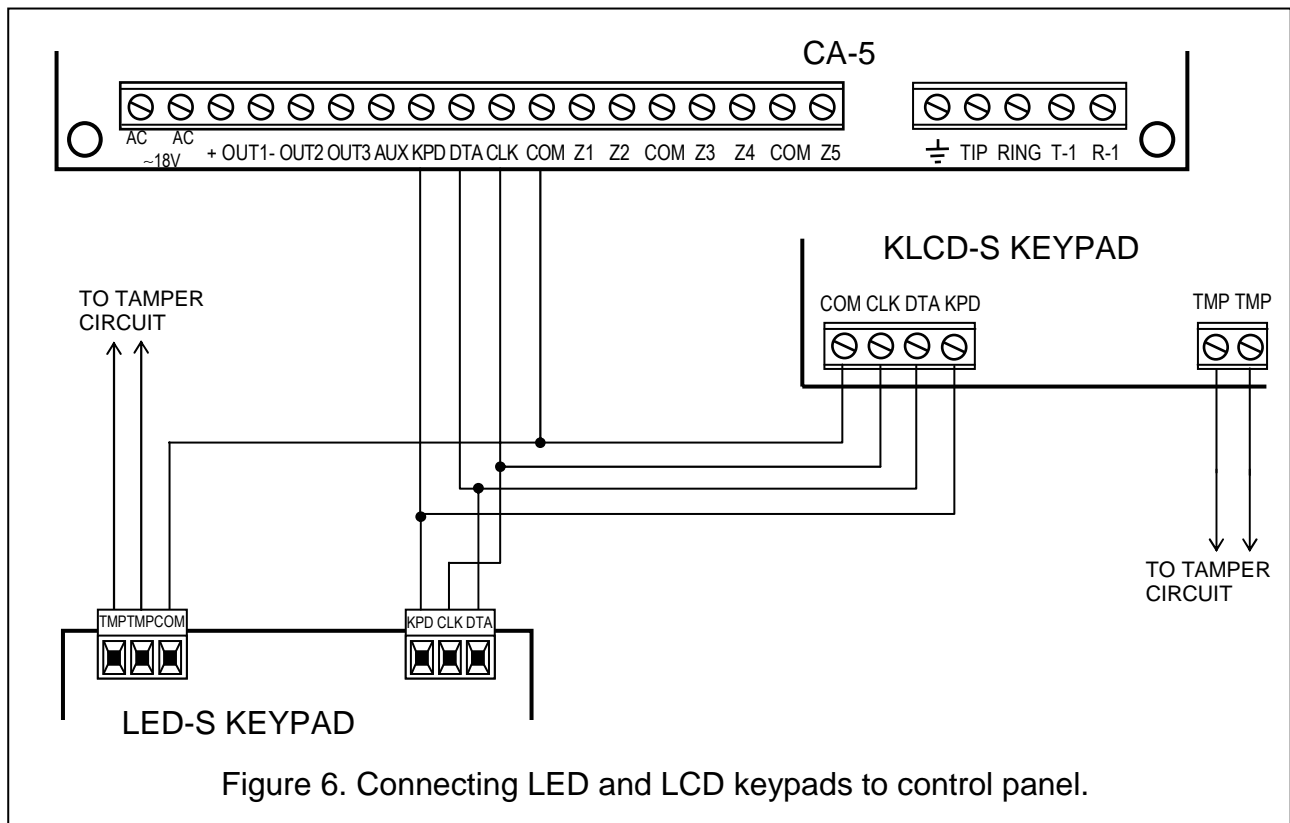
The CA-5 control panel interfaces with SATEL made LED and LCD type keypads.

Note: *The control panel in version 2.10 supports LCD keypads in program version 1.08 or later, and CA-5 KLED-S keypads in version 1.1 or later.*

The keypad should be connected to the system with a four-wire line, using the COM, KPD, DTA, CLK connectors on the control panel. It is recommended to use an untwisted unshielded cable 8x0.5 mm² (do not use twisted pair). Where this cable is used, the cable length can be up to 200 m.

Distance	Lead	No. of cores
to 100 m	Supply and common ground CLK and DTA signals	2 x 1 2 x 1
from 100 m to 200 m	Supply and common ground CLK and DTA signals	2 x 2 2 x 1

Provision is made for connecting additional keypads (in parallel to the others). Each keypad should be connected to the control panel by means of a separate cable. If this is the case, activation of the programming mode (service or user one) from any keypad will block the operation of the other keypads.



The tamper contact (NC) of the keypad should be connected with the system tamper circuit. Where two keypads are connected in parallel, the (TMP) tamper contacts should be connected in series, and the other keypad wires – in parallel.

IMPORTANT: *If one of the system zones has been programmed as 24H TAMPER and used for protection of the system elements against tamper, thus creating a tamper circuit, violation of such a zone will trigger no alarm if the control panel is in the service mode. If the control panel gives an alarm at the moment of exiting the service mode, it can mean violation of the tamper line (opening of one of the contacts).*

4.4 CONNECTION OF DETECTORS

The circuit connected to the EOL configured zone is to be closed with a 2.2 k Ω resistor. In case of 2EOL zone, the detector output is to be closed with two 1.1 k Ω resistors. This type zones (2EOL) allow the control panel to simultaneously monitor the status of detector and its tamper contact (see Figure 10).

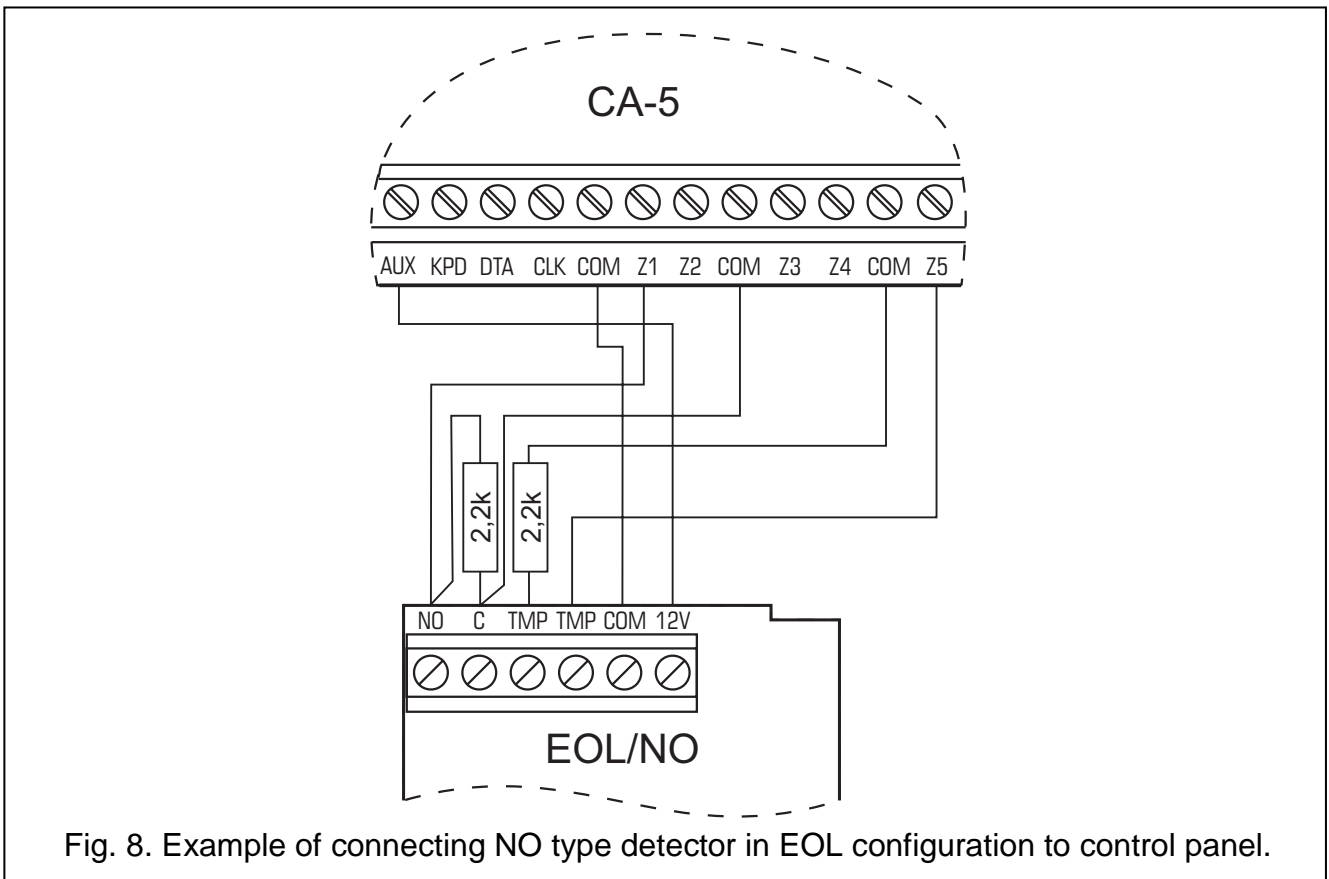
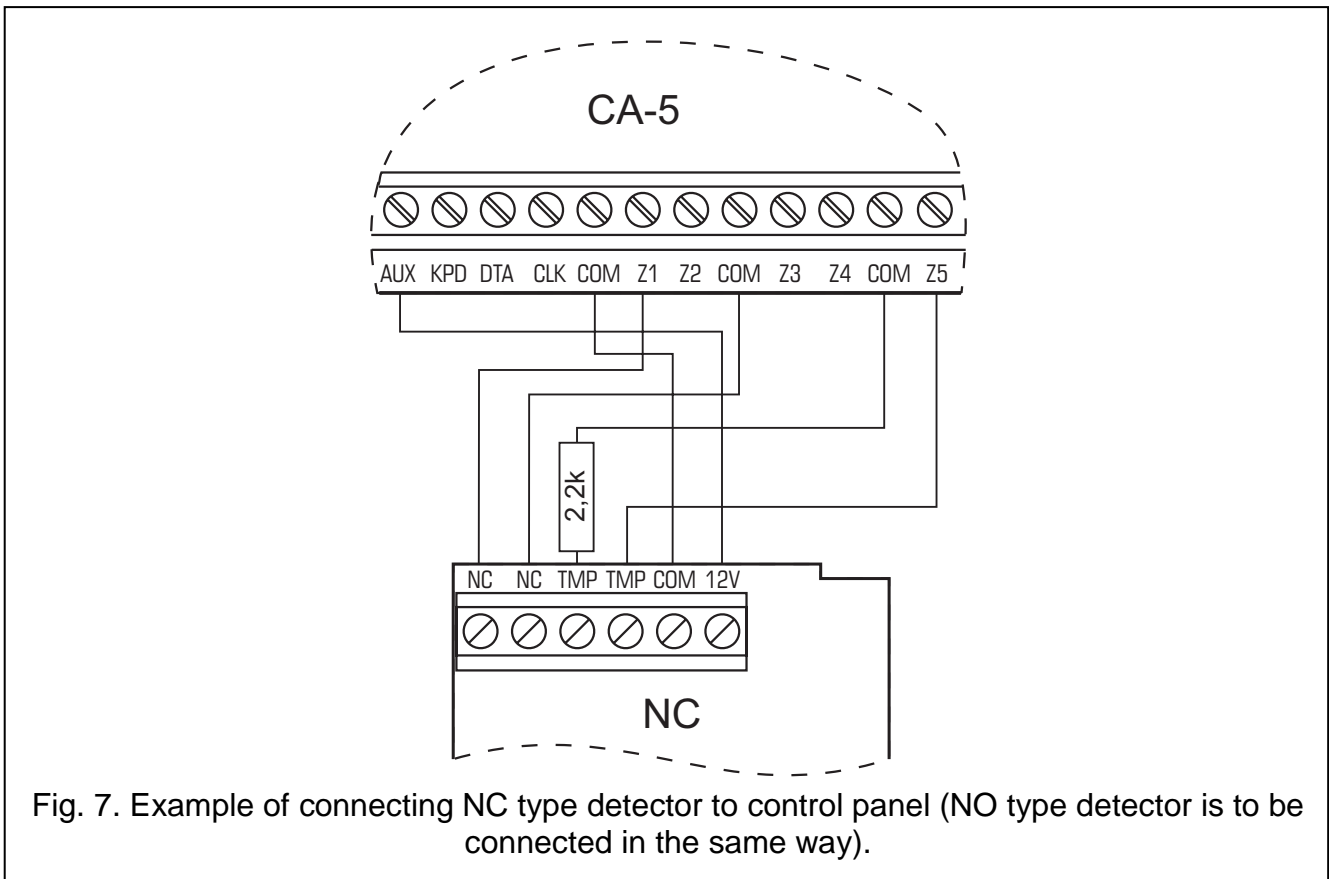
The NO and NC detectors in 2EOL configuration can be connected in the identical way, it is only important to indicate to the control panel what type of detector is connected to the zone (2EOL/NO or 2EOL/NC). The same is the case with the detectors having no parameter.

The AUX output is intended to be used for powering the detectors. Separation of the detector power supply common and the zone common permits eliminating the adverse effect of the wiring resistance. Assuming that the cable is not very long and that it has just one detector connected, it is possible to make the installation simpler by leading the power supply common wire and the signal common wire in one conductor.

Notes:

- *The real system tamper circuit should also include the tamper contacts of keypad, sirens, control panel housing, etc.*

- For figures 7, 8 and 9 it is assumed that the zone no. 5 is a tamper line (default setting: 24H TAMPER, EOL line), enclosure tamper switch: NC type.



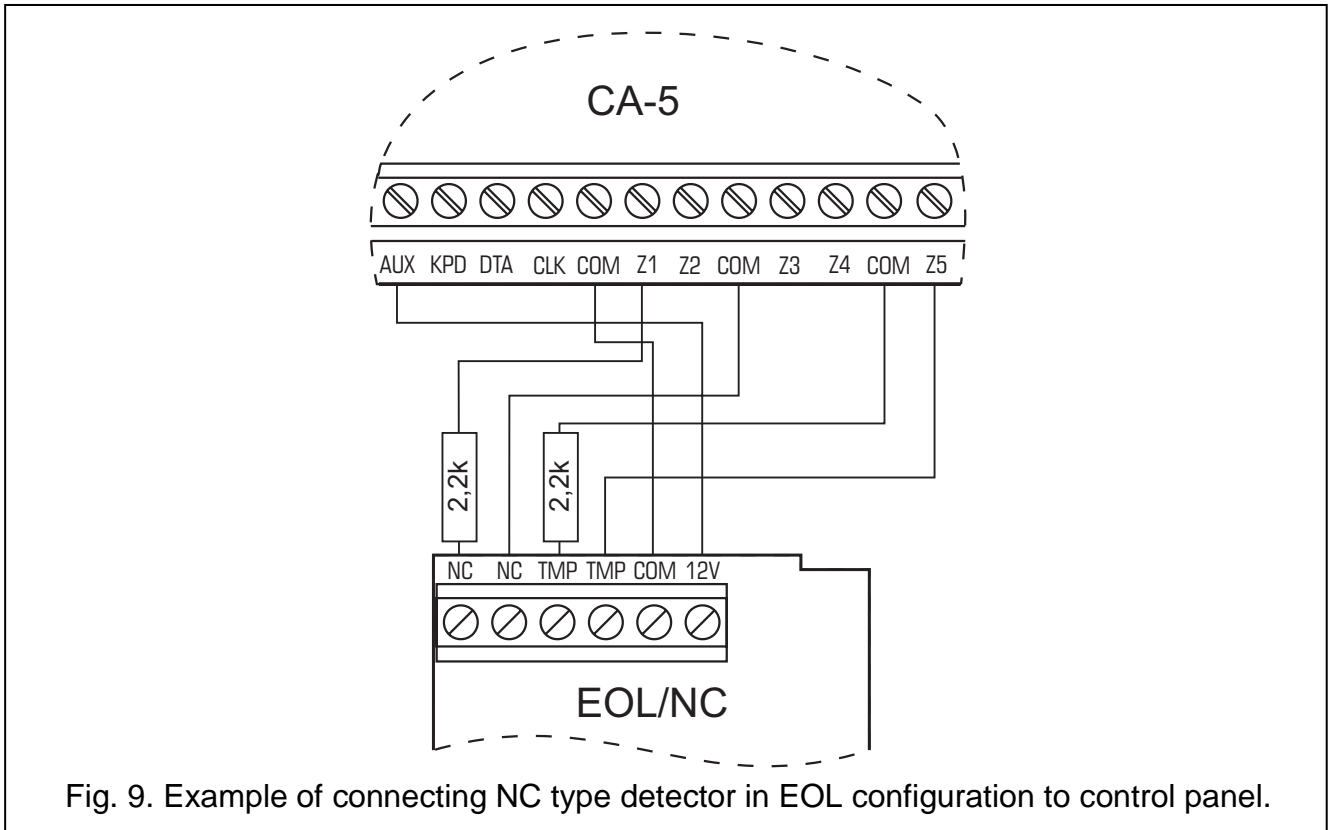


Fig. 9. Example of connecting NC type detector in EOL configuration to control panel.

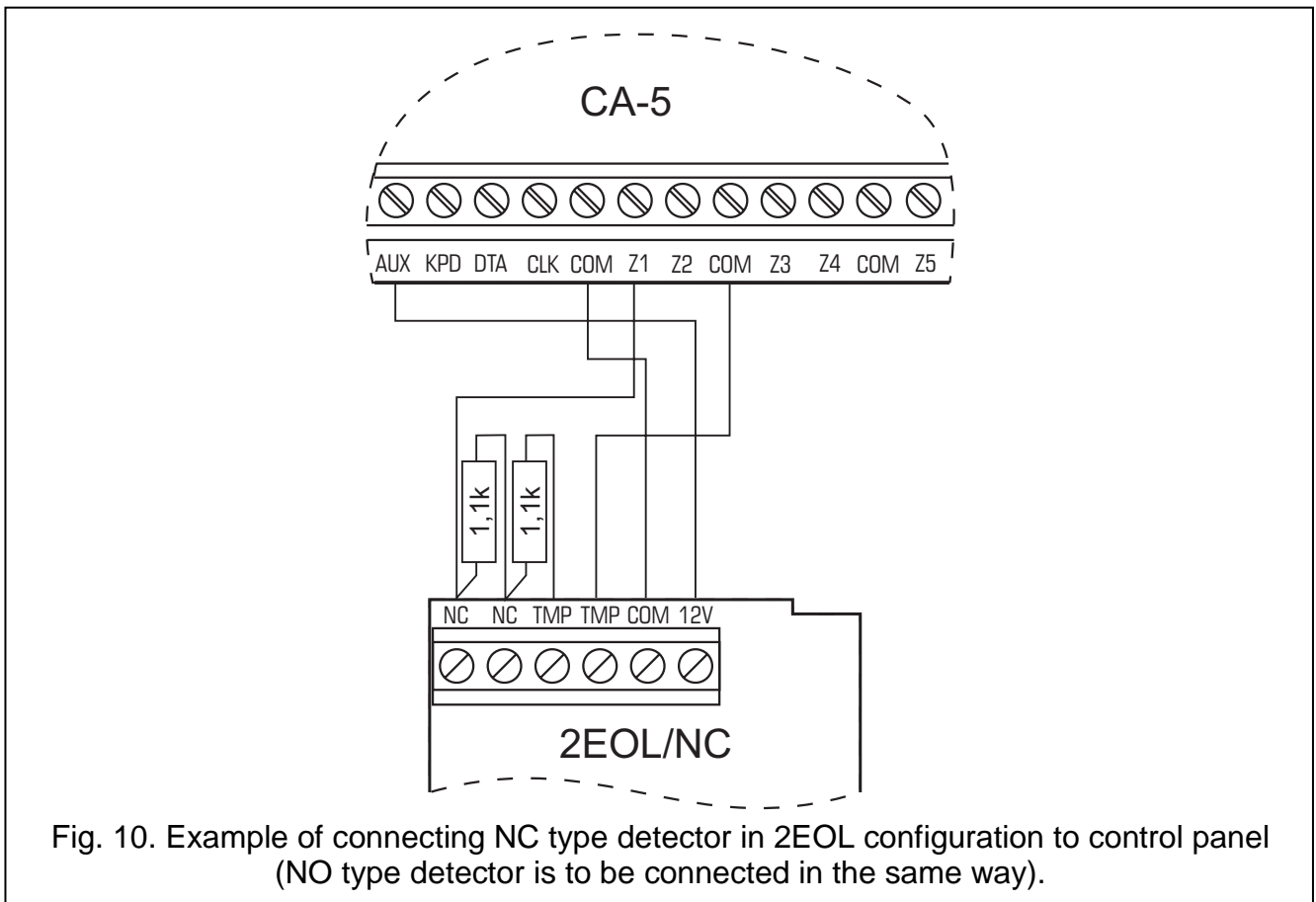
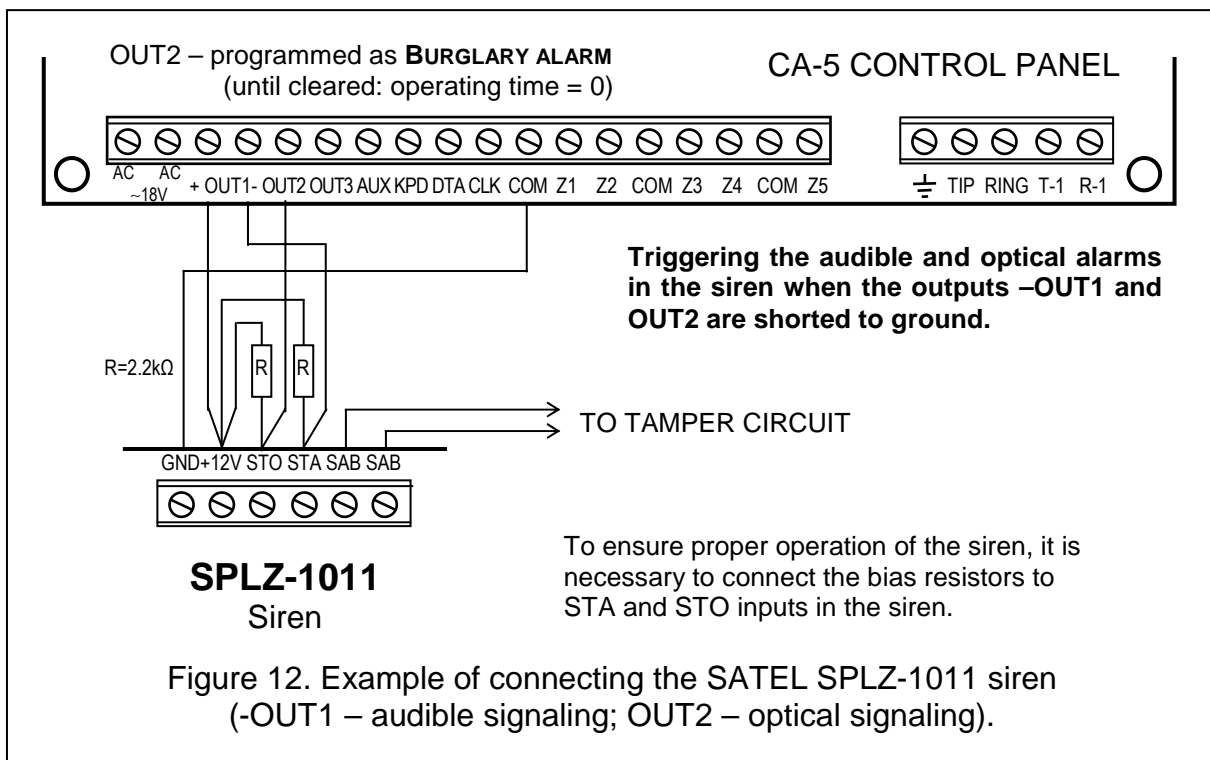
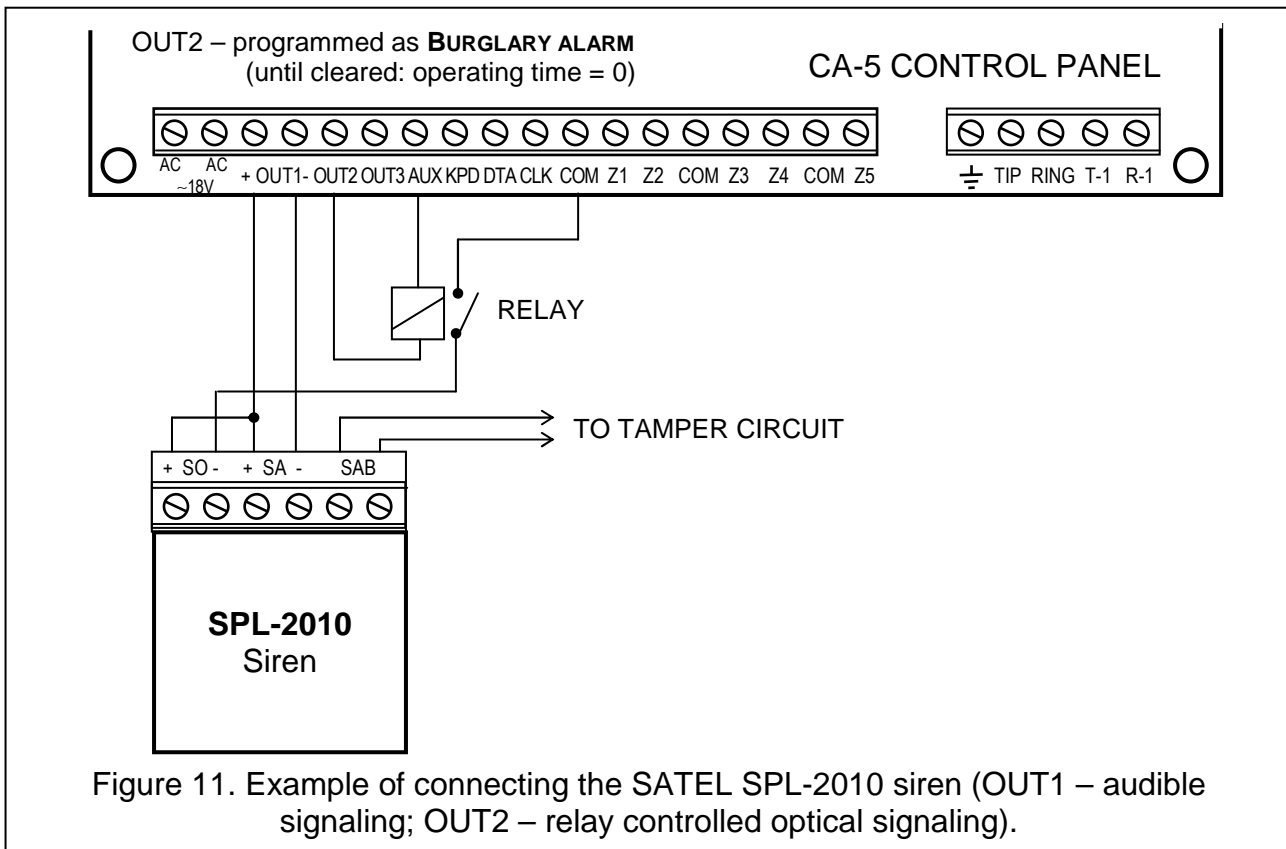


Fig. 10. Example of connecting NC type detector in 2EOL configuration to control panel (NO type detector is to be connected in the same way).

4.5 CONNECTION OF SIRENS

Where sirens are used that give alarm when power supply is switched on, the "+" of siren power supply should be connected to the control panel +OUT1 terminal, and the siren common – to the control panel –OUT1 terminal. In this mode, one independent siren can be set.



Where sirens with internal battery of their own are employed, the +OUT1 output should be used to power the sirens, the siren common should be connected to the control panel COM terminal, and the triggering signals should be provided by the –OUT1 output and the OUT2 and/or OUT3 low-current outputs.

Triggering alarm in the sirens can be brought about by shorting to or cut off from the common ground (reversed polarization of the control panel output – FS 84).

The OUT2 and OUT3 outputs can be utilized to control the relays switching on any sirens or other equipment. The relays can be directly connected to the outputs, as shown in Figure 11 which presents connection of the optical signaling SPL-2010 siren. It should be borne in mind that these outputs can be loaded with a maximum current of **50 mA**.

4.6 CONNECTION OF TELEPHONE LINE

If the security system utilizes the control panel telephone communicator (for remote programming or monitoring), it is necessary to connect telephone line to the control panel. It should be connected to a connector situated on the right side of the electronics board. In order to ensure proper operation of the dialer, **the control panel must be directly connected to the line** (connectors designated as TIP and RING), and any other devices (telephone, telefax) – after the control panel (connectors designated as T-1 and R-1). Such a connection will make it possible for the control panel to fully engage the line for the time of calling, which prevents the monitoring function from being blocked by lifting the handset. Additionally, the telephones connected after the control panel do not signal the dialing by the control panel.

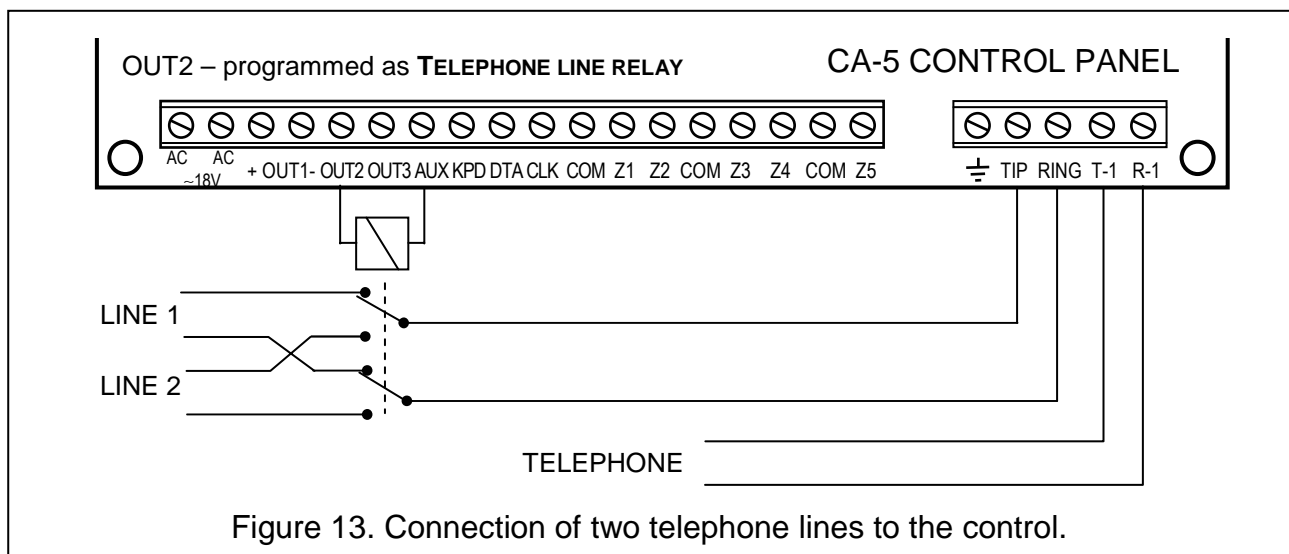


Telephone terminals of the panel should be connected to PSTN lines only. Connecting to ISDN lines may lead to damage of the equipment.

System installer should give the necessary information on the way of connection with telephone network to system owner.

4.6.1 TELEPHONE LINE RELAY

The control panel has been fitted with the **telephone line relay** function, which improves the efficiency of monitoring. The function is served by the type 10 TELEPHONE LINE RELAY output. Where two telephone lines are available at the site, this output can directly control the relay to switch over the telephone line connected to the TIP and RING terminals. The output gets activated if problems occur with sending the code to both telephone numbers of the monitoring station.





The function works in the following way:

- The control panel dials the first number of the monitoring station in order to send the event code. If it fails to send the code, the other number of the station is dialed.
- If connection to the second number fails, the control panel switches over the telephone line and dials again the first number of the station. When the problem recurs, the control panel redials the second number.
- If the code is still not received by the station, the control panel returns to the first telephone line (deactivates the type 10 output) and repeats the whole cycle of dialing the station numbers.

5. STARTING THE CONTROL PANEL

After all electrical connections are made and their correctness checked, you can proceed to start the system. It is recommended to begin the work with the control panel with no sirens connected. These can be connected after programming parameters is completed and operation of the realized security system tested.

After the power is switched on, the keypad will report readiness for work with four short beeps followed by a long one. If the panel starts alarming (the  [ALARM] LED is on and the keypad makes a continuous sound), it usually means that a tamper alarm has been triggered by incompatibility of factory settings with parameters of the connected detectors. To clear the alarm enter the MASTER access code [1][2][3][4] and press [#]. Then, enter the factory service code [1][2][3][4][5] and accept it with the [#] key – the control panel will enter the service mode. The  [PROGRAM] LED will come on and will be lit up continuously and the keypad will start emitting a short beep every 3 seconds. At this moment, you can proceed to programming the control panel.

The list of service functions as well as the method of introducing and changing of system parameters by means of the keypad have been described in a separate instruction called SETTINGS LIST.

If the service code is unknown (as its contents was previously changed), it is necessary to carry out the procedure of **entering the service mode „from the pins”**. This procedure is presented together with the description of service functions in the SETTINGS LIST.

Note: *Blinking of all LEDs and sound signals given at the same time by the keypad indicate that there is a faulty connection (no communication with the control panel) – the cable connections must be checked.*

If the suggested procedure turns out to be unsuccessful, the option to enter the service mode „from the pins” must have been disabled in the control panel by software means. If this is the case, it is necessary to carry out another procedure which would **unblock the control panel** and restore the factory settings - see description of the **FS 9** service function in the SETTINGS LIST.

After completing the procedure, exit the service mode using the FS 0 function and call the service mode again – this time from the keypad – entering the factory access code [1][2][3][4][5] and accepting it with the [#] key.

Re-entering the service mode by the control panel means that the equipment operation is correct and programming of all necessary parameters may be commenced.

A trouble with entering the service mode by hardware method points to incorrect performance of the above mentioned procedures.

5.1 DLOAD10 PROGRAM

Delivered together with the control panel, the DLOAD10 program is designed for programming the control panels: CA-5, CA-6 and CA-10, as well as the remote control sets RX2K and RX4K, RE-4K, GSM-4 and GSM LT-1 communication modules and ACU-100 wireless system controller from a computer. Furthermore, the program makes possible creation of documentation for the security systems, sets of settings for various configurations ("patterns" which facilitate programming new systems), sets of events for each system, as well as remote control of the control panel, identical as by means of the keypads.

The program is designed for IBM PC/AT compatible computers. It works in any computer hardware configuration in the **WINDOWS** (9x/ME/2000/XP) environment. It is recommended that the program be installed on the computer hard drive.

The control panel communicates with the computer via the RS-232 (TTL) port or a telephone line. For the telephone communication with the panel, the program uses a modem controlled by one of the COM ports (external or internal), compatible with the HAYES "AT Command" standard. Communication with the CA-5 control panel is possible in the **BELL 103** standard (at rate of 300 Bps). As the control panel only transmits data at a speed of 300 bauds, the modem must support this rate of transmission.


Usually, a suitable configuration of the modem is necessary i.e. disabling the function of transmission standard negotiation and forcing operation with the rate of transmission of 300 Bps.

The program installation consists in running the **setup.exe** program from a CD-ROM delivered with the control panel. After installation, the program should be launched. Access to the program is protected with an **access code**. After installation of the program, the access code is: **1234** and can be changed in any string of 16 alphanumeric characters. As long as the code has its factory form, pressing the "ENTER" key (without entering any code) will start the program with the default access code (1234).

Having started the program, perform the configuration and initialize the RS-232 port, or the modem, by means of which the control panel will be programmed. The further step can be selection of the control panel type CA-5 and starting of connection (remote or local).

To facilitate using the program and programming the control panel parameters itself, a HELP system is provided. The system is accessible from the "**HELP**" menu or, after pressing the **F1** key, from the computer keyboard. In order to get an immediate access to more detailed information, it is necessary to select the desired element in the program window (by moving the mouse pointer onto it and clicking the left mouse button), and then press the F1 key.

5.1.1 PROGRAM CONFIGURATION TO ESTABLISH COMMUNICATION WITH THE CONTROL PANEL

In order to start configuration, click on the  icon – the „**Configuration**” window will be opened. The "**Port RS-232**" tab enables the port number to be selected during direct programming through the RS port of the control panel. If the control panel is to be programmed by means of the modem, select the „**Modem**" tab and click on the „**Details**" button.

Having opened the „**Modem**" window, select the corresponding modem type from the list or click on the „**! Change**" button and enter the data according to the documentation of your modem. Clicking on this button will also allow you to change the communication port number or the rate of transmission.

The „**✓Test**" button permits checking the modem operation with the program – it opens a window containing information on the modem initialization.

After correct initialization of the operation, close the configuration windows.

In order to start communication through the RS port or modem, you should follow the procedures set forth in the section “Remote programming – downloading”.

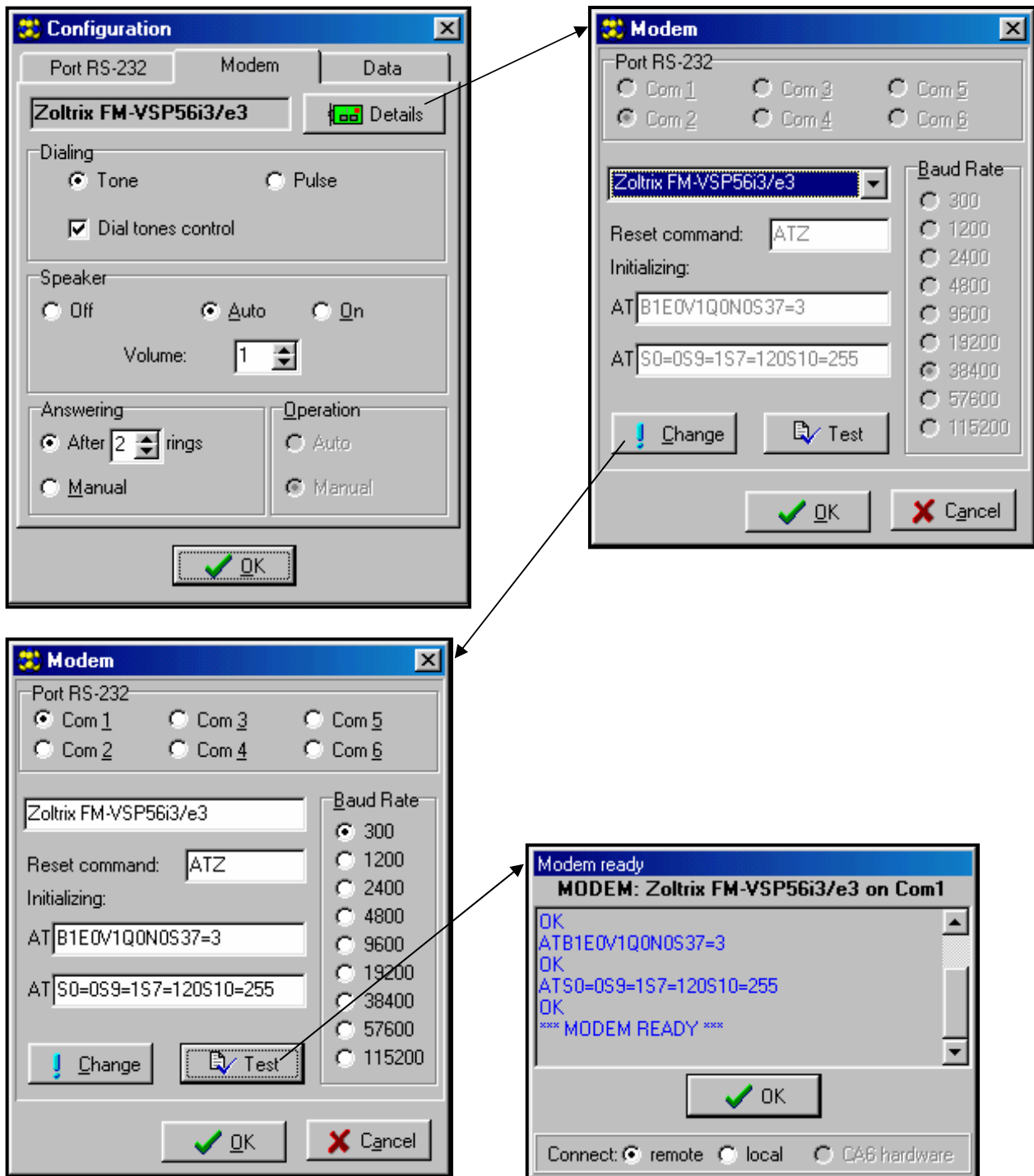




Figure 14. Dialog windows of the DLOAD10 program.


To start the modem communication you can click on the  icon (or select the “Modem” command from the “Communication” menu). The program will open a window enabling a connection to be made and will prompt further procedures.

The control panel type is recognized automatically after establishing connection, or it can be selected through the “File” menu.

Calling the downloading function with the communication established (the ) icon, can speed up the subsequent process of uploading changes made to the panel software.

6. DEFAULT SETTINGS

The control panel is preprogrammed for work in the following configuration:

- service code: 12345,
- master user code: 1234,
- panel communication code – 3736353433323130,
- computer communication code – 3031323334353637,
- number of rings before answer – 2,
- exit delay – 30 seconds,
- keypad alarm duration – 30 seconds,
- entry delay – 30 seconds (for zone 1),
- zone 1 (Z1) – ENTRY/EXIT, EOL, violation will generate chime signal in the keypad,
- zones 2 to 4 (Z2 ... Z4) – INSTANT, EOL, may not be violated during arming,
- zone 5 (Z5) – 24H TAMPER LINE, EOL,
- sensitivity of all zones – 480 ms,
- OUT1 output – audible alarm (duration – 60 seconds, shorted to ground during alarm, assigned to all zones),
- OUT2 output – optical alarm (BURGLARY ALARM, duration – until cleared),
- OUT3 output – failure indicator for AC supply, battery or telephone,
- monitoring disabled,
- downloading disabled.
- FS 79 option 1 and FS 9 option 2 and 3 enabled:
 - failure signaled until review is made,
 - tamper alarm from zones audible in armed mode only,
 -  [ARMED] LED goes off after 180 seconds.

The above settings can be restored by using the FS 74 service function – “restart settings” (except for the service and user access codes, which are restored by the FS 75 function - “restart codes”).

7. TECHNICAL DATA

Mainboard

Mainboard supply voltage	18 V AC ± 10% 50 Hz
Nominal power supply voltage	12 V DC
Mainboard current consumption.....	80 mA
Number of programmable zones.....	5
Number of programmable outputs	2
Current-carrying capacity of OUT1 alarm output.....	1.1 A
Current-carrying capacity of OUT2 and OUT3 outputs	50 mA
Current-carrying capacity of AUX, KPD supply outputs	350 mA
Total capacity of power supply	1.2 A
Standby power supply (recommended)	battery 12 V / 7 Ah
Battery charging current.....	350 mA
Battery cut-off voltage	9.5 V ±0.3 V
Battery protection.....	2.5 A
Operating temperature range.....	-10...+55°C
Mainboard dimensions	147x70 mm
Mainboard weight.....	150 g

Keypads

CA-5 KLED-S

Nominal supply voltage	12 V DC ±15%
Average current consumption	15 mA
Housing dimensions (width x height x thickness).....	80x95x20 mm
Keypad weight	76 g

CA-5 KLCD-S

Nominal supply voltage	12 V DC ±15%
Average current consumption	33 mA
Housing dimensions (width x height x thickness).....	114x94x23 mm
Keypad weight	139 g

CA-5 KLCD-L

Nominal supply voltage	12 V DC ±15%
Average current consumption	61 mA
Housing dimensions (width x height x thickness).....	145x115x26 mm
Keypad weight	212 g

Table 1. Example of panel power supply load estimation/battery selection.

No.	Loads	Max current	Mean current consumption
1	Mainboard CA-5	80 mA	80 mA
2	Keypad + output AUX and 5 detectors*	350 mA	200 mA
3	Output OUT1	1.1 A**	0.5 A
4	Outputs OUT 2 and OUT3	2 x 50 mA	50 mA
5	Battery charging current	350 mA	-
Total max current consumption by the system with no alarm signaling		$\Sigma I = 80 \text{ mA} + 350 \text{ mA} + 100 \text{ mA} + 350 \text{ mA} = 880 \text{ mA}$	
Battery selection based on max. and mean current consumption by the system, assumed duration of power trouble 12 h, assumed 1 alarm with 15 min (0.25 h) duration of signaling		$\Sigma A_{\text{Max}} = 1.25 \times (0.08 \times 12 + 0.4 \times 12 + 1.1 \times 0.25 + 0.1 \times 0.25) \approx 7.575 \text{ Ah}$ $\Sigma A_{\text{Av}} = 1.25 \times (0.08 \times 12 + 0.2 \times 12 + 0.5 \times 0.25 + 0.1 \times 0.25) \approx 4.387 \text{ Ah}$ Recommended standby power supply: battery 12 V/7.5 Ah	

* Assumed current consumption by a single detector 20 mA.

** In case, where the capacity of the power supply is exceeded, the current is supplied by battery.



Notes:

- ***It is impermissible to connect a fully discharged battery (voltage on terminals without a load less than 11 V) to the alarm panel. To avoid hardware damage, fully discharged or never used battery should be charged initially using proper charger.***
- ***The control panel power supply unit has been designed for work with lead batteries or other batteries with a similar charging curve (European Directives 91/157/EEC and 83/86/EEC).***

8. HISTORY OF MANUAL UPDATES

The changes described refer to the manual drawn up for the CA-5 v1.09 control panel.

DATE	VERSION	DESCRIPTION OF CHANGES
July 2007	2.10	New designations (pictograms) have been introduced for the keypad LEDs. RS port socket has been changed; it requires a new cable now (p. 9). Previously existing fuses on the electronics board have been replaced with polymer ones, their rating changed (p. 3 and p. 4). The CONNECTION OF KEYPAD chapter has been supplemented (p. 12). The detectors connection figures have been added (p. 14).

ATTENTION!

An efficient security system does not prevent burglary, assault or fire from happening, however it diminishes the risk that such a situation will cause no alarm or notification.

Therefore, the SATEL Company recommends that operation of the whole security system be regularly tested.

SATEL sp. z o.o.
ul. Schuberta 79
80-172 Gdansk
POLAND
tel. +48 58 320 94 00
info@satel.pl
www.satel.eu