GB

FAP54

Multiprocessor modular control panel for fire detection

Installation manual

ELKRON

CE 09 00 51

DS80SC61-002I LBT80099

DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE)

The symbol of the crossed-out wheeled bin on the product or on its packaging indicates that this product must not be disposed of with your other household waste.
Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment.
The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.
For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

ELKRON

Tel. +39 011.3986711 – Fax +39 011.3986703
www.elkron.com – mail to: info@elkron.it

TABLE OF CONTENTS

1 GENERAL SAFETY RULES

1.1 PEOPLE'S SAFETY

Below some general safety instructions which must be absolutely observed.

1.1.1 Installation, commissioning and maintenance operations

Only skilled people must be in charge of installation, fault research and in general of any operation to be carried out on the system or control panel.
This personnel shall be provided with the suitable documentation, in particular the present manual. For no reason a non-skilled operator must operate the control panel. The control panel shall be preventively disconnected from the network.

1.1.2 Power supply isolating device

As the control panel is designed to be installed in a fixed way, regulations require the installation of a power supply isolating device with manual control. This device shall be fitted by the installer inside an electric cabinet which might include also other devices, therefore it shall be suitably identified.

1.1.3 Batteries

The control panel has an internal power source provided by two sealed lead batteries.

ATTENTION!

Danger of explosion if the batteries are replaced with the wrong type. Remove used batteries following the instructions provided.
The batteries can generate electric shock or burns due to the short circuit high current. It is necessary to observe the following precautions:

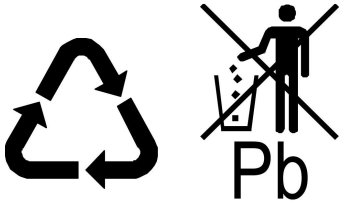
- Remove all clocks, bracelets or any other metal objects.
- Use objects with insulated handles.
- Do not put metal tools or objects on the batteries.

RISK OF ELECTRIC SHOCK!

- Do not try to change battery wiring or connectors. These operations can cause injuries.

1.1.4 Battery disposal

Lead batteries contain harmful substances!



At the end of their life cycle they shall not be disposed of with common waste, but delivered to an authorized recycling and disposal centre.

1.2 SICUREZZA PRODUCT SAFETY

- The control panel shall be installed in a fixed way.
- Do not position the control panel next to liquids or in an environment with a high level of humidity.
- Do not let any liquid or foreign bodies penetrate inside the equipment.
- Do not obstruct ventilation grilles.
- Do not expose the control panel to sunrays or place it next to heat sources.

1.3 PARTICULAR PRECAUTIONS

It is absolutely necessary to observe the order of the installation and connection instructions described in the present manual. Check the indications on the identification plate: they shall correspond to your power network and electric consumption.

1.4 DECLARATION OF THE MANUFACTURER

The control panel described in this manual has been developed according to the quality, reliability and performance criteria used by ELKRON.
Every component can operate according to the EN54-2 and EN54-4 standards.

1.5 LIST OF OPTIONS WITH REQUIREMENTS

7.8	Output to fire alarm device
7.9	Output to fire alarm routing equipment
7.11	Delay to outputs
7.12	Co-incidence detection
8.3	Fault signals from points
8.9	Output to fault warning routing equipment
9.5	Disablement of addressable points
10	Test condition

1.6 COMPLIANCE WITH EN54-2

In order to be compliant with the EN54-2 standard, the following rules must be observed:

1. Each manual push button and fire detector used in the control panel must be associated to fire alarm detection zones
2. Connect up to 32 points to each circuit configured in OPEN mode
3. Connect up to 128 points (each point is a short circuit isolator) to each circuit configured in LOOP mode

2 FAP54 OVERALL DIMENSIONS

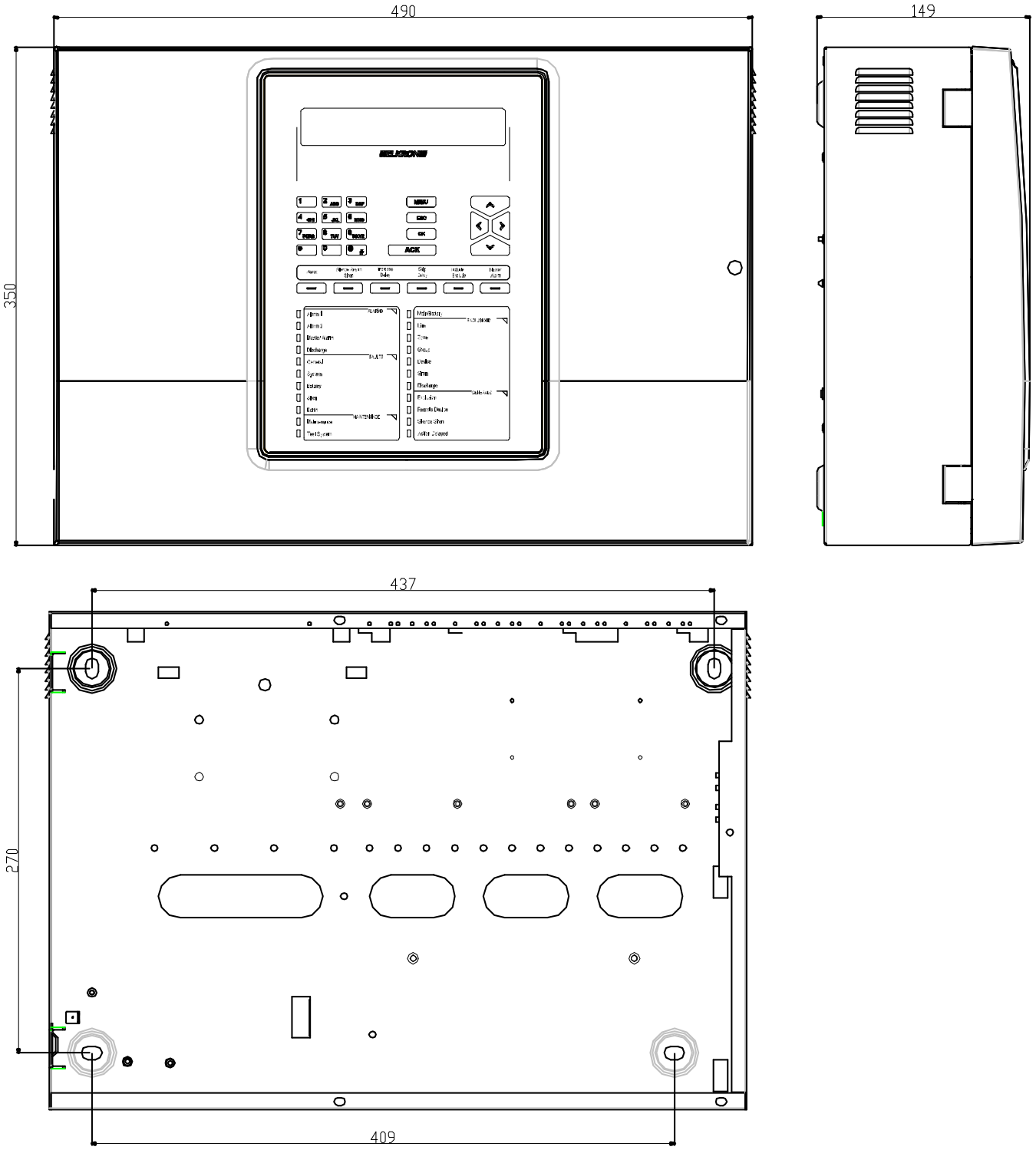


Figure 1 - Internal view and hole template for fastening to the wall

2.1 FASTENING THE FAP CONTROL PANEL TO THE WALL

The FAP control panel must be fastened to the wall at a suitable height in order to facilitate the reading of display and access for the operator.

If the control panel is installed near a corner, verify that the front panel can be opened without any difficulty.

The control panel is fastened to the wall by means of 4 screw anchors with maximum dimension of 6 mm.

Do not install the control panel near heat sources (radiators, convectors, heating plants, etc.)

After the fixing holes are made in the wall, open the front panel by removing the blocking screw, pass the cables coming from the field through the holes in the rear of the cabinet and fasten the control panel to the wall with suitable screws.

Connect the cables coming from the field to the control panel by avoiding to put them too close to the power supply cable.

Pass the power supply cable through the suited hole put in the bottom of the cabinet, on the left (near the AC/DC converter).

2.2 CONNECTING THE FAP CONTROL PANEL TO THE AC POWER SUPPLY

The connection must be carried out with a sheathed cable with 3 conductors (line – neutral – earth).
Remove the sheath from the cable and connect the conductors L, N and Earth to the correspondent terminals on the AC/DC converter. Then, fasten the cable properly with a small band.

For the supply cable, a manually operated power supply switching device externally to the control panel must be used; this switching device must have a 3 mm minimum distance between contacts.
The switching equipment must disconnect simultaneously the Line and the Neutral conductor.

After powering the control panel on, connect the batteries to the correspondent terminals located on the command and control board and place the thermal probe on the batteries. This probe is used to compensate the charging voltage of the batteries when the temperature changes.

2.3 MAINTENANCE

Periodically clean the keypad and the display window by using a wet cloth.
Do not use any detergent or solvent product for cleaning.
Periodically check the LEDs functionality by using the relevant function from the control panel's menu.
After system start-up, set the desired interval of periodic execution of the automatic maintenance procedure, which monitors the cleaning level of the smoke detectors, by signalling the ones needing maintenance.

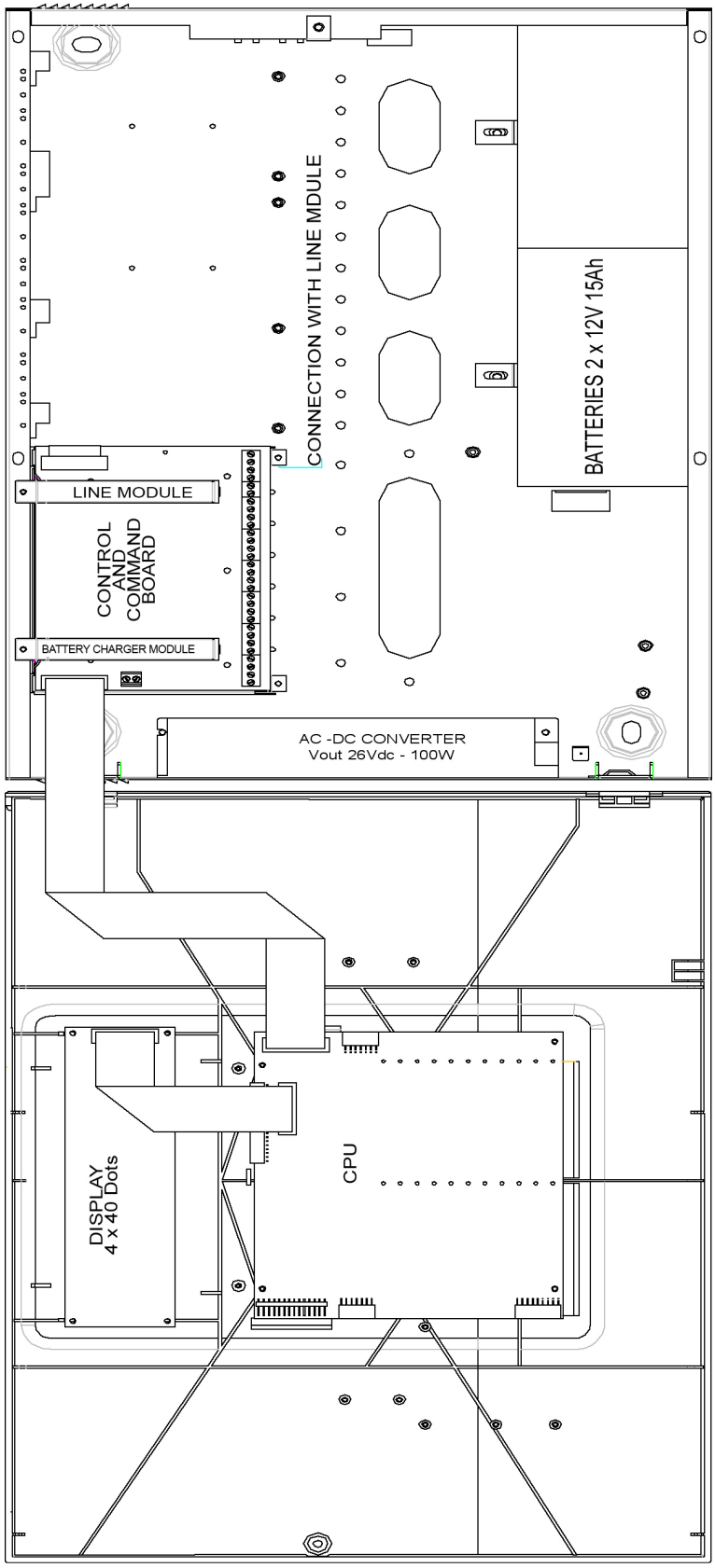
2.4 BATTERIES

In the control panel must be used two rechargeable batteries of 12 V, 12 Ah connected in series.
The batteries must:

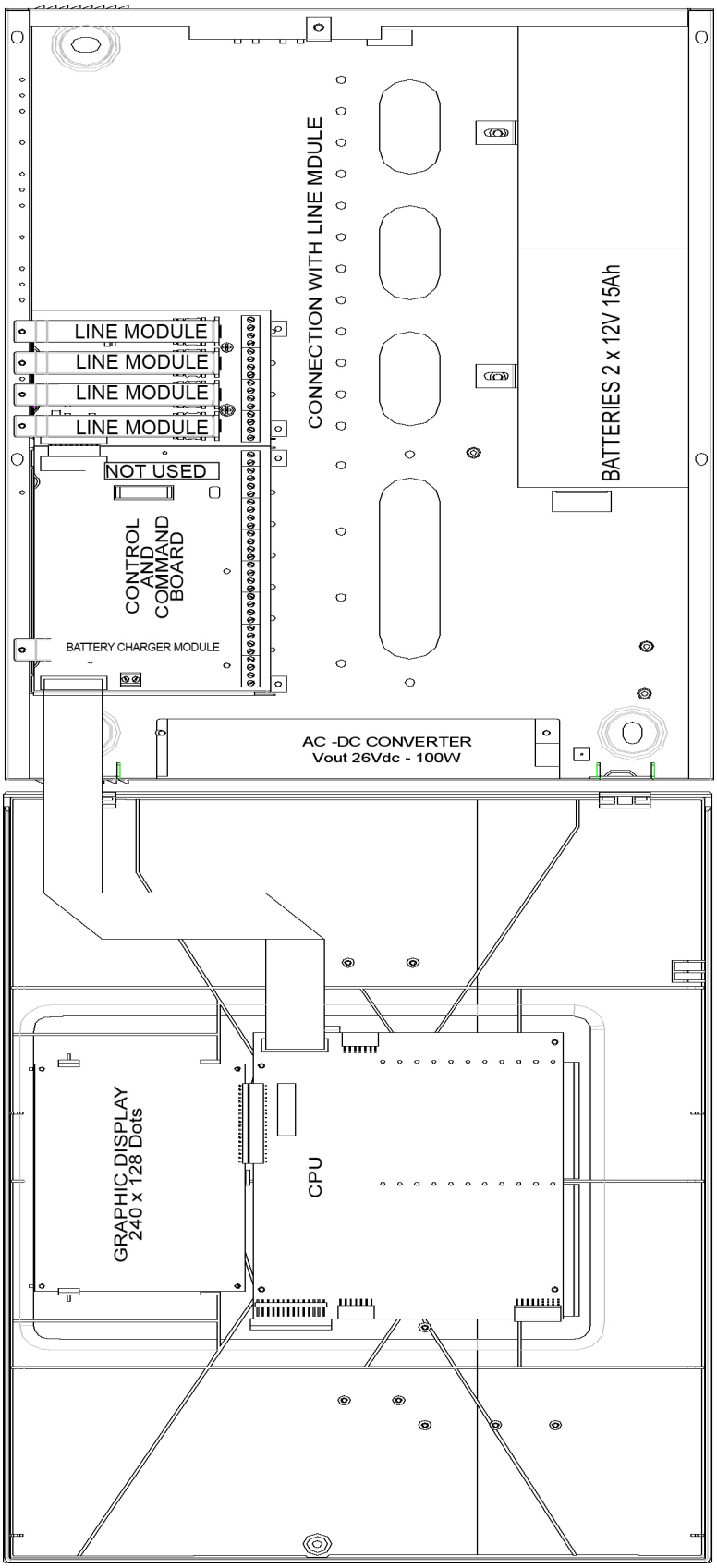
- Have the same model/capacity
- Be of VRLA (Valve Regulated Lead Acid) type
- Have a case with UL94V-1 or better flame rating
- Be compliant with IEC 60896-21:2004, IEC 60869-22:2004 standards

The batteries replacement must be performed on by qualified personnel.

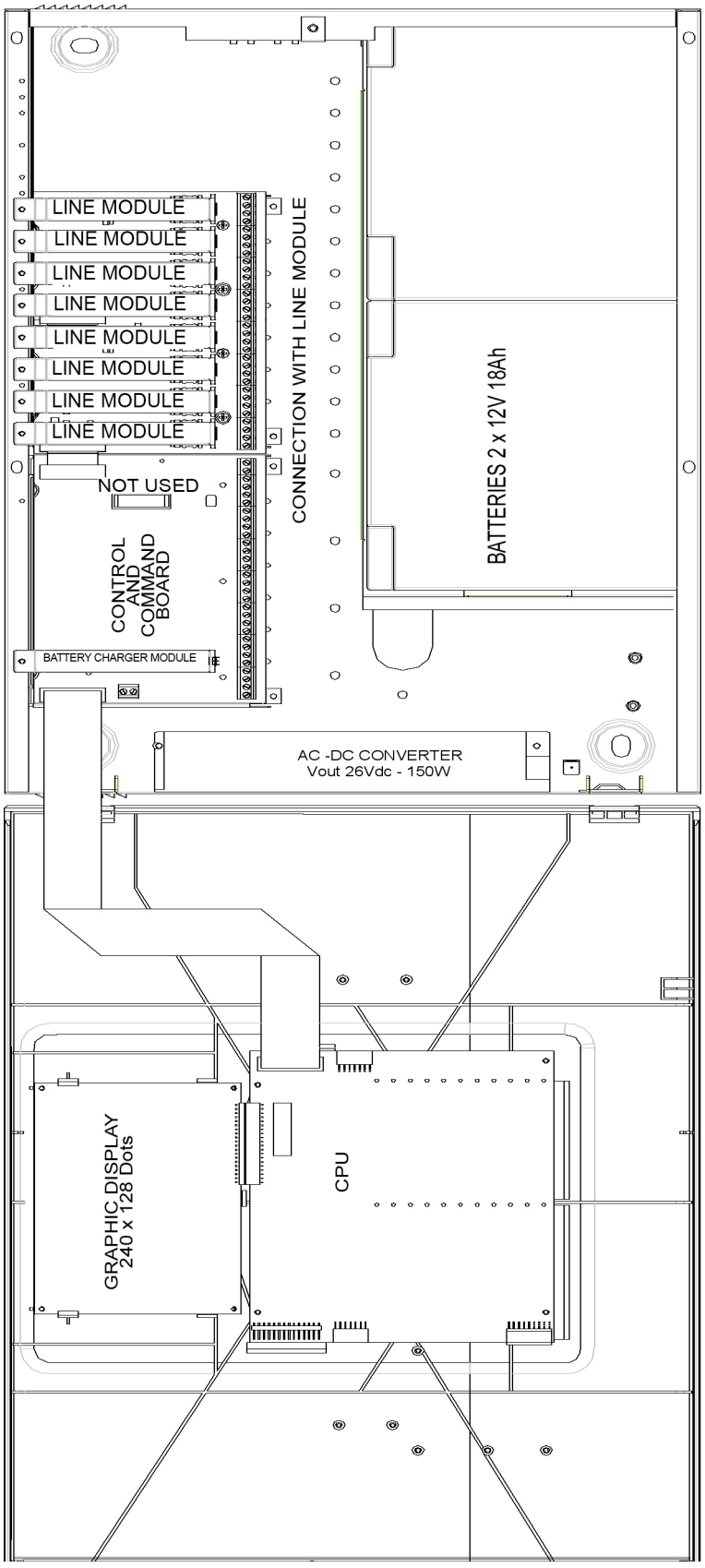
2.5 LAYOUT OF FAP54-01 INTERNAL MODULES



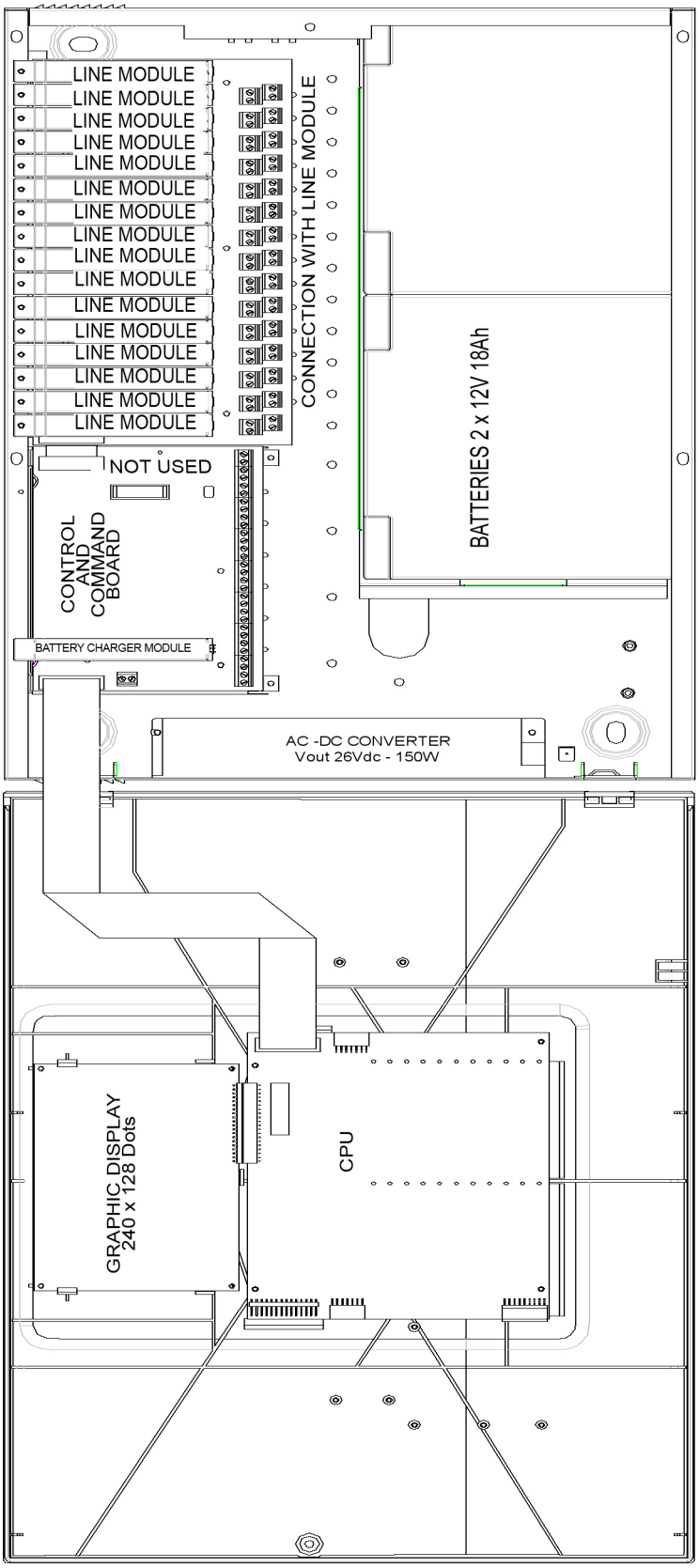
2.6 LAYOUT OF FAP54-04 INTERNAL MODULES



2.7 LAYOUT OF FAP54-08 INTERNAL MODULES

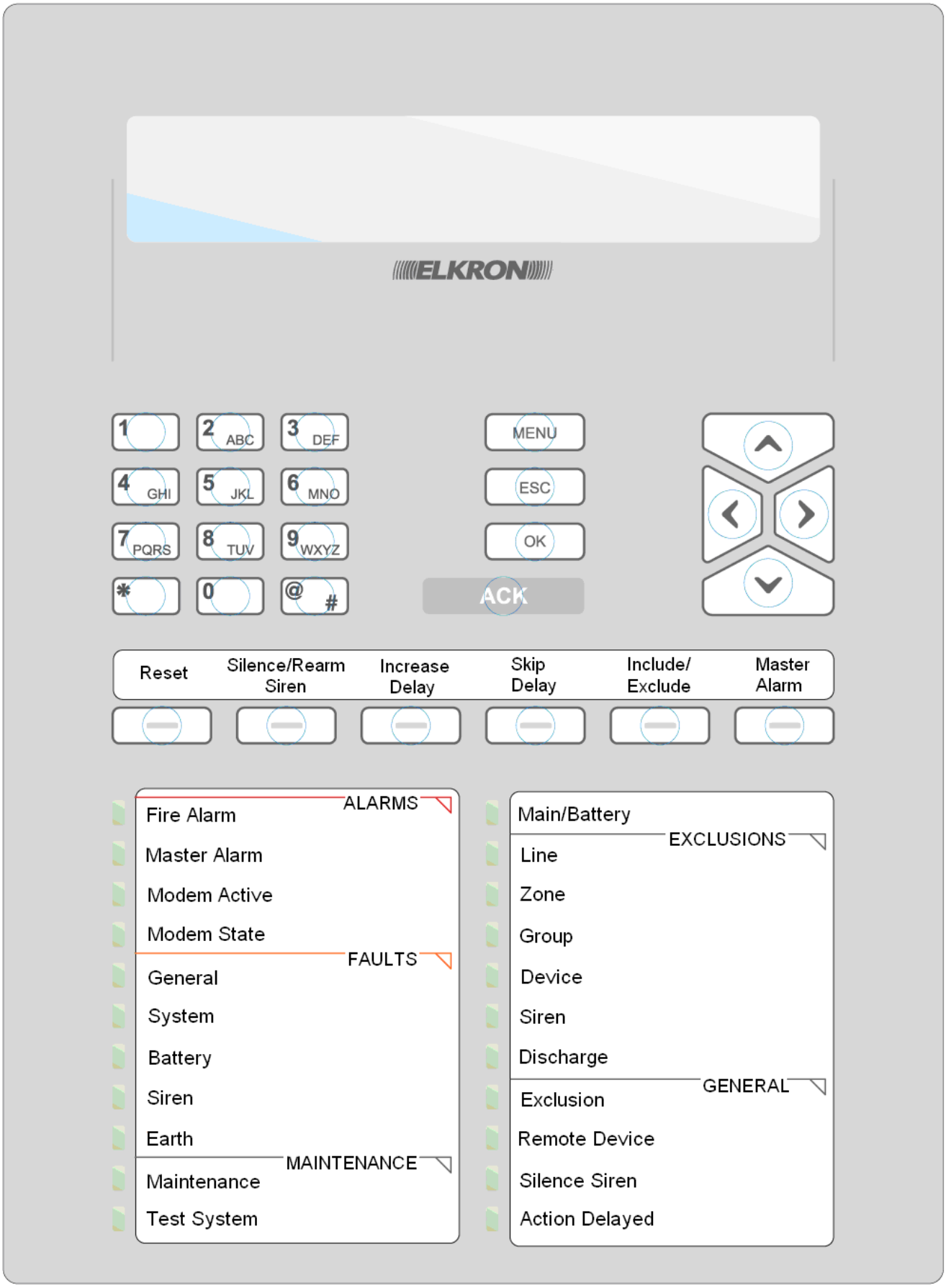


2.8 LAYOUT OF FAP54-16 INTERNAL MODULES

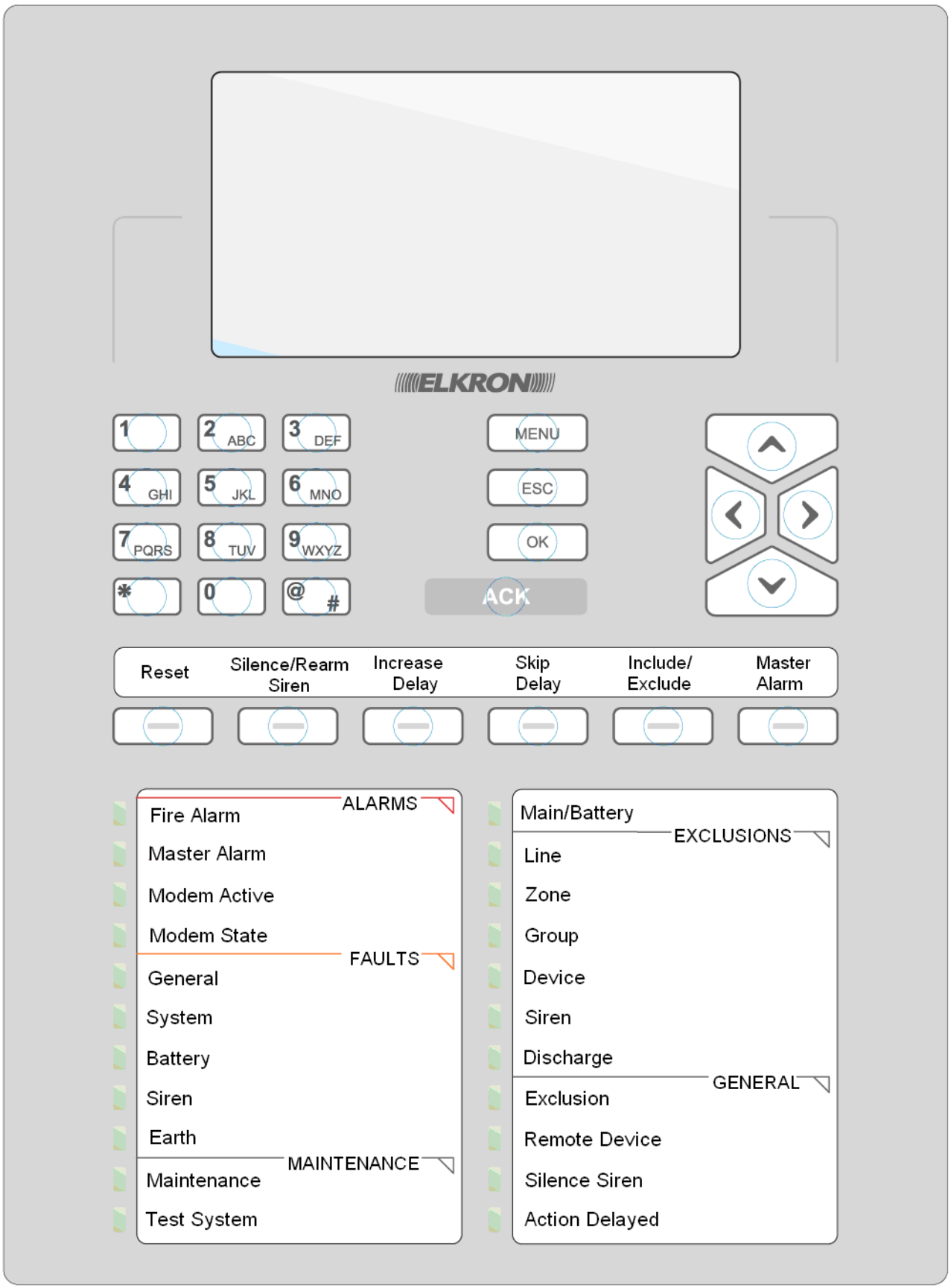


3 FAP54 COMPONENTS

3.1 FRONT PANEL OF FAP541



3.2 FRONT PANEL OF FAP544 - FAP548 - FAP5416



The front panel contains the following components:

- display
- alphanumeric keypad
- keys
- LEDs

3.3 KEYPAD

The keypad is located on the front panel and is composed of the alphanumeric keys and 10 function keys, described below.

KEY	FUNCTION
ACK (↵)	This key must be pressed to acknowledge the events (alarms, faults, maintenance) detected by the control panel.
RESET	This key starts the “Global Reset” procedure. Whenever the user presses this key, an event is stored in the event log and, if the passwords are enabled, the level 2 password is required.
SILENCE / REARM SIREN	This key stops and restarts the siren output and the alarm outputs of the actuators after the occurrence of an alarm. Whenever the user presses this key, an event is stored in the event log and, if the passwords are enabled, the level 2 password is required.
SKIP DELAY	This key makes the siren output activation delay expire immediately when the control panel is in alarm condition of a zone/group alarm in timer mode and the timer is running. By pressing this key the control panel will ignore the delay and will activate the siren output immediately.
INCREASE DELAY	In order for this key to have an effect, the timer of a zone/group alarm in time mode must be running. In this situation, when this key is pressed the current value of the running timer is increased by 1 minute. The maximum overall time (initial delay + increments due to the key) is 10 minutes. Whenever the user presses this key, an event is stored in the event log and, if the passwords are enabled, the level 2 password is required.
MASTER ALARM	When the control panel is in monitoring phase, this key triggers the general alarm condition. Whenever the user presses this key, an event is stored in the event log and, if the passwords are enabled, the level 2 password is required.
INCLUDE/EXCLUDE	When the control panel is in monitoring phase, this key allows the user to include/exclude circuits, zones, groups, points or any other equipment connected to the control panel. When the user presses this key, the level 2 password is required (if passwords are enabled).
MENU	When the control panel is in the monitoring phase, it allows the user to access to the PROGRAMMING and SERVICE menus.
ESC	This key takes the system back to its previous condition (e.g., when in a menu, it goes back to the previous menu) and in some cases it makes it possible to interrupt some procedures.
OK	Key confirming the data entry.

3.4 LED INDICATORS ON THE FRONT PANEL

1	**R**	FIRE ALARM	**12**	**G**	MAIN/BATTERY
2	**R**	MASTER ALARM	**13**	**Y**	LINE
3	**R**	MODEM ACTIVE	**14**	**Y**	ZONE
4	**Y**	MODEM STATE	**15**	**Y**	GROUP
5	**Y**	GENERAL	**16**	**Y**	DEVICE
6	**Y**	SYSTEM	**17**	**Y**	SIREN
7	**Y**	BATTERY	**18**	**Y**	DISCHARGE
8	**Y**	SIREN	**19**	**Y**	EXCLUSION
9	**Y**	EARTH	**20**	**Y**	REMOTE DEVICE
10	**Y**	MAINTENANCE	**21**	**Y**	SILENCE SIREN
11	**Y**	TEST SYSTEM	**22**	**Y**	ACTION DELAYED

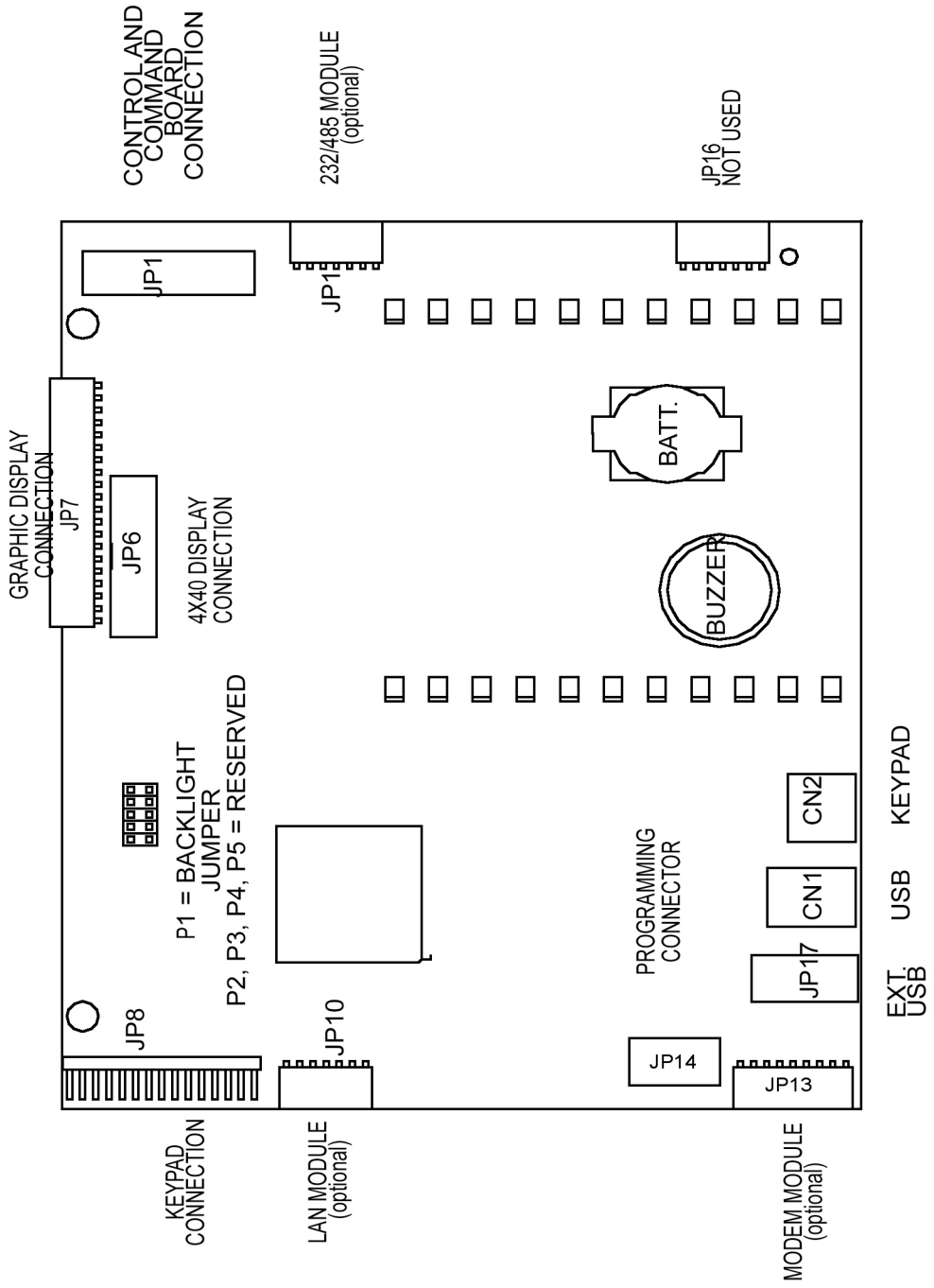
	INDICATOR	COLOR	FUNCTION
ALARMS	FIRE ALARM	RED	**Blinking**: the control panel is in alarm condition and the siren output is **not** active. **Fixed ON**: the control panel is in alarm condition and the siren output is active.
	MASTER ALARM	RED	When turned ON, a general alarm condition has occurred.
MODEM	MODEM ACTIVE	RED	**Blinking**: the modem is attempting to setup a call. **Steady ON**: the modem connection is active. **Steady OFF**: the modem is not performing any activity.
	MODEM STATE	YELLOW	**Blinking**: fault on the transmission line. **Fixed ON**: modem (or part of its functionality) excluded.
FAULTS	GENERAL	YELLOW	When turned ON, it indicates a Fault condition. Further information on the type of fault is provided through the display and the dedicated LEDs. This LED provides a cumulative fault indication.
	SYSTEM	YELLOW	When turned ON, it indicates a system fault. Usually, when this LED is ON it indicates a fault affecting the CPU of the control panel.
	BATTERY	YELLOW	When ON, it indicates a control panel battery fault or malfunctioning.
	SIREN	YELLOW	When ON, it indicates a fault on the line controlling the siren or a fault on an actuator driving an alarm signalling device (“C” type).
	EARTH	YELLOW	When ON, it signals an earth dispersion.
MAINTENANCE	MAINTENANCE	YELLOW	When ON, it indicates that the maintenance procedure has found one or more smoke detectors which require maintenance.
	TEST SYSTEM	YELLOW	When ON, it indicates that a zone test is in progress.
	MAIN/BATTERY	GREEN	**Steady ON**: the control panel is powered on by the main AC. **Blinking**: the control panel is powered on by batteries.
EXCLUSIONS	LINE	YELLOW	When ON, it indicates that one or more circuits are excluded.
	ZONE	YELLOW	When ON, it indicates that one or more zones are excluded.
	GROUP	YELLOW	When ON, it indicates that one or more groups of points or groups of zones are excluded.
	DEVICE	YELLOW	When ON, it indicates that one or more points are excluded.
	SIREN	YELLOW	When ON, it indicates the exclusion of a siren or an actuator driving an alarm signaling device (“C” type).
	DISCHARGE	YELLOW	When ON, it indicates the exclusion of an actuator driving fire-extinction equipment (“G” type).
GENERAL	EXCLUSION	YELLOW	When ON, it indicates that something is excluded in the control panel. This is an exclusion cumulative indicator.
	REMOTE DEVICE	YELLOW	When ON, it indicates a communication error during communication with an LCD annunciator or a SLAVE control panel, or a communication problem during communication with a PC via modem or LAN.
	SILENCE SIREN	YELLOW	When ON, it indicates that the siren output has been turned off by using the **SILENCE SIREN** key.
	ACTION DELAYED	YELLOW	When ON, it indicates that the timer of a zone or group in time mode is running or has expired and the zone or group has undergone an alarm condition.

3.5 FAP ELECTRICAL SPECIFICATIONS

AC mains	100-240 V~ -15/+10%, 50/60 Hz, 3 A
Current consumption I min: I max a:	 0.4 A control panel only and line modules 4.85 A
Maximum and minimum electrical characteristics for each input and output: Output voltage variation (V OUT): Minimum output voltage (V OUT): Output voltage ripple (V OUT):	 23 V⎓ ÷ 26 V⎓ 18.4 V⎓ (nominal load and mains disconnected) 160 mVpp
Detection circuit: Maximum current to be used for detection lines:	20 V nominal, max 100 mA (limited to 400 mA) 1.5 A
Batteries: Maximum usable battery: Batteries fuse: Maximum current provided by batteries with AC power supply disconnected: Maximum battery internal resistance:	 2x12V 12 Ah F4AL 250V 4.0 A Rimax 0.8 Ω
Operating temperature:	-5°C ÷ +40°C
Pollution grade:	Grade 2
Overvoltage category:	CAT II
NA/NC outputs:	Fire alarm Siren activated Faults Programmable (Missing AC / Exclusions)
Controlled outputs:	Siren (max 500mA) Self-powered siren (max 250 mA)
RS232/RS485: USB: LAN: MODEM: KEYBOARD: REMOTE PANEL:	RS485 opto-isolated RS485 (optional) USB device + USB host (connection with mass storage USB key) Ethernet (10/100 Mbit , RJ45 connector) optional Modem PSTN/GSM optional Connector for PS2 keyboard Terminal blocks for connection to a 1043/534 remote panel

Symbol	Meaning
⎓	Direct current voltage
	Refer to the installation manual

3.6 FAP54 CPU BOARD

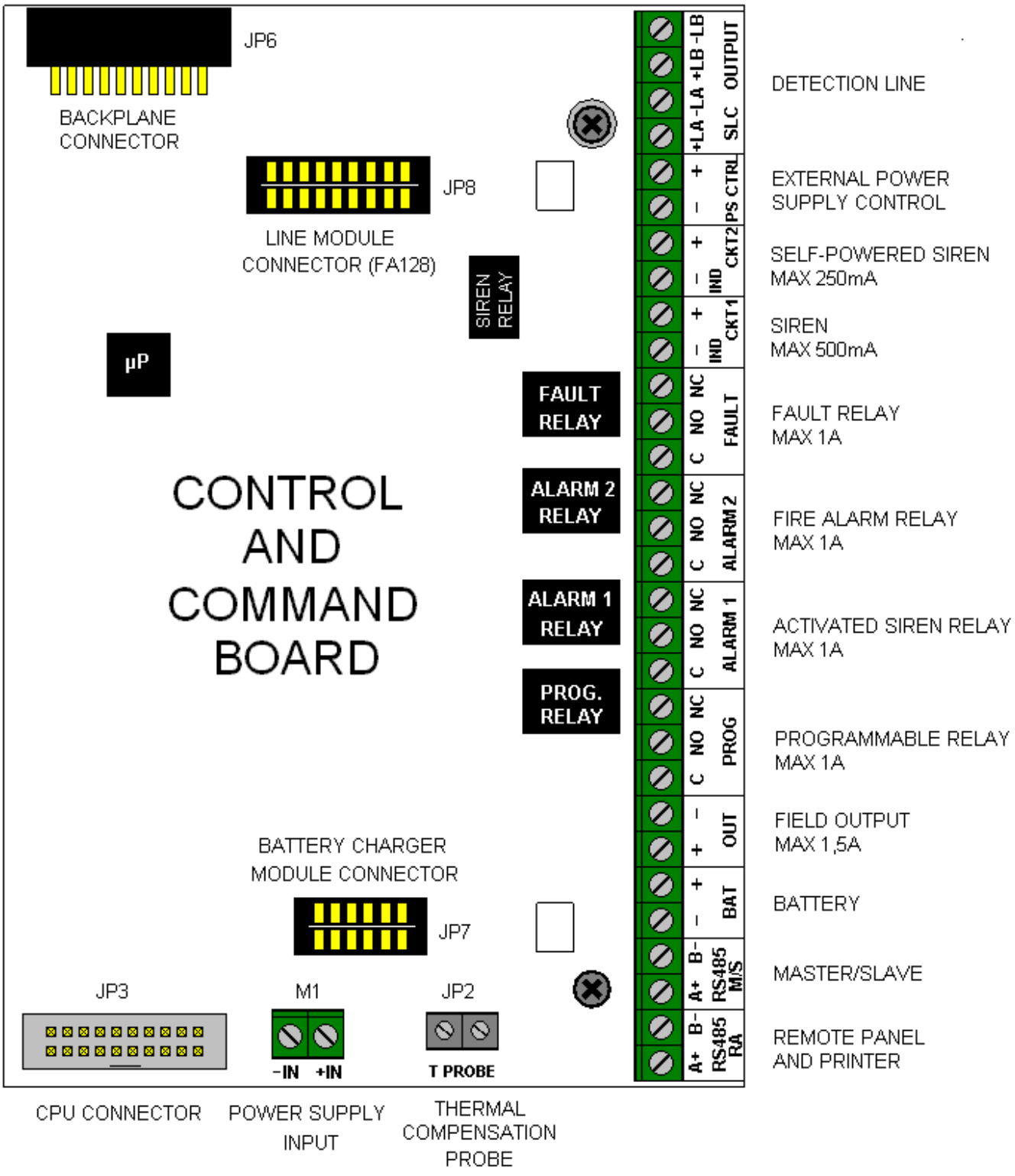


NOTES

The following (optional) modules are not covered by the EN54-2 standard:

- MODEM MODULES: MPSTN500 (PSTN) and MGSM500 (GSM)
- LAN MODULE: LAN/TCP/IP500
- 232/485 MODULE: RS232/RS485
- IT USB/KEY MODULE: for connection (via JP17) with external mass storage USB key

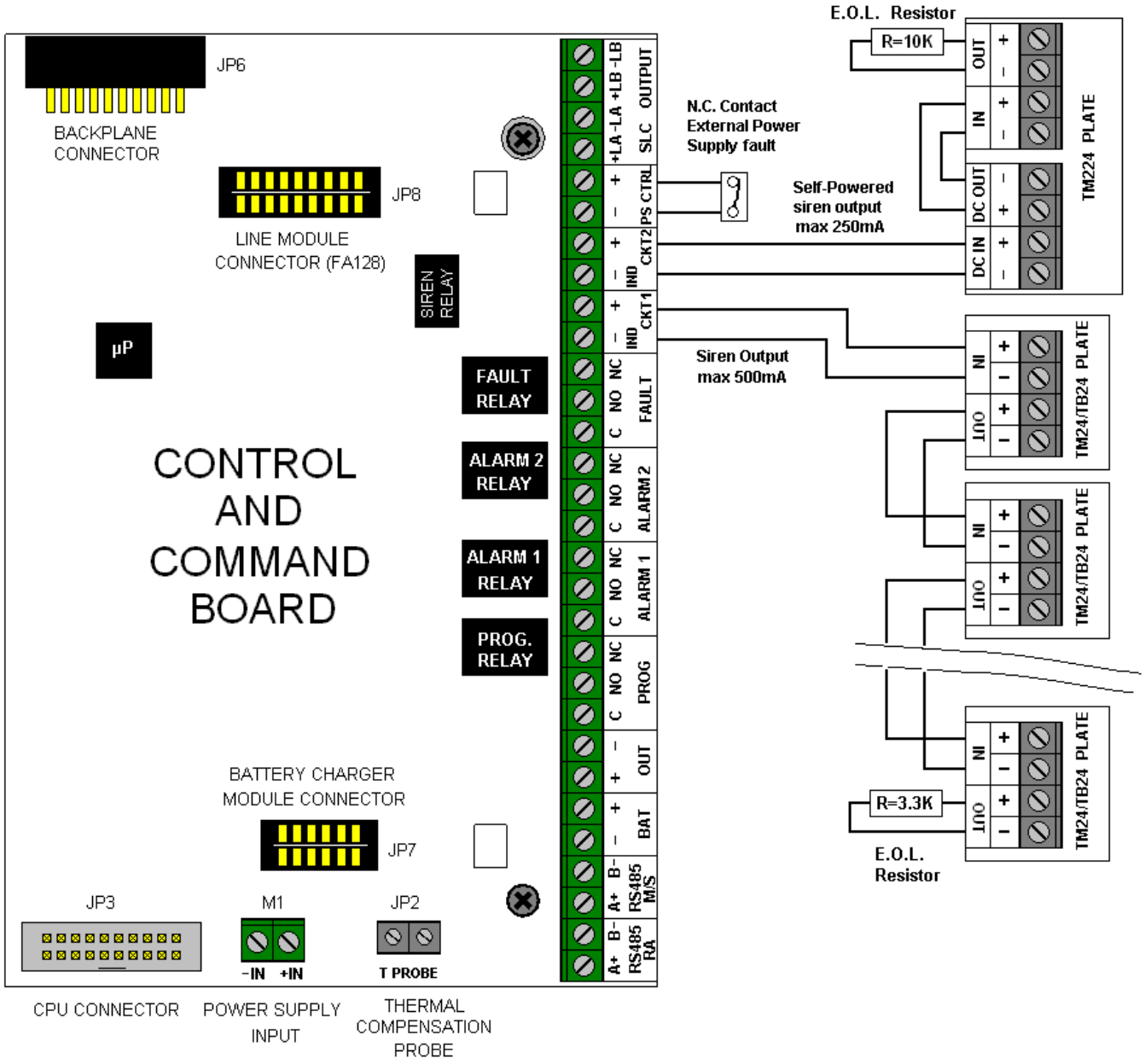
3.7 FAP54 CONTROL AND COMMAND BOARD



NOTES

- C NO NC are meant to be idle NOT armed.
- The fault relay is normally energized when the control panel is powered on, in case of fault the relay is released.
- The relay outputs PROG, RL1, RL2 and FAULT must NOT be used to command output devices of type C, E, J, G and transmission devices.

3.8 EXAMPLES OF FAP54 TERMINAL BOARD CONNECTION

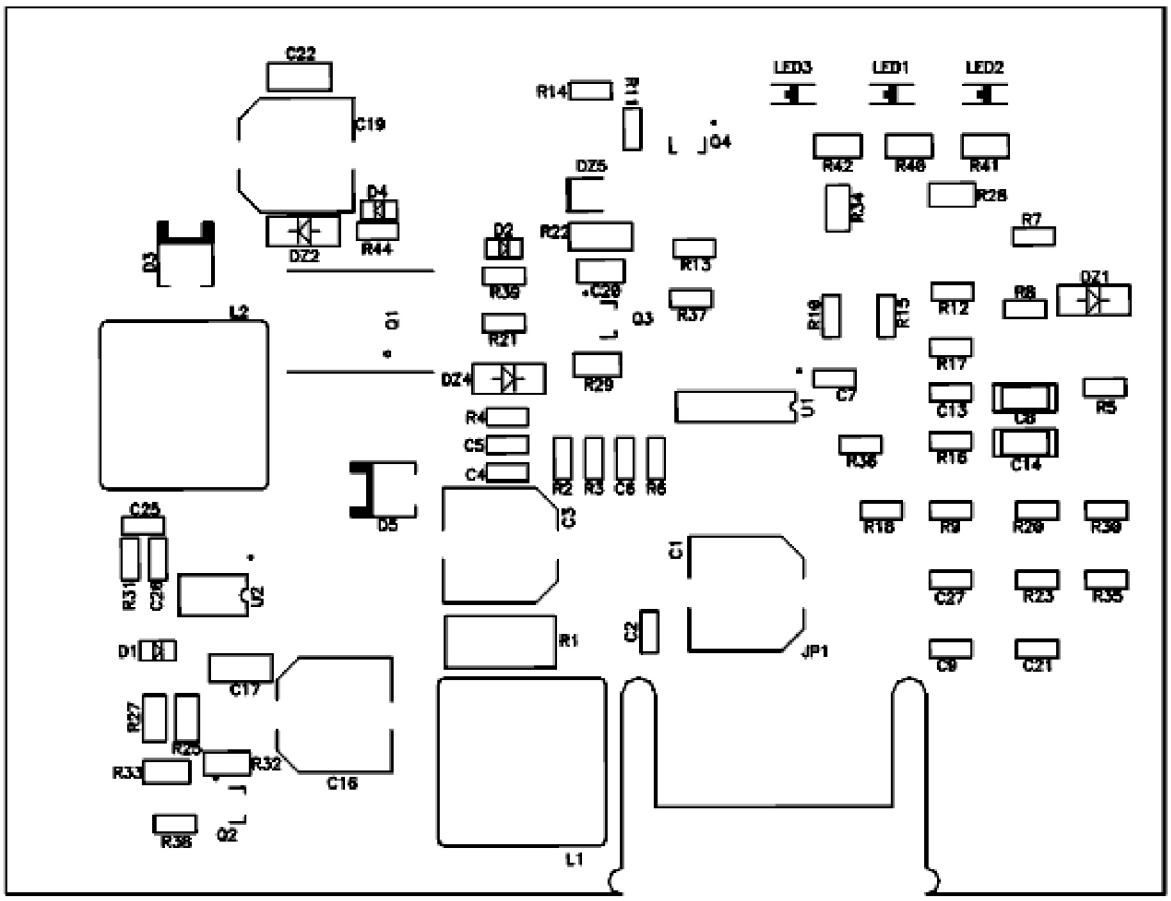


NOTES

- If the siren output is used, always connect a 3300Ω line end resistor on the last siren.
- If no siren output is used, connect a 3300Ω resistor with the siren output terminals on the control and command board.
- If a self-powered siren output is used, connect a 10KΩ end line resistor with the siren terminals (see figure).
- If no self-powered siren output is used, connect a 10KΩ resistor with the self-powered siren output terminals on the control and command board.
- If no external power supply is connected, make a jumper between PS-CTRL terminals
- he resistors and jumper are mounted by factory and therefore are already present.

3.9 FAP54 BATTERY CHARGER BOARD

The battery charger board of FAP control panels handles the recharge of two lead acid batteries connected in series. As to performance, it complies with EN54-4.

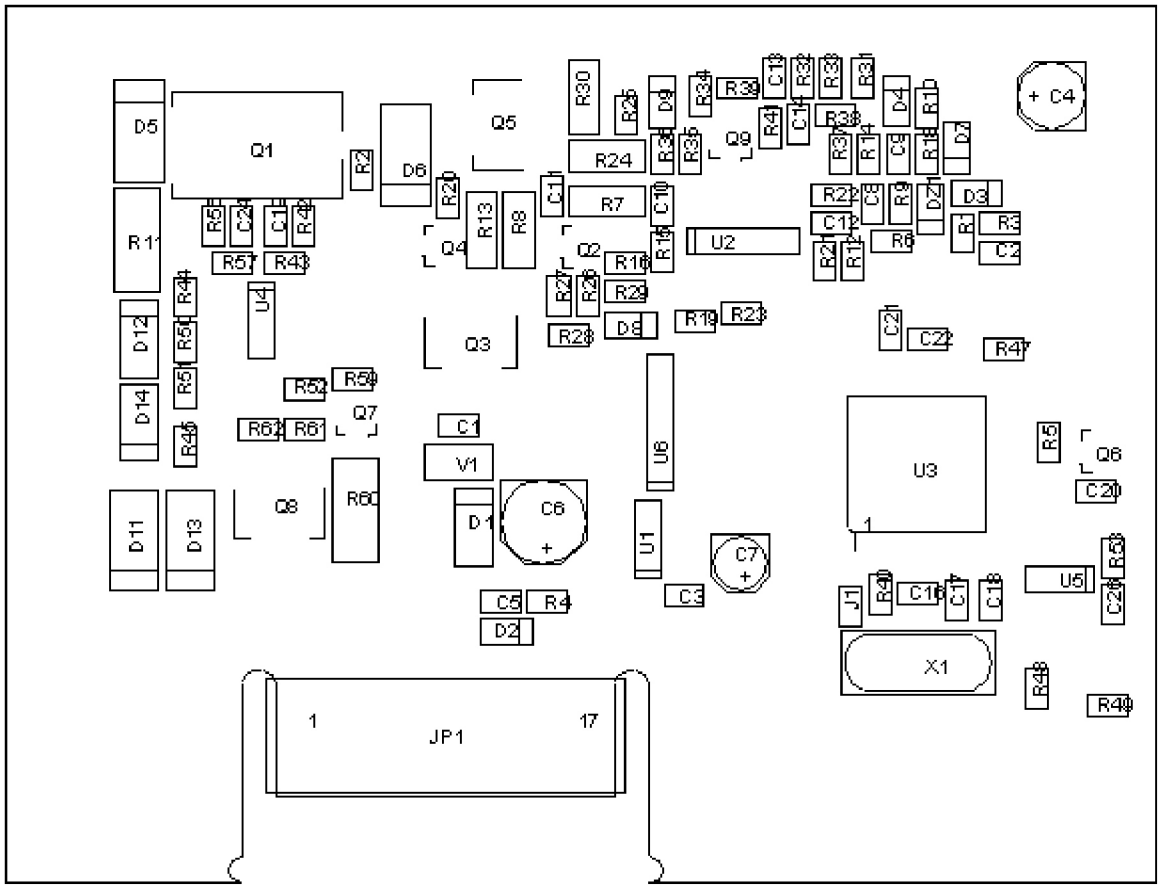


CONNECTION TO
CONTROL
AND COMMAND BOARD

NOTE: in case of connection of additional power supply units, connect the negative terminal of the additional power supply unit with the negative terminal of the control panel power supply unit.

3.10 FA128 LINE MODULE

The FA128 line module makes it possible to manage the control panel detection lines.
Each module manages up to 128 connected devices without any type limits.
The FA128 line module can be acquired separately to expand the number of lines of the following control panels: FAP54-04, FAP54-08, FAP54-16.
It can be inserted in any free slot of the Backplane and its configuration is completely automatic without the need to set the address.
The presence on-board of the short circuit insulator ensures the best protection against possible faults due to the detection line.



CONNECTION TO CONTROL
AND COMMAND BOARD
OR BACKPLANE

The FA128 line module can be configured by the control panel both with open and closed line (LOOP). For further details see the control panel programming manual.

3.11 CE LABELS

According to the EN54 standards, below are reported the CE labels containing all the necessary information:

CE 09

0051

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Via Bologna, 188/C - 10154 Torino - Italy
09
0051-CPR-0240
DoP n. 0051-CPR-0240

FAP541

Fire detection and fire alarm control panel

EN 54-2: 1997 + A1:2006
EN 54-4: 1997 + A1:2002 + A2:2006
100-240 V~ -15/+10%, 50/60 Hz, 3 A
V out: 26 V⎓, ± 10%, 4.85 A

Circuit module: 1

Options with requirements list:
7.8 Output to fire alarm device
7.9 Output to fire routing equipment
7.11 Delay to outputs
7.12 Co-incidence detection
8.3 Fault signals from points
8.9 Output to fault warning routing equipment
9.5 Disablement of addressable points
10 Test condition

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0051-CPR-0239
DoP n. 0051-CPR-0239

FAP544

Fire detection and fire alarm control panel

EN 54-2: 1997 + A1:2006
EN 54-4: 1997 + A1:2002 + A2:2006
100-240 V~ -15/+10%, 50/60 Hz, 3 A
V out: 26 V⎓, ± 10%, 4.85 A

Circuit module: 2 up to 4

Options with requirements list:
7.8 Output to fire alarm device
7.9 Output to fire routing equipment
7.11 Delay to outputs
7.12 Co-incidence detection
8.3 Fault signals from points
8.9 Output to fault warning routing equipment
9.5 Disablement of addressable points
10 Test condition

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09
0051-CPR-0238
DoP n. 0051-CPR-0238

FAP548

Fire detection and fire alarm control panel

EN 54-2: 1997 + A1:2006
EN 54-4: 1997 + A1:2002 + A2:2006
100-240 V~ -15/+10%, 50/60 Hz, 3 A
V out: 26 V⎓, ± 10%, 4.85 A

Circuit module: 4 up to 8

Options with requirements list:
7.8 Output to fire alarm device
7.9 Output to fire routing equipment
7.11 Delay to outputs
7.12 Co-incidence detection
8.3 Fault signals from points
8.9 Output to fault warning routing equipment
9.5 Disablement of addressable points
10 Test condition

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0051-CPR-0237
DoP n. 0051-CPR-0237

FAP5416

Fire detection and fire alarm control panel

EN 54-2: 1997 + A1:2006
EN 54-4: 1997 + A1:2002 + A2:2006
100-240 V~ -15/+10%, 50/60 Hz, 3 A
V out: 26 V⎓, ± 10%, 4.85 A

Circuit module: 8 up to 16

Options with requirements list:
7.8 Output to fire alarm device
7.9 Output to fire routing equipment
7.11 Delay to outputs
7.12 Co-incidence detection
8.3 Fault signals from points
8.9 Output to fault warning routing equipment
9.5 Disablement of addressable points
10 Test condition

4 DETECTION LINES

4.1 LOOP LINE CONNECTION - CLASS A

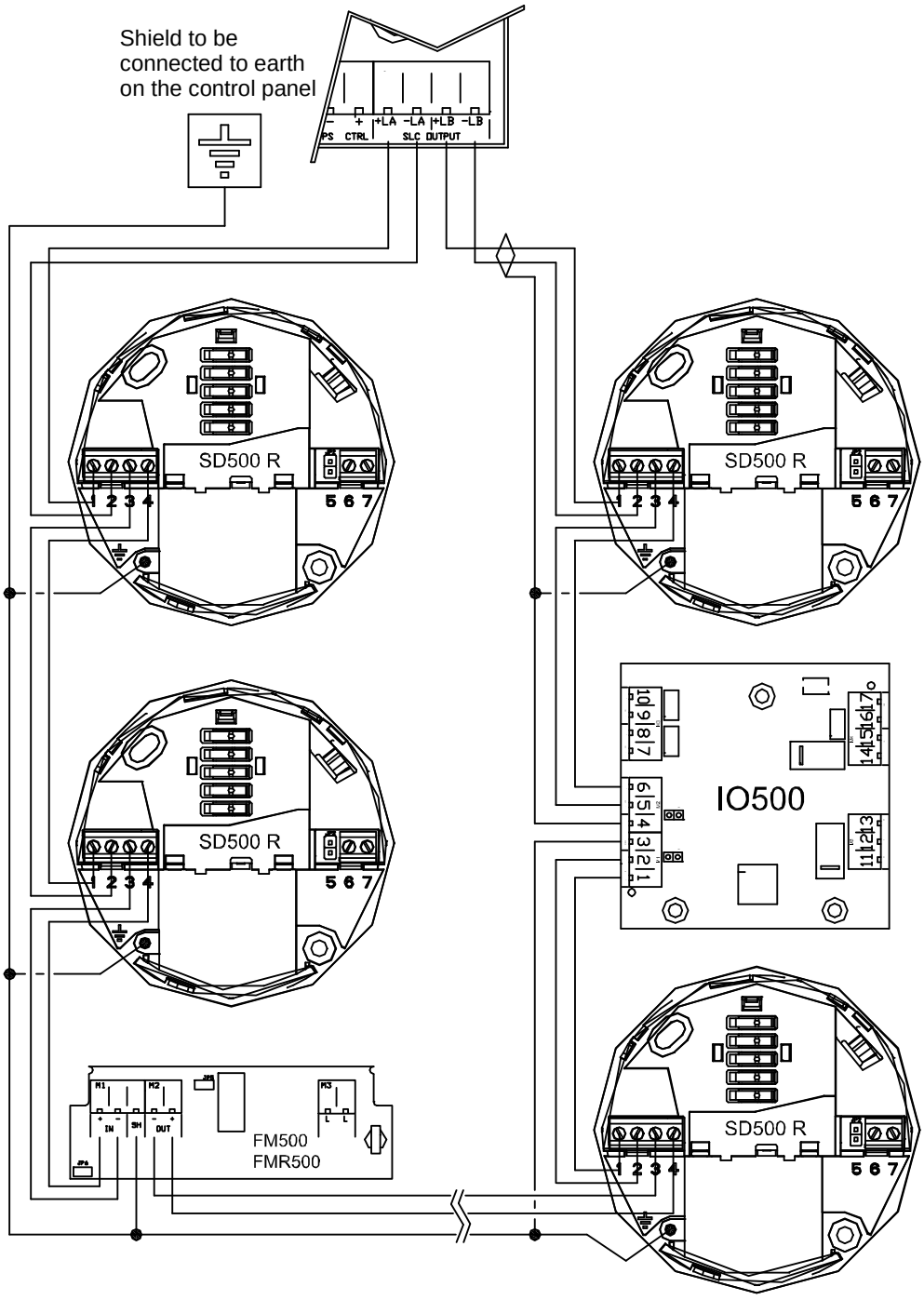


Figure 2 - Device connection on loop line class A

4.2 OPERATION AND CHARACTERISTICS OF CONNECTION WITH CLASS A

The loop connection ensures the integrity of the system also in case of malfunctioning due to the opening or short circuit of the detection line.
In normal operating conditions the control panel communicates with the detectors by sending a code from both loop sides, therefore a possible line opening does not affect communication: in such a case, the control panel gives notice of the occurred opening, but the system keeps on working. In the event of line short circuit, the short circuit insulators fitted on the line devices allow the insulation of the line section affected by the short circuit, without losing any devices.
Should the short circuit affect a device, the insulators will isolate the line in order to automatically exclude the device and signal, in addition to the detected short circuit, also a fault due to lack of communication with the isolated device.

For example, with reference to Figure 2, if a short circuit occurs between device 2 and device 3, the action of the insulators enables the system to isolate the line section between the devices under consideration.
Device 2 will be powered by “side A” of the line module, while device 3 will be powered by “side B” of the line module.
No device will be lost and the short circuit will be isolated.

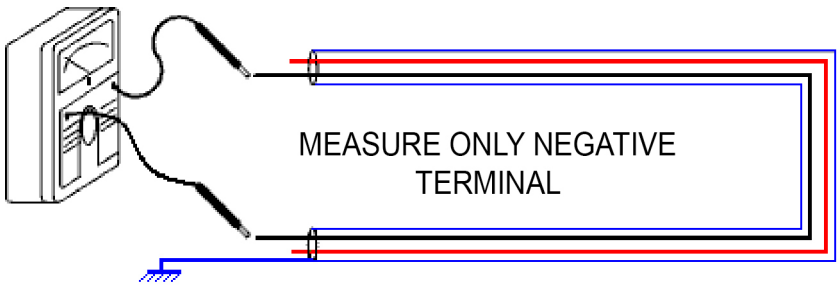
Instead, if the short circuit occurs on device 2, the insulators will isolate the line section upstream (between devices 1 and 2) and downstream (between devices 2 and 3).
Device 1 will be powered by “side A” of the line module, while device 3 will be powered by “side B” of the line module.
In this case device 2, where the short circuit occurred, will be lost.
The control panel will signal, in addition to the detected short circuit, also the lack of communication with device 2.

In class A connections no “T” shunting is admitted.

Loop line electric characteristics

- Suggested cable: 2 x 1.5 mm² shielded.
- Max loop line total length: 2000 m
- Cable total resistance: less than 100 Ω

To find out the line cable resistance, short circuit one end of the two wires and measure the opposite end with an ohmmeter.



4.3 OPEN LINE CONNECTION – CLASS B

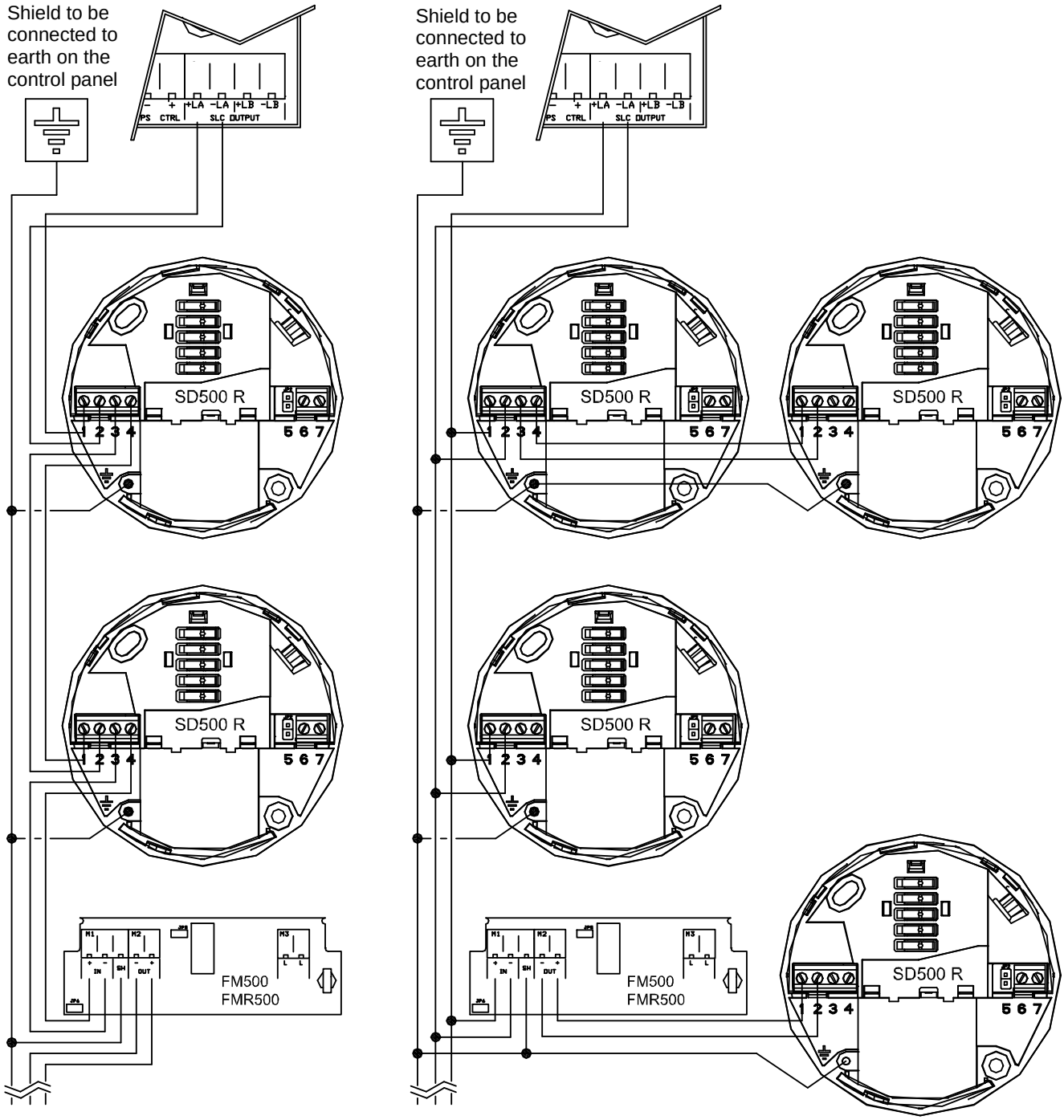


Figure 3 - Device connection on open line class B

The picture on the left shows a series type connection. The picture on the right shows a parallel type connection.

Note that the execution of autoaddressing procedures on series type connections guarantees the assignment of consecutive addresses to the points.

4.4 OPERATION AND CHARACTERISTICS OF CONNECTION WITH CLASS B

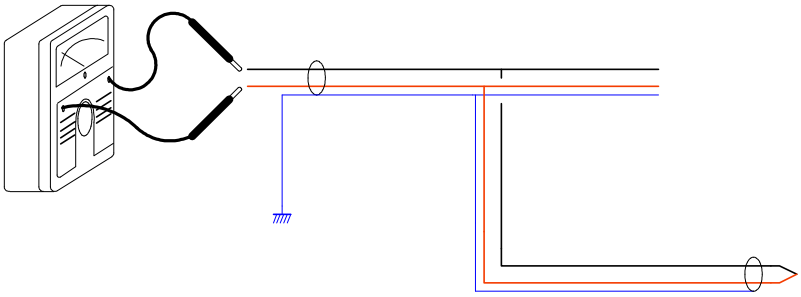
The connection with open line or class B ensures a higher flexibility of installation compared to that with loop line. However, the system can still signal malfunctioning due to the opening or short circuit of the detection line. As for the loop line, the opening of a line section implies the lack of communication with the device/s, therefore the control panel will signal it as field fault. In case of short circuit, the insulator upstream will isolate the line section downstream and the control panel will give notice of the lack of communication with the isolated devices.
It is important to point out that on each line section max 32 devices are admitted.

Open line electric characteristics

- Suggested cable: 2 x 1.5 mm² shielded.
- Max open line total length: 2000 m
- Cable total resistance: less than 100 Ω

NOTE: the max total length of the open line is the sum of the lengths of all the branches.

To find out the line cable resistance, short circuit the two wires at each branch terminal, and then use an ohmmeter to measure the wires to be connected with the control panel terminals.



NOTE: if on the detection line there are short circuit insulators, they shall be removed before carrying out measurement.

4.5 TEST PROCEDURE FOR DETECTION LINES

Before connecting the wires and the line cable shield with the line terminals of the control panel, check the following:

- Electric resistance of the detection line which must be below 100 Ohm.
- Electric insulation between the single detection line wires and the line cable shield.
- Electric insulation between the line cable shield and the earth wire.
- Connect the wires and the line cable shield with the control panel terminals and the earth connection point.

NOTE: the connection of the line cable shield with the earth point shall be carried out in the control panel and only with a cable end.

5 ADDRESSING

FAP54 control panels can manage up to 128 devices for each detection line.

The devices can be addressed in manual mode or in a completely automatic mode.

In case of manual addressing, the following constrains are applied:
- The address is univocal and no duplicates are admitted, even on a different line section.
- Valid addresses are in the range 1-128
- There is no correlation between device type and address.
- Progressive addressing is not necessary, addresses can be assigned in any sequence.

To manually address a device use the feature “CONFIGURE LOCAL DEVICE”. See the programming manual for further details.

In case of automatic addressing it is possible to:
- address one single line
- address simultaneously all the lines

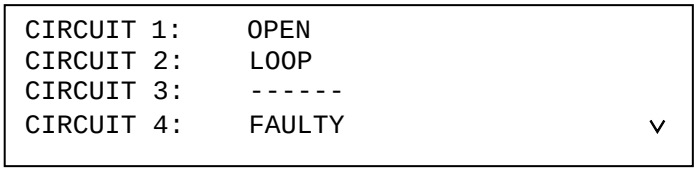
In both cases it is necessary to define the type of line:
- Open
- Loop

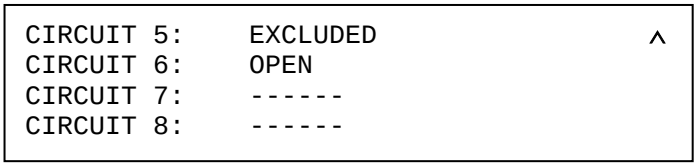
To enable automatic addressing follow the steps below:
- Press the menu key
- Select programming (option 1)
- Press “OK” to confirm selection
- Select “1” to select the “Circuit” menu
- Select “1” to configure all the circuits
- Select “2” to configure the single circuit
- Select “3” to configure the circuit manually

5.1 CONFIGURE ALL THE CIRCUITS

The user can select the configuration of each circuit separately (loop or open).
Keys ∧ and ∨ are used to select the circuit, while keys **<** and **>** are used to select the type (open/loop). The latter can be selected only for present and working modules (neither faulty nor excluded).

If a module is not present, a dashed line will be drawn instead of the type.





After selecting the configuration of each circuit, press **OK** to move to the selection of the addressing mode:

```
[1] AUTO-ADDRESSED MODE
[2] PRE-CONFIGURED MODE
[3] UPDATE
```

The user can select separately:

Auto-addressed mode: the whole set of points is re-addressed according to the physical position occupied by each single point. The previous addresses are replaced by new addresses assigned by the control panel.

Pre-configured mode: the points in the field are acquired by the control panel without any change of their address. However, the control panel accepts only the points with valid addresses (1-128). A new or non-configured device is not accepted by the control panel which will abort the procedure.

Update: this type of initialization is used in case of system expansion. The previous points already configured are not changed, while the new ones are automatically assigned a valid address, starting from the first available one.
If any point of the previous configuration is removed, the control panel will automatically assign the address of the removed point to a new device.

If the auto-addressed mode is selected, a further confirmation is requested before proceeding:

```
 WARNING! THIS PROCEDURE AFFECTS
 THE ADDRESSES OF THE DEVICES

[OK] CONTINUE                [ESC] BACK
```

Actually, if this procedure is carried out accidentally on a configured system it will result in the loss of the pre-existing configuration, as this procedure implies the re-assignment of the addresses to all the points in the field.

Regardless of the selected initialization mode, at the end of initialization the following information will be displayed:

```
 |01  |02  o03  o04 |05  |06  o07  o08
 010  000  011  MNP 000  ER2  005  000
 |09  |10  |11  |12 |13  |14  |15  |16
 MNP  ER1  MNP  100 056  EXCL EXCL ER3
```

This screen summarizes the circuit type (open/loop) and the outcome of the procedure for each circuit (the example shown refers to a control panel with 16 circuits) according to the following rules:

CXX
YYY

The configuration is represented by symbol C, which can be:
- | = open circuit configuration
- o = loop circuit configuration

XX is the circuit number

The procedure outcome is represented by the string YYY, which can take the following values:

a numerical value: the procedure for circuit XX has been successfully completed and YYY points have been detected on the line

ER1: a module error has occurred during the procedure execution
ER2: a line error has occurred (field fault) during the procedure execution
ER3: a procedure error has occurred during the procedure execution
MNP: the module is not present
EXCL: the module is excluded

For example, by referring to the example shown above, at the end of the procedure:

- Circuit 1 has been initialized correctly in open mode and 10 points have been detected on the line
- Circuit 2 has been initialized correctly in open mode and there are no points on the line
- Circuit 3 has been initialized correctly in loop mode and 11 points have been detected on the line
- module 4 is not present
- Circuit 5: remarks similar to circuit 2
- Circuit 6, in open mode, has not been initialized correctly because of a line error
- …
- Circuit 15 is excluded
- Circuit 16, in open mode, has not been initialized correctly because of a procedure error.

Therefore, possible errors affecting on one or more circuits/lines do not compromise the procedure on the remaining circuits which will be completed successfully.
The circuits whose procedure has not been completed successfully shall be initialized individually to provide more accurate information on the failure reasons.

The initialization procedure consists of sub-procedures, some of which (usually the most burdensome in terms of time) can be interrupted by the user.
The user is allowed to interrupt/abort a procedure when the following message is shown:

```
PROCEDURE IN PROGRESS
  PLEASE WAIT
                    [ESC] ABORT
```

If the procedure is interrupted by the user, the control panel will carry out the following operations on each module:

- restore of the previous configuration, if either pre-configured or update initialization mode has been selected
- **cancellation of the previous configuration, if the auto-addressed initialization mode has been selected; in such a case, then, the configuration of the whole system is cancelled.**

The same operations will be carried out on the modules where the procedure has been terminated with an error (codes ER1, ER2, ER3 described previously).

If the procedure is not interrupted by the user and completes successfully, by pressing **OK** in the summary screen the following menu is shown:

```
PROCEDURE COMPLETED
[1]   DELETE ALL ASSOCIATIONS
[2]   DELETE EXPIRED ASSOCIATIONS
[ESC] BACK
```

This menu is necessary because the initialization of an existing system may lead to a change of addresses and/or removal of detectors or output modules previously associated with zones and/or groups. Therefore, it might be necessary to cancel completely all the existing associations or simply cancel those no longer valid, i.e. the ones whose points are not longer present or have acquired an incompatible type with the association itself (e.g. after auto-addressing a system already configured, an output module and a device might exchange their addresses).
The menu above gives the user the possibility to choose whether to carry out these association cancellation/update operations.

The circuit initialization carried out on a pre-existing configuration, therefore, can change the type of the devices already present.

5.2 CONFIGURE SINGLE CIRCUIT

The user is asked to insert the number of the circuit to be initialized:

```
CIRCUIT:
```

After entering and confirming with **OK** the circuit number, the user is asked for the type of configuration:

```
[1] SET SINGLE CIRCUIT IN LOOP MODE
[2] SET SINGLE CIRCUIT IN OPEN MODE
```

After selecting the circuit configuration, the initialization mode is requested.
The initialization modes depend on the circuit configuration.

If the loop configuration has been selected, the following circuit configuration menu is displayed:

```
[1] AUTO-ADDRESSED MODE
[2] PRE-CONFIGURED MODE
[3] UPDATE
```

If the open configuration is selected, the following options are displayed:

```
[1] AUTO-ADDRESSED MODE
[2] PRE-CONFIGURED MODE
[3] UPDATE
[4] WALK ADDRESSING
```

Auto-addressed mode: the whole set of points is re-addressed according to the physical position occupied by the single point. The previous addresses are replaced by new addresses assigned by the control panel.
Pre-configured mode: the points in the field are acquired by the control panel without any change in their address. However, the control panel accepts only the devices with valid addresses (range 1-128). A new or non-configured device is not accepted by the control panel which will abort the procedure.
Update: this type of initialization is used in case of system expansion. The points already configured are not changed, while the new ones are automatically assigned a valid address, starting from the first available one. If any addresses of the previous configuration are removed, the control panel will automatically assign the address of the removed point to a new device.
Walk addressing: this type of initialization is carried out by removing and then reconnecting the points, one by one. The points will be assigned the addresses in the order they have been removed.
The condition required to enable this type of initialization is that all the devices are already wired and connected in pure parallel (if modules or pushbuttons are used, insert the input/output short circuit jumper).
The operator shall remove one device at a time, keep it removed for at least 5 seconds and then put it back (for pushbuttons and modules, remove the related power supply jumper). After the device has been reconnected, wait for the green LED blinking to confirm the address assignment.

For the auto-addressed mode the same considerations made in the case of configuration of all the circuits can be applied. The user will be asked for a further confirmation before proceeding:

```
    WARNING! THIS PROCEDURE AFFECTS
      THE ADDRESSES OF THE DEVICES

 [OK]  CONTINUE            [ESC] BACK
```

During the initialization process in auto-addressed, pre-configured or update mode, the user will be notified of the number of points currently acquired with the following message:

```
          PROCEDURE IN PROGRESS
               PLEASE WAIT
N. POINTS: XXX                [ESC] ABORT
```

At the end of initialization in auto-addressed, pre-configured or update mode, the circuit hardware configuration will be displayed along with all the points detected on the selected line, subdivided according to quantity and type.
The type “ER” refers to devices with communication problems with the control panel or devices with duplicated addresses.

The type “??” refers to a device whose address is recognized by the control panel, but whose type is not valid for the control panel.

```
 CONFIGURATION CIRCUIT:XX    TYPE: XXXXX
 TOT.PTS: XXX
  XXX/SM  XXX/HT  XXX/OM  XXX/CM
  XXX/MN  XXX/GS  XXX/LN  XXX/SH      v
```

```
 CONFIGURATION CIRCUIT:XX    TYPE: XXXXX
 TOT.PTS: XXX
   XXX/LI  XXX/PI  XXX/XS  XXX/TB     ^
   XXX/CI  XXX/IS  XXX/ER  XXX/??
```

By pressing **ESC**

- The configuration before initialization is restored if the pre-configured or update mode is selected.
- **The configuration is cancelled if the self-addressed mode is selected.**

By pressing **OK**, the new configuration will be confirmed and stored.

At the end of storage, it is possible to delete all the associations or only the ones no longer valid (the same considerations made for the configuration of all the lines are valid in this case):

```
CONFIGURATION STORED
 [1]   DELETE ALL THE ASSOCIATIONS
 [2]   DELETE EXPIRED ASSOCIATIONS
 [ESC] BACK
```

If the walk addressing mode is selected, a further confirmation will be asked to the user:

```
 WARNING!  THIS  PROCEDURE  IS  VALID  ONLY
 FOR DEVICES CONNECTED IN PURE PARALLEL

[OK] CONTINUE                [ESC] BACK
```

If the user confirms with **OK**, the procedure will be started and the following message displayed:

```
           PROCEDURE IN PROGRESS

********************************
[OK]  FINISH                 [ESC] ABORT
```

By pressing **ESC**, the procedure is interrupted and the control panel cancels the circuit configuration. Cancellation is due to the fact that the walk addressing mode changes the addresses of the devices in the field which now are misaligned with a possible old configuration potentially restorable by the control panel.

By pressing **OK**, the control panel is informed that the procedure is finished (the operator has removed and then re-inserted each single device in the order he wanted them to be addressed).

In this last case the screen will display the devices initialized up to that moment, subdivided per type and number.

```
CONFIGURATION CIRCUIT: XX   TYPE: XXXXX
TOT. PTS: XXX
  XXX/SM  XXX/HT  XXX/MU  XXX/MC
  XXX/MN  XXX/GS  XXX/LN  XXX/SH     v
```

```
CONFIGURATION CIRCUIT: XX   TYPE: XXXXX
TOT. PTS: XXX
  XXX/LI  XXX/PI  XXX/XS  XXX/TB     ^
  XXX/CI  XXX/IS  XXX/ER  XXX/??
```

By pressing **ESC** the configuration is cancelled. By pressing **OK** the new configuration is confirmed and stored.

At the end of storage, it is possible to delete all the associations or only the ones no longer valid:

```
CONFIGURATION STORED
[1]    DELETE ALL THE ASSOCIATIONS
[2]    DELETE EXPIRED ASSOCIATIONS
[ESC]  BACK
```

During the initialization procedure, regardless of the type of selected initialization, a module fault could occur. In such a case, the procedure will be interrupted and the following message will be displayed with:

- The number of the circuit connected to the line affected by the fault
- The error code (please, refer to Appendix 1 for further details)

```
FAULT ON CIRCUIT MODULE XX
ERROR CODE: YYY
```

If a procedure error occurs during the initialization procedure, it will be interrupted and the following message will be displayed with:

- The number of the circuit connected to the line affected by the fault
- The error code (please, refer to Appendix 2 for further details)
- The address or physical position of the device which has generated the error (depending on the procedure, this information could be present or not and, in the case it is present, its meaning is strictly related to the procedure)

```
ERROR ON CIRCUIT: XX
ERROR CODE: YYY
ADDRESS/POSITION: ZZZ
```

If an error related to the detection line (concerning specifically the field) occurs , the following message is displayed (please, refer to appendix 3 for further details):

```
FAULT ON CIRCUIT: XX
BMP1: 01234567       BMP2: 01234567
      ----**--              *-*-----
TYPE: XXXX           A = D---  B = D---
```

The phases of the initialization procedure which can be interrupted by the user are characterized by the following message:

```
          PROCEDURE IN PROGRESS
                PLEASE WAIT
N.POINTS: XXX                [ESC] ABORT
```

If the procedure is interrupted, the control panel carries out the following operations on the module involved:

- restore of the previous configuration, if the pre-configured or update initialization mode has been selected
- **cancellation of the configuration if the auto-addressed or walk-addressing initialization mode has been selected. Therefore, if the user interrupts the initialization procedure in auto-addressed or walk-addressing mode, any configuration stored in the module before the start of initialization procedure will be lost.**

The above operations will be carried out as well on modules where the procedure has been terminated with errors.

6 APPENDIXES

6.1 APPENDIX 1: ERROR CODES FOR CIRCUIT MODULE

The table below reports the error codes for the circuit modules and the relevant explanation:

Code	Fault
1	Access error to the non volatile memory of the module
2	Program supervision error (1)
3	Fault in the output analog section of the module
4	The module does not answer to commands
5	Module removed
6	Module reset
7	Unexpected answer from the module (1)
8	Unexpected answer from the module (1)
9	Unexpected answer from the module (1)
10	Unexpected answer from the module (1)
11	Unexpected answer from the module (1)
12	Unexpected answer from the module (1)
13	Module is blocked (1)
14	Module not usable because of a serious line fault (e.g. short circuit, overload)
15	Fault in the module transmitter
16	Fault in the module transmitter
17	Data memory corrupted (1)
18	System memory corrupted (1)
19	System memory corrupted (1)
20	Code memory corrupted
21	Non volatile memory corrupted (1)

(1) Please, contact the ELKRON Customer Service.

6.2 APPENDIX 2: PROCEDURE ERROR CODES

The table below reports the error codes returned by the circuit module after the failure of a procedure.

Code	Error
0	Auto-addressed loop mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit module and the points connected directly with LA and LB.
1	Auto-addressed loop mode initialization: unexpected voltage on line LB. A voltage on LB terminals has been detected at the beginning of the initialization procedure; this voltage is probably due to an unwanted connection between line LA and line LB (please, note that it is necessary to place at least one point in series between LA and LB).
2	Auto-addressed loop mode initialization: lack of 4 consecutive addresses to assign to a multiple I/O module.
3	Auto-addressed loop mode initialization: missing answer in current from the point or open line. The procedure completes correctly when a voltage on LB is detected.
5	Auto-addressed loop mode initialization: missing answer from a point with invalid address. The module could not communicate with the point: check the electrical connections.
6	Missing answer from a point with valid (1–128) address. The module could not communicate with the point: check the electrical connections.
7	Auto-addressed loop mode initialization: circuit fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
8	Auto-addressed loop mode initialization: maximum number of points reached and lack of voltage on LB. The procedure completes correctly when a voltage is found on LB; warning: do not overcome the limit of max 128 points per line.
10	Point too far from the circuit module cable too long or cable resistance too high).
11	Auto-addressed loop mode initialization: no answer from the point during the address assignment phase. Check the electrical connections after the point.
12	Auto-addressed loop mode initialization: point with random address not found. Check the electrical connections.
13	Procedure stopped by the control panel (a stop command has been received).
20	Pre-configured loop mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit module and the points connected directly with LA and LB.
21	Pre-configured loop mode initialization: unexpected voltage on line LB. A voltage on LB terminals has been detected at the beginning of the initialization procedure; this voltage is probably due to an unwanted connection between line LA and line LB (please, note that it is necessary to place at least one point in series between LA and LB).
23	Pre-configured loop mode initialization: missing answer in current from the point or open line. The procedure completes correctly when a voltage on LB is detected.
27	Pre-configured loop mode initialization: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
28	Pre-configured loop mode initialization: maximum number of points reached and lack of voltage on LB. The procedure completes correctly when a voltage is found on LB; warning: do not overcome the limit of max 128 points per circuit.
29	Pre-configured loop mode initialization: there is a point with invalid address. The procedure only works with points having valid addresses (range 1 – 128).
40	Update loop mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
41	Update loop mode initialization: unexpected voltage on line LB. A voltage on LB terminals has been detected at the beginning of the initialization procedure; this voltage is probably due to an unwanted connection between line LA and line LB (please, note that it is necessary to place at least one point in series between LA and LB).

Code	Error
42	Update loop mode initialization: lack of 4 consecutive addresses to assign to a multiple I/O module.
43	Update loop mode initialization: missing answer in current from the point or open circuit. The procedure completes correctly when a voltage on LB is detected.
46	Update loop mode initialization: missing answer from a point with valid (1 – 128) address. The module could not communicate with the point: check the electrical connections.
47	Update loop mode initialization: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
48	Update loop mode initialization: maximum number of points reached and lack of voltage on LB. The procedure completes correctly when a voltage is found on LB; warning: do not overcome the limit of max 128 points per line.
49	Update loop mode initialization: the maximum number of addressed points has been reached and there are other points not addressed yet on the line. **Warning**: do not overcome the limit of max 128 points per line.
50	Update loop mode initialization: reached the maximum number of generated random addresses. Repeat the procedure and/or manually address the points not yet addressed.
60	Auto-addressed open mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit module and the points connected directly with LA and LB.
61	Auto-addressed open mode initialization: unexpected voltage on line LB. A voltage on LB terminals has been detected at the beginning of the initialization procedure; this voltage is probably due to an unwanted connection between line LA and line LB.
62	Auto-addressed open mode initialization: lack of 4 consecutive addresses to assign to a multiple I/O module.
65	Auto-addressed open mode initialization: missing answer from a point with invalid address. The module could not communicate with the point: check the electrical connections.
66	Auto-addressed open mode initialization: no answer from a point with valid (1-128) address. The module could not communicate with the point: check the electrical connections.
67	Auto-addressed open mode initialization: Missing answer from a point with valid (1–128) address. The module could not communicate with the point: check the electrical connections.
70	Auto-addressed open mode initialization: unexpected voltage is found on LB while the procedure is in progress on line LA. Check that the detection line connected to LA is not connected to LB.
71	Auto-addressed open mode initialization: no answer from the point during the address assignment phase. Check the electrical connections after the point.
72	Auto-addressed open mode initialization: point with random address not found. Check the electrical connections.
80	Pre-configured open mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
87	Pre-configured open mode initialization: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
88	Pre-configured open mode initialization: maximum number of points reached. **Warning**: do not overcome the limit of max 128 points per line.
89	Pre-configured open mode initialization: there is a point with invalid address. The procedure only works with points having valid addresses (range 1 – 128).
100	Update open mode initialization: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit module and the points connected directly with LA and LB.
102	Update open mode initialization: lack of 4 consecutive addresses to assign to a multiple I/O module.
106	Update open mode initialization: missing answer from a point with valid (1–128) address. The module could not communicate with the point: check the electrical connections.

Code	Error
107	Update open mode initialization: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
108	Update open mode initialization: maximum number of points reached. **Warning**: do not overcome the limit of max 128 points per line.
109	Update open mode initialization: the maximum number of addressed points has been reached and there are other points not addressed yet on the line. **Warning**: do not overcome the limit of max 128 points per line.
110	Update open mode initialization: reached the maximum number of generated random addresses. Repeat the procedure and/or manually address the points not yet addressed.
111	Update open mode initialization: the line is empty. Check the electrical connections.
160	Procedure of point programming: no answer from the point
180	Walk addressing: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
182	Walk addressing: lack of 4 consecutive addresses to assign to a multiple I/O module.
184	Walk addressing: simultaneous answer from more than one point. Check the electrical connections, the connection of the detectors on their base and the power supply jumpers for each single module and push button.
186	Walk addressing: missing answer from a point with valid (1 – 128) address. The module could not communicate with the point: check the electrical connections.
193	Walk addressing: procedure stopped because of a stop command coming from the control panel.
200	Search for multiple addresses procedure: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
201	Search for multiple addresses procedure: found a duplicated address.
205	Type match verification procedure: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
206	Type match verification procedure: mismatch between the configuration stored in the control panel and the configuration in the field.
207	Search short circuit: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
208	Search short circuit: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
209	Search short circuit: no answer from the point. Check the electrical connections.
210	Search short circuit: no answer from the point. Check the electrical connections.
211	Search short circuit: unexpected voltage on line LB. A voltage on LB clamps has been detected at the beginning of the procedure; this voltage is probably due to an unwanted connection between line LA and line LB (please, note that it is necessary to place at least one point in series between LA and LB).
212	Search short circuit: line fault (overload / short circuit) after brand new point addressing or acquisition. Check the electrical connections after the point.
213	Search short circuit: simultaneous answer from more than one point. Check the addressing of the points (possible presence of duplicated addresses).
214	Search open loop: line fault (overload or shortcircuit) at power on. Check the electrical connections among the circuit line card and the points connected directly with LA and LB.
215	Search open loop: unexpected voltage on line LB at power on. A voltage on LB terminals has been detected at the beginning of the initialization procedure; this voltage is probably due to an unwanted connection between line LA and line LB.
216	Search open loop: line fault (overload / short circuit) after point addressing or acquisition. Check the electrical connections after the just addressed/acquired point.
217	Search open loop: missing communication with the point. Check the electrical connections.

Code	Error
218	Search open loop: missing communication with the point. Check the electrical connections.
219	Search open loop: no answer from the point and lack of voltage on line LB, The last point which answered is located just before the section where the loop is open.
220	Search open loop: line fault (overload / short circuit) after brand new point addressing or acquisition. Check the electrical connections after the point.
221	Search open loop: simultaneous answer from more than one point. Check the address assignment (there could be duplicated addresses).

6.3 APPENDIX 3: CIRCUIT FAULT BITMAPS

If a circuit fault occurs during an initialization procedure on a single circuit, the following screen will be displayed:

```
FAULT ON CIRCUIT: XX
BMP1: 01234567       BMP2: 01234567
      ----**--              *-*-----
TYPE: XXXX           A = D---  B = D---
```

Where are indicated:

- number of the circuit affected by the fault
- bitmaps with fault codes. The bits set are represented by asterisks and indicate the faults occurred, according to the following decoding table:

BMP1
Bit 0 - Fault on circuit A (1) isolated at terminals LA for short circuit/overload
Bit 1 - Fault on circuit B (2) isolated at terminals LB for short circuit/overload
Bit 2 - Fault on circuit A (1) isolated at the point XXX for short circuit/overload
Bit 3 - Fault on circuit B (2) isolated at the point XXX for short circuit/overload
Bit 4 - Fault: open circuit (positive cable)
Bit 5 - Fault: open circuit (negative cable)
Bit 6 - Unexpected voltage present on circuit A (1)
Bit 7 - Unexpected voltage present on circuit B (2)
BMP2
Bit 0 - Positive cable resistance too high
Bit 1 - Negative cable resistance too high
Bit 2 - Overload on circuit A (1)
Bit 3 - Overload on circuit B (2)
Bit 4 - Short-circuit on circuit A (1)
Bit 5 - Short-circuit on circuit B (2)
Bit 6 - Main voltage missing
Bit 7 - Not used

- circuit configuration (open / loop)
- A = D --- and B = D - - -, which indicate:
  - the address involved in the fault in case of open configuration
  - the physical position of the point involved in the fault in case of loop configuration

ELKRON
Tel. +39 011.3986711 - Fax +39 011.3986703
Milano: Tel. +39 02.334491- Fax +39 02.33449213
www.elkron.com *– mail to: info@elkron.it*