TFA1-298

Analog fire detection system

Installation

Release:	3.0
FW release:	2.0.00
Models:	TFA1-298
Programming SW release:	5.4
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Language:	English

Tecnofire® DETECTION
by Tecnoalarm®

CONFORMITY

The manufacturer, Tecnoalarm S.r.l., declares that the present equipment complies with the Directives LVD 2014/35/EU and EMC 2014/30/EU as well as the regulation CPR 305/2011.
The full text of the EU Declaration of Conformity is available at the following internet address: www.tecnofiredetection.com.

In addition, the manufacturer declares that the listed products are certified according to the following standards:

Control panels EN 54-2:1997 + A1:2006

TFA1-298 Certification number 0051-CPR-0444

Power supply EN 54-4: 1997 + A1:2002 + A2:2006

TFPS-5 Certification number 0051-CPR-0492

The certificates are available at the following internet address: www.tecnofiredetection.com.

The product features can be subject to change without notice. Unanthorized reproduction of distribution of this manual, or any portion of it, on any device and in any form, is prohibited. The contents of this manual may be subject to change without notice.

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1 - GENERAL REFERENCES

Premise
Before proceeding with the installation, read this manual thoroughly. It contains important references and instructions concerning the correct installation, operation and servicing of the fire alarm system.

Operational restrictions and purposes of a fire alarm system
It is fundamental to consider that a fire alarm system does not guarantee protection and immunity against material damages, of any kind and nature, caused or induced by fire. It is equally important that the fire alarm system must be installed and kept in a state of perfect functioning according to the instructions provided by the manufacturer.
The Tecnofire systems, designed for the detection, extinguishing, actuation, evacuation etc., are able to notify fire alarms promptly to the final user and/or the personnel in charge. The systems process the events automatically and, according to programming, transmit acoustic and/or telematic notifications apt to urge the evacuation of the premises, activate automatic control or extinguishing systems and eliminate all situations and events that may feed the fire, with the aim of guaranteeing the safety of the persons and safeguarding the property.

Installation requirements
Although this manual contains all the necessary procedures for a correct installation of the equipment, the interpretation and correct application of its contents requires adequate training of the technical staff in charge of the installation. In particular, the installer must have the necessary technical skills and acquaint himself with the valid European standards regarding both the general requirements for fire alarm systems and the specific provisions for installation, electrical safety and maintenance. In addition, he must have a thorough knowledge of the products, acquired through specific training at Tecnofire (division of Tecnoalarm S.r.l.).

Environmental requirements
The control panel and all the system components must be installed inside structures or buildings with climatic characteristics (temperature and non-condensing relative humidity) that comply with the standards applied during certification. Specific operating temperature and humidity values are indicated in the relevant technical data tables.

Usage requirements
To avoid damage to the equipment or, even worse, dangerous malfunctions in detecting fire and actuating the devices and systems that operationally dependent from the fire alarm system, it is mandatory to use only the components and devices indicated by Tecnofire. The interfacing with third-party systems must be made with Tecnofire input and output modules, verifying each time the full compatibility. If in doubt, always refer to the Tecnofire technical support service.

Technical support
The technical support service of Tecnofire provides assistance in answering technical questions regarding the installation, functioning and operation of the Tecnofire products.

Power supply
In the planning phase, to ensure the autonomy of service requested by the standards, it is important to size the primary (mains power) and secondary (battery) power supply correctly.
It must be considered that, in case of power failure, the system ensures functioning by means of batteries for a limited period of time, the length of which depends on the capacity and the state of efficiency of the batteries.

Induced damage
Prior to working on any system component, in order not to cause damage while installing or servicing the equipment, always disconnect both the primary (mains power) and secondary (battery) power supply of the system. To avoid damage caused by electrostatic discharges, handle the electronic boards of the devices with care and avoid direct contact with the electronic components.

Periodic maintenance

To guarantee the efficiency of the fire alarm system, it is necessary to provide for an appropriate maintenance program.
The frequency of maintenance depends on different aspects, however, it is recommended to have the system serviced at least once every 6 months. The maintenance operations should be carried out by specialized technical staff. It is assumed that those who designed and installed the system have the necessary information and knowledge to perform proper maintenance.
The maintenance guidelines are prescribed by the European standards.

The most important controls include:

- Checking the operational state of the primary (mains power) and secondary (battery) power supply of the control panel and of the auxiliary power supplies
- Checking the operational state of the batteries and self-powered devices (sirens and telephone transmitters)
- Checking the functional efficiency of the detectors
- Checking the functional efficiency (cleanliness) of the smoke chamber of the optical detectors
- Checking the functional efficiency of the control panels and repeaters
- Verifying the efficiency of the acknowledgment, evacuation and system reset procedures
- Checking the functional efficiency of the manual call points
- Checking the functional efficiency of the optical-acoustic alarm devices
- Checking the functional efficiency of the alarm transmission equipment (ATE)
- Verifying the efficiency of the actuations through the input and output modules
- Verifying the correct coupling of the cables to the terminals
- Drafting of the final inspection report

2 - SYSTEM RESOURCES

The TFA1-298 control panel manages 1 detection loop.

General specifications	TFA1-298
Repeaters	5
Detection loops	1
Detectors per loop	199
Modules per loop	99
Zones	150
Virtual zones	100
Access periods	8
Access levels	4
Codes	10
Formulas	100
Alarm plans	50

The TFA1-298 addressable fire alarm panel is designed and manufactured in accordance with the standards EN 54-2:1997 + A1:2006 (control panel) and EN 54-4:1997 + A1:2002 + A2:2006 (power supply).

It was designed under a quality system certified ISO 9001 that involves the application of a set of rules for the design and all subsequent activities necessary for the production. All the components of the equipment were selected for the intended purposes. Their specifications are guarenteed, if the environmental conditions outside the casing correspond to those specified for the class 3K5 of the standard EN 60721-3-3:1995.

The control panel should be installed in indoor areas, monitoring of temperature and humidity is not required.

The control panel consists of a metal casing with space for two 12V/7.2Ah batteries, a CPU board, which integrates the user interface consisting of a display and a keypad, a switching 24V/2.7Ah power supply (ALSW2827) and a terminal board.

EN 54	**Warning:** the TFA1-298 control panel is certified with the following options with requirements from EN 54-2
7.8	Outputs to fire alarm devices
7.11	Output delays
7.12	Dependencies on more than one alarm signal (type B)
8.3	Failure signals from points
9.5	Disablement of addressable points
10	Test conditions

EN 54	**Warning:** the power supply of the TFA1-298 control panel is certified to the requirements of EN 54-4
5.1	Power supply from the main power source
5.2	Power supply from the stand-by power source (battery)
5.3	Battery charging and check
5.4	Recognition and signaling of power supply failures

3 - SYSTEM SPECIFICATIONS

The scope of the TFA1-298 control panel is to build analog systems for the automatic detection of fire, able to cover all the needs of small and medium-sized plants.

User interface

The front panel of the control panel hosts the user interface, consisting of 16 LED, a graphic color display and a keypad for management of the fire detection system. The user interface integrates also a voice synthesis function that uses a customizable vocabulary.

Access levels

The control panel manages 4 levels of access: level 1 (not protected by code), level 2 (user), level 3 (installation and maintenance personnel and level 4 (manufacturer).

Monitored system mode

The control panel provides for the monitored system mode, subject to the recognition of a level 2 code.
The monitored system mode is indicated by the relevant LED on the control panel and the relevant icon on the repeater panel.

System configuration

The configuration of the system can be performed locally through the control panel or remotely using a personal computer and the programming software.

Detection loop

The detection loop of the control panel can handle up to 199 detectors and 99 modules (maximum configuration in closed-loop mode).

Detectors

The control panel can directly manage the addressable detectors of the Tecnofire product line.
Conventional detectors can be managed through addressable interfaces.

Modules

The control panel can manage different types of specialized modules: input modules, output modules, sirens, call points, optical-acoustic alarm devices, additional power supplies.

Telephone communicator

A total of 5 external PSTN telephone communicators with optional GSM-GPRS interface can be connected for transmitting voice, SMS, GPRS notifications of alarms and signaling.

Repeater

The repeater panel has the task of repeating alarm signaling and decentralizing system management.
The repeater provides a 7 inches touch screen and a voice synthesis function.

Synoptic repeater

The synoptic repeater panel performs the same functions as the repeater and, in addition, it manages dynamically or on request up to 32 floor plans with up to 32 interactive icons each.

Additional power supply

The system provides for the use of additional power supplies, which allow to increase the power supply and autonomy of the system.
The power supplies can be freely distributed within the infrastructure of the loop. The Tecnofire power supplies are constantly supervised by the control panel and comply with the applicable standard EN 54-4-A2:2006.

Zones

Each zone may control 1 to 32 detection and/or actuation devices, typically detectors and modules (maximum number of devices defined by EN 54). The control panel controls up to 150 zones, which can be specialized as fire zones or technical zones.

Virtual zones

The control panel can manage up to 100 virtual zones. The virtual zone is an abstract set which includes detection and/or actuation devices, typically detectors and modules. The virtual zones do not cause any kind of alarm notification, but can be recalled as operands within formulas. The virtual zone may consist of devices, belonging to different loops and even to other virtual zones.

Formulas

The formulas determine the rules of behavior affecting the operation of the devices, on the basis of the dynamic behavior of the system.

Alarm plans

Each fire or technical zone can be associated with a specific alarm plan that, in the event of an alarm, is viewed by the control panel and the repeaters of the system.
The alarm plan informs the operators about the behavior and the measures to be taken to deal with the alarm in the specific zone.

Programmable outputs

In addition to the mandatory alarm, failure and reset outputs, the control panel features 2 programmable outputs. For each of them it is possible to program a function and the logic status (standard or reversed).

Access periods

The control panel manages 8 access periods that can be recalled as operands within formulas governing the operation of the output modules, sirens and optical-acoustic alarm devices. The access periods invoked within a formula perform the operation requested by the associated operand.
The access periods can also be used to enable the monitored system mode.

Customizable calendar

The control panel is equipped with a customizable four-year calendar that manages all the operations controlled by the clock.
It is possible to define weekdays, holiday eves, holidays and automatic Daylight Saving Time setting.

Personal computer interface

The control panel has an USB interface dedicated to the connection of a personal computer with which it is possible to perform, depending on the access level, all programming operations and the system firmware update.

Serial printer interface

The control panel provides a TTL port dedicated to connecting a PROG32 interface to which you can connect a serial printer.

Event buffer

The control panel stores in its non-volatile buffer up to 8192 events in descending chronological order.
The memory contents can be displayed via the control panel or sent to the printer through the TTL port. Events can be displayed and filtered by the software. For this, the events are downloaded and saved in a log file on the software.

Communication analysis

The control panel constantly supervises all communications among the devices that make up the system and registers possible errors.

TFA1-298 - Technical specifications and functions

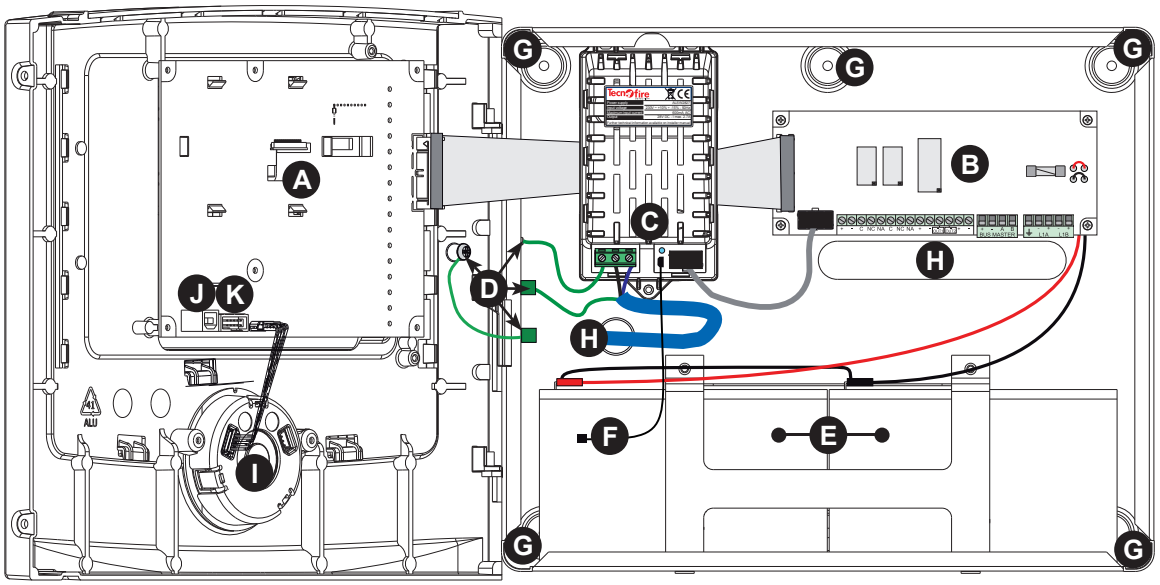
Detectors Modules Zones	Total connectable detectors	**199**
	Total connectable modules	**99**
	Total zones	**150**
	Virtual zones	**100**
CPU outputs	Hard-programmed relays	**2**
	Programmable open-collectors	**2**
	Controlled siren output	**1**
System features	True color TFT display	**480 x 272 pixels**
	Voice synthesis	**Customizable vocabulary**
	Detection loops	**1**
	RS485 serial bus	**Master Bus (1 port)**
	Event buffer capacity	**8192**
Access management	Access levels	**4**
	Access codes	**10**
	Monitored system mode	✓
Protocols	Detection loop	**Fire-Speed**
	RS485 serial bus	**Fire-Bus**
Automation	Formulas	**100**
	Alarm plans	**50**
	Access periods	**8**
	Calendar	**Quadrennial (programmable)**
Expandability	Serial expansions (max. 5)	**TFT-7**
		TFT-7S
		Telephone communicator
		Ethernet interface
	Serial printer	✓
Electrical specifications CPU	CPU power consumption	**200mA @ 24V DC**
	Electrical outputs	**Max. 50mA**
	Power supply voltage (loop, serial bus, sirens)	**20V...27.6V DC**

Modular power supply	Type	**A - switching**
	Operating voltage	**230V AC +10% -15% 50Hz**
	Power supply consumption	**600mA ac**
	Rated output current	**2,7A @ 27.6V dc ±2%**
	Max. current availble	**2.7A**
	Peak-to-peak ripple voltage	**≤230mV p-p**
	Battery protection fuse	**T 1A**
Battery	Capacity	**2 x 12V/7.2Ah**
	Flamme class	**V-2 or higher**
	Internal resistance	**Max. 1.5 ohm**
	Cut-off voltage	**<17.6V**
	Recharge time	**100% in 24h**
Physical specifications	Environmental class	**3K5 EN 60721-3-3:1995**
	Operating temperature	**-5° C...+40° C**
	Relative humidity (non-condensing)	**10%...93%**
	Protection class	**IP30**
	Casing	**Aluminium - Steel**
	Dimensions (L x H x D)	**361 x 301 x 107mm**
	Weight (without batteries)	**2.7Kg**
Conformity	Fire alarm panel	**EN 54-2:1997+A1:2006**
	Power supply	**EN 54-4:1997+A2:2006**
	Certification number	**0051-CPR-0444**
	Year of CE marking	**15**
	Number of declaration of performance	**015_TFA1-298**
	Notified body	**IMQ**

4 - WARNINGS FOR INSTALLATION

4-1 - Casing

A	Signaling LED	C	Function keys	
B	Display	D	Numeric keys	

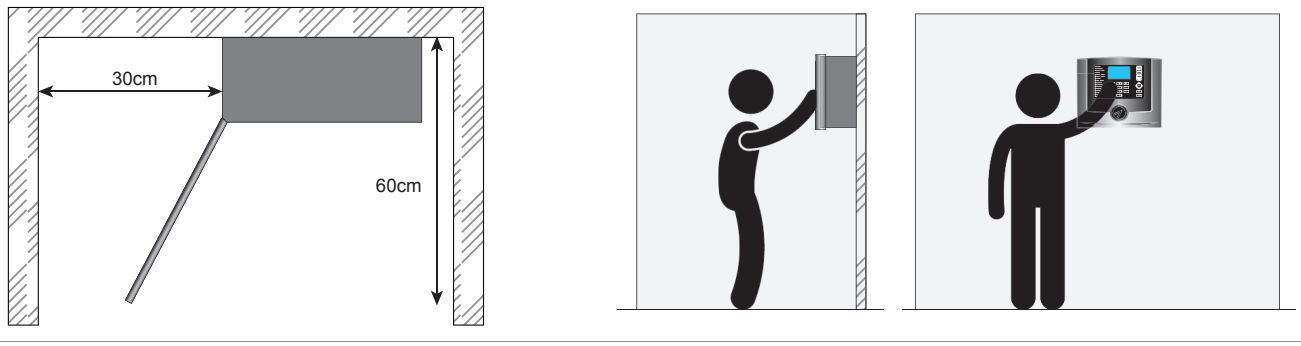


A	CPU board	E	12V/7.2Ah batteries	I	Speaker
B	Terminal board	F	NTC probe for battery temperature monitoring	J	USB port
C	ALSW2827 power supply	G	Mounting holes	K	TTL port
D	Ground connectors	H	Cable entry		

4-2 - Fixing of the casing

The casing of the control panel must be fixed in a position that guarantees adequate protection from accidental shocks and at a height that grants full access to the operator. Consider the space necessary for fully opening the casing door (approx. 60cm). Fix the casing horizontally on a solid surface using 4 dowels with 8mm diameter.

General warnings
For the safety of the operators protect the control panel, as any electronic device, against splashes and avoid placing recipients containing liquids next to it. The control panel must be installed so as to ensure adequate ventilation. Do not cover the device with things that may hinder correct heat dissipation.
Install the control panel at an adequate distance from heat sources (e.g. radiators) and any device that may cause electromagnetic disturbances (e.g. radio antennas).



4-3 - Connection cables

The cables to be used for the connections are defined by standards and installation regulations.
These are flame retardant, low smoke emission and halogen free cables.
The European standards specify the cables to be used for the construction of fire detection systems.
Among these standards we mention (non-exhaustive list):
EN 50200, EN 60228, EN 50363, EN 60332, EN 50267, IEC 60332, IEC 61034, IEC 6754.
The installer shall ascertain the current legislative requirements for his country.

For all the connections on the loop, it is recommended to use shielded multipolar twisted-pair cables with flexible conductors.
For selecting the loop and 24V power supply cables to be used, refer to the below table that indicates, based on the extension of the loop, the minimum section that must be observed.

MINIMUM CABLE SECTION			
Loop extension	**Minimum section required**	**Loop extension**	**Minimum section required**
750 meters	0.75mm²	1500 meters	1.5mm²
1000 meters	1mm²	3000 meters	2.5mm²

For reasons of electrical safety, the shieldings of the cables must be connected in order not to stop their path and must be grounded inside the casing of the control panel.

The maximum length allowed for the laying of the detection loop is 3000 meters, as defined by the low voltage directive LVD 2006/95/EU.

The maximum length allowed for the RS485 bus (Master Bus) is 1000 meters. For greater distances use a fiber optic connection by connecting a TFSFC01 RS485-fiber optic converter.

The relays and the electrical outputs of the control panel and its expansion devices form a SELV voltages network (EN 60950-1). These outputs can only be connected to circuits that comply with SELV voltages.

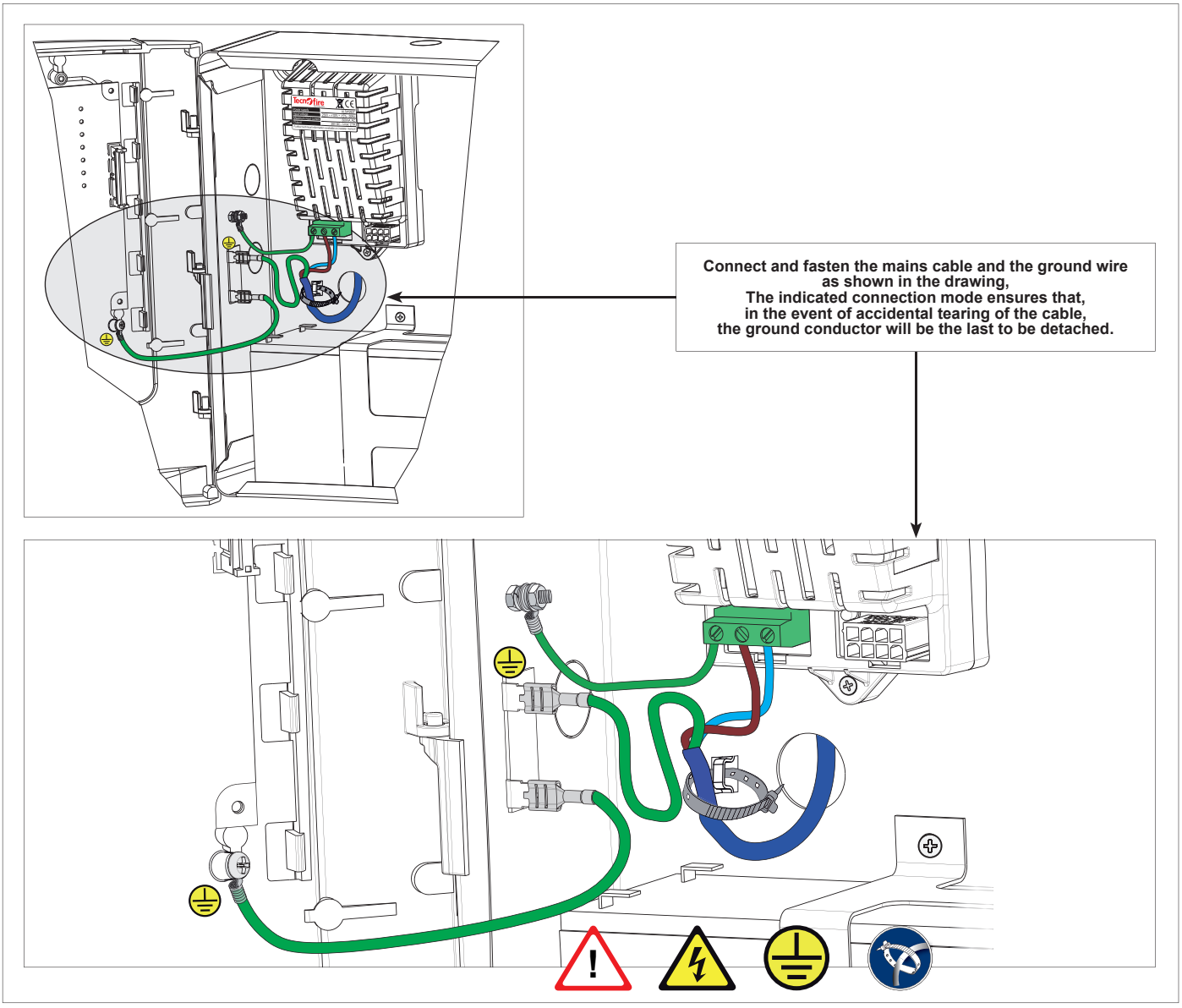
4-4 - Compliance with EN 60950-1- Electrical Safety

Ground connection
The ground connection must comply with the valid European standards.
It is mandatory to connect the ground conductor between the casing and the door.

External circuit breaker
The power supply of the control panel is not equipped with a circuit breaker. To guarantee accordance of the installation with the valid European standards, it is necessary to connect an external circuit breaker or a bipolar mains switch (16A curve C, opening stroke min. 3mm) in an accessible part of the electric installation (230V AC).
The circuit breaker must be installed close to the control panel and must be clearly labeled.

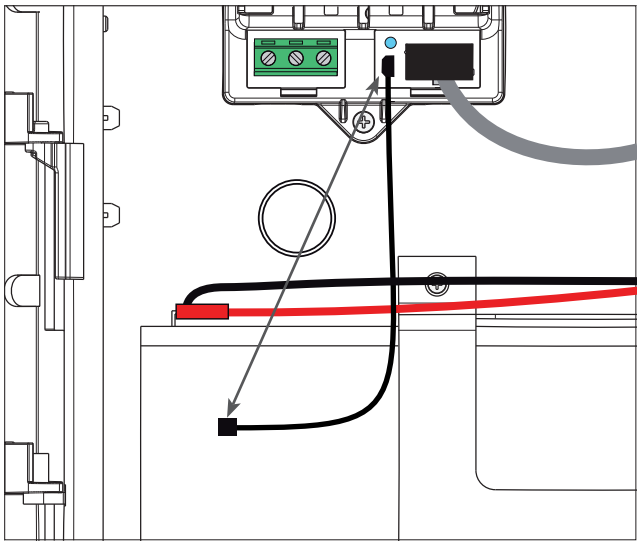
Mains connection (230V AC)
The mains cable is not included. To reduce the risk of electric shocks in normal operating conditions, observe the following precautions:

- Use a double insulated cable (with shielding) for the connection to mains power.
- The mains cable should have a diameter of minimum 3x 1.5mm^2 and, once it has been connected to the corresponding power input, it should be attached with a cable tie to the casing (see figure).
- To guarantee the electrical safety and correct functioning, always connect the ground conductor between the corresponding terminal and the threaded pin for ground connection and between the base and the door of the casing (see figure).



4-5 - Secondary power supply

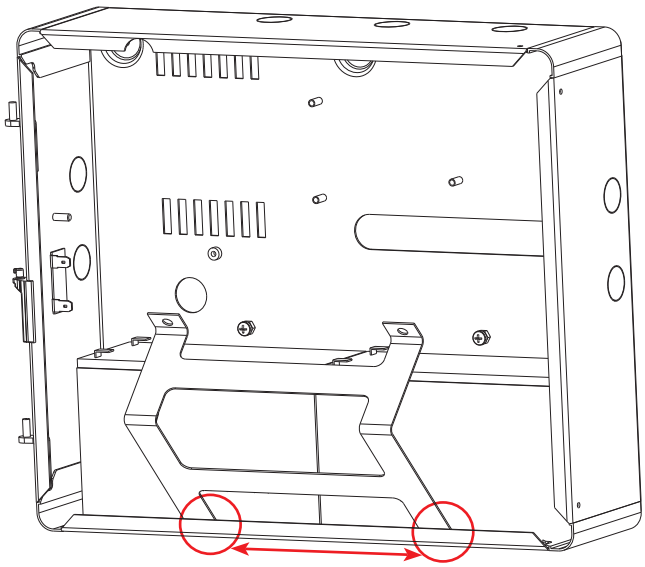
Battery information
The batteries must always be two. Never use batteries of different manufacturers and capacities. Capacities lower than 7.2Ah, besides reducing the autonomy, distort its resistance values causing possible improper failure signaling.
In accordance with the standards EN 54, it is mandatory to block the two batteries using the provided fixing bracket.
The bracket must be screwed on the casing.

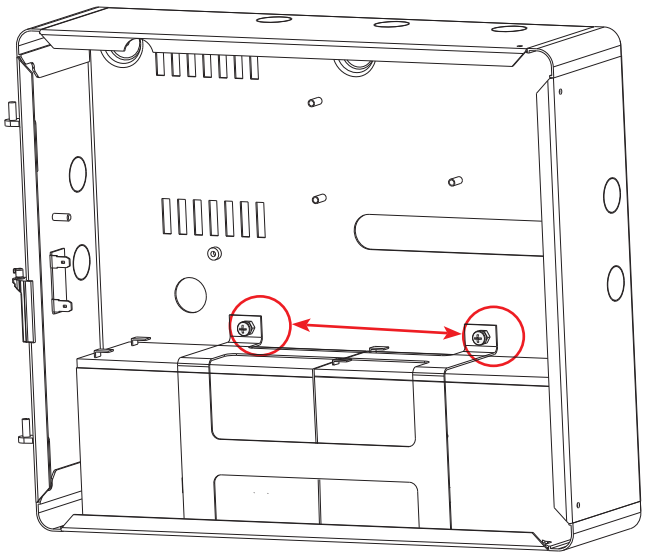


Self-regulation of the charging voltage
The power supply reads the temperature of the battery via the NTC (Negative Temperature Coefficient) probe and adjusts the charging voltage of the batteries according to the themperature measured. The NTC probe must be connected to the dedicated polarized connector, the sensing end of the probe should be attached to the battery casing using an electrical tape.

Automatic disconnection
In the absence of the primary power supply voltage (230V AC mains), the batteries automatically assume the power supply of the system. When the battery voltage drops to a value <18V for a duration of 15 minutes, the batteries automatically disconnect, to prevent their deep discharge and consequent functional degradation.

Battery bracket fastening
Insert the bracket into the two slots located at the bottom.
Rotate the bracket blocking the batteries and fasten the bracket using the supplied screws.

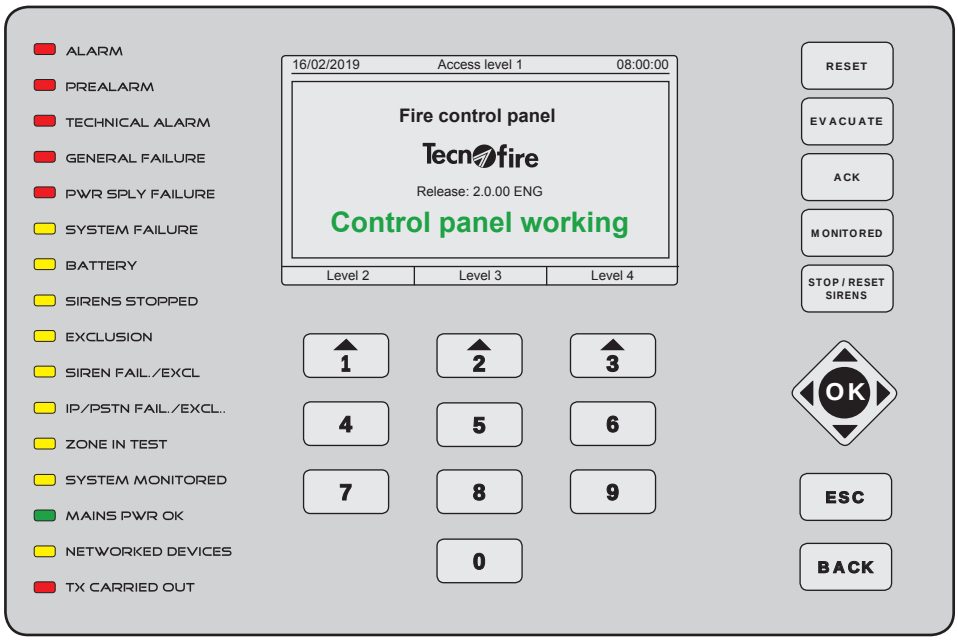




5 - USER INTERFACE

5-1 - Control panel

The user interface of the control panel consists of a 480 x 272 pixels TFT color graphic display, 16 signaling LED, 5 function keys, 7 navigation keys and 10 number keys, with which the user can manage the system. The user interface is completed by the speaker that, according to the functional states of the control panel, provides audible alarms or notifications by using the voice synthesis function.



5-2 - Access levels and codes

The control panel manages 10 access codes associated to 4 levels of access: level 1 (not protected by code), level 2 (user), level 3 (installation and maintenance personnel) and level 4 (manufacturer).

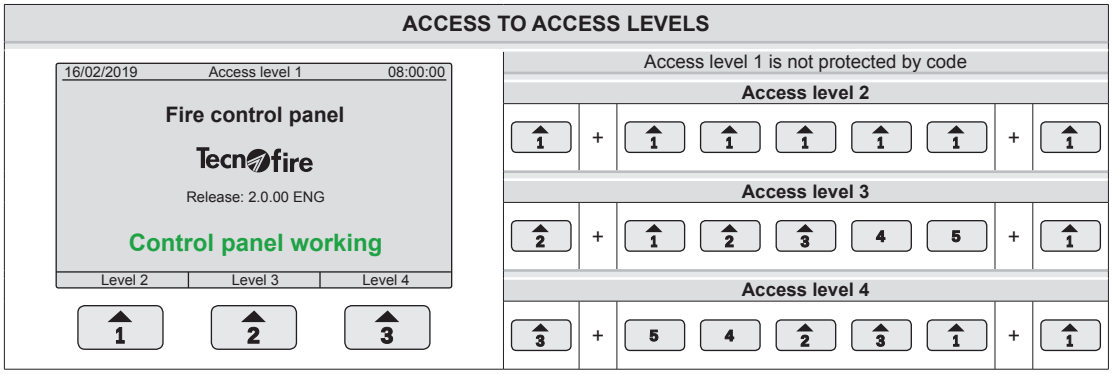
Level 1
In stand-by, the control panel provides access to the functions reserved to the level 1, without having to enter a code.
The access level 1 allows to perform the following operations:
A - Access the upper levels with the keys 1 or 2 or 3 and the relevant code (password)
B - Acknowledge the alarm pressing the **ACK** key
C - Display the acknowledged, the ongoing alarms and those stored in the event categories folders.

Level 2
To access level 2 press the key 1 and enter the relevant user code, then press the confirmation key.
At level 2, it is possible to perform all the operations of the level 1, plus the followings:
A - Reset the control panel pressing the **RESET** key.
B - Switch the operating state of the control panel (monitored/not monitored).
C - Manually activate an evacuation alarm.
D - Access the list of menus reserved to level 2.
E - Stop and reset the sirens.

Level 3
To access level 3 press the key 2 and enter the relevant installer code, then press the confirmation key.
Access to level 3 is reserved to staff authorized to edit important operating parameters.
At level 3 it is possible to perform all the operations of the levels 1 and 2 and to access the menus reserved to level 3 (system configuration menu)

Level 4
To access level 4 close the **JP5 KEY** jumper, press the key 3 and enter the manufacturer code, then press the confirmation key.
Access to level 4 is reserved to highly qualified personnel authorised by the manufacturer to carry out technical services of special importance.
At level 4 it is possible to perform all the operations of the previous levels and to access the menus reserved to level 4.

The following table shows how to enter the codes and access the different access levels:
Access level key + code + confirmation key.



5-3 - Function keys

The table describes the keys on the front panel of the control panel.

Key	Description	Operational sequence
RESET	Reset (deletion) of all prealarm, fire alarm, technical prealarm, technical alarm and failure notifications and reset of the control panel to normal operating condition.	**1 -** Press **RESET** **2 -** Enter level 2 code The LED and display notifications are cleared.
EVACUATE	Activation of the programmed procedure for the evacuation alarm, activation of the sirens and output modules programmed to be activated by the evacuation alarm procedure.	**1 -** Press **EVACUATE** **2 -** Enter level 2 code **3 -** Confirm the operation The **ALARM** LED turns on. The display shows **Evacuation**.
ACK	Acknowledges the alarms issued for prealarm, fire alarm, technical prealarm, technical alarm and failure. Moreover, the local speakers of all the control panels and repeaters are muted. **N.B.** The button does not mute the sirens and does not stop the external activation devices (output modules, sirens etc.).	**1 -** Press **ACK** The code is not required. The **ALARM** LED remains lit. The display alarm notifications remain visible.
MONITORED	Toggle of the **Monitored system mode**. **N.B.** This function only works if the option has been programmed.	**1 -** Press **MONITORED** **2 -** Enter level 2 code The **MONITORED SYSTEM** LED turns on or off: LED on = monitored, LED off = not monitored
Stop/RESET SIRENS	Stop and reset of all sirens programmed for prealarm, fire alarm, technical prealarm, technical alarm and failure as well as all external actuating devices (output modules, sirens etc.) if the acknowledgment function has been programmed for each of them.	**1 -** Press **STOP/RESET SIRENS** **2 -** Enter level 2 code The **SIRENS STOPPED** LED turns on.
OK	Navigation and confirmation keys. The arrow keys allow navigation of the menus. Depending on the context, you can change the displayed page and/or increase and decrease programming parameters. The **OK** key is to confirm the selection. ▲ Move the cursor up - Increase the value ▼ Move the cursor down - Decrease the value ◀ Move the cursor left - Decrease the value ▶ Move the cursor right - Increase the value OK Confirm the selection	
ESC	The **ESC** key allows to exit from the menu or displayed function.	
BACK	The **BACK** key allows to move the cursor to the previous position and erase its contents	
1 9	The number keys allow to enter the code and select the menus and devices in a direct way.	
1 2 3	Number keys 1, 2 and 3 are accompanied by an arrows up symbol. Depending on the context, they are numeric keys or pointing keys. The arrows indicate the pointing boxes displayed directly above them: access to level 2, 3 and 4.	

5-4 - Signaling LED

The table describes the functions and procedures for reporting of the LED on the front panel of the control panel.
As required by EN 54-2 provisions concerning light signals, the ON/OFF flashing frequency of the LED is:

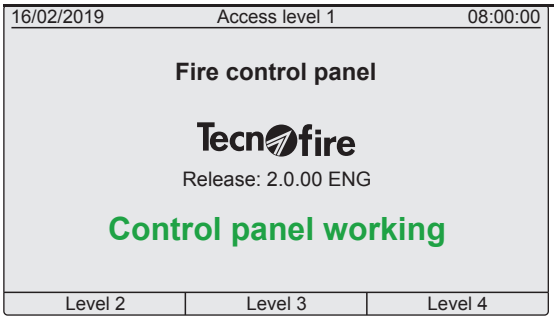
- 2.5s ON / 2.5s OFF (slow flashing) for failure
- 0.5s ON / 0.5s OFF (fast flashing) for alarm

LED	Color	Description	Signaling	
ALARM	Red	Fire alarm	Off	No alarm
			Flashing	Fire alarm active (not acknowledged)
			On	Fire alarm active (acknowledged)
PREALARM	Red	Fire prealarm	Off	No prealarm
			Flashing	Fire prealarm active (not acknowledged)
			On	Fire prealarm active (acknowledged)
TECHNICAL ALARM	Red	Technical prealarm and alarm	Off	No alarm
			Flashing	Technical alarm active (not acknowledged)
			On	Technical alarm active (acknowledged)
GENERAL FAILURE	Yellow	Failure	Off	No failure
			Flashing	Failure active (not acknowledged)
			On	Failure active (acknowledged)
PWR SPLY FAILURE	Yellow	Failure of the power supply of the control panel (insufficient current to power the control panel and/or to charge the batteries)	Off	No failure
			Flashing	Power supply check active
			On	Power supply failure active
SYSTEM FAILURE	Yellow	System failure	Off	No failure
			Flashing	System failure active (not acknowledged)
			On	System failure active (acknowledged)
BATTERY	Yellow	Low battery	Off	Battery OK
			Flashing	Low battery
			On	Battery failure or missing battery
SIRENS STOPPED	Yellow	General siren stop	Off	Sirens not stopped
			On	Sirens stopped
EXCLUSION	Yellow	Exclusion of system devices	Off	No device excluded
			On	At least one device excluded
SIREN FAIL./EXCL.	Yellow	Failure or exclusion of the sirens	Off	No siren excluded
			Flashing	Siren failure active (not acknowledged)
			On	Siren failure acknowledged or siren excluded
IP/PSTN FAIL./EXCL.	Yellow	Failure or exclusion of the alarm transmission equipment	Off	No ATE excluded
			Flashing	ATE failure active (not acknowledged)
			On	ATE failure acknowledged or ATE excluded
ZONE IN TEST	Yellow	Presence of zones under test	Off	No zone under test
			On	At least one zone under test
SYSTEM MONITORED	Yellow	Monitored system mode	Off	System not monitored
			On	System monitored
MAINS PWR OK	Green	Presence of mains power	Off	No mains power
			On	Mains power OK
NETWORKED DEVICES	Yellow	State of the connections between the devices connected on the RS485 bus	Off	RS485 communication OK
			Flashing	Communication error active (not acknowledged)
			On	Communication error active (acknowledged)
TX CARRIED OUT	Red	State of telephone notifications	Off	No telephone notification transmitted
			Flashing	Telephone notification transmission active
			On	Telephone notification transmitted successfully

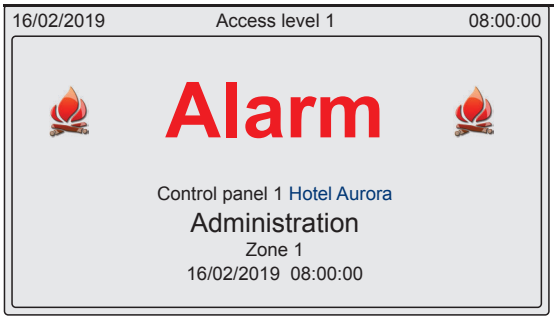
N.B. The lighting of each specific failure LED is always accompanied by the lighting of the general failure LED. If the automatic acknowledgment of failures is disabled, the power supply failure and battery LED remains visible until the alarms are acknowledged. In cases where the control panel is reset or not working, lighting of the two general failure and system failure LED is accompanied by a beep.

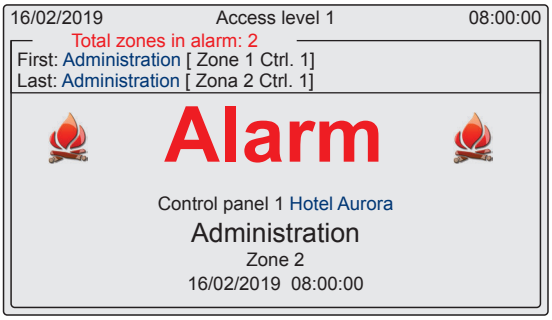
5-5 - Viewing of operating states

The display changes the display mode according to the operating state of the control panel, stand-by, active event and active acknowledged event.



Stand-by state
The display shows the date and time, the access level, the description given to the control panel, the firmware release, the operating mode and the pointing boxes of the access levels.

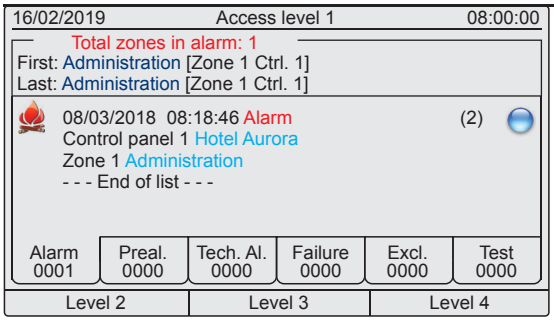




Active event
When the control panel collects an alarm notification, it enables the speaker and displays the category of the alarm: fire alarm, fire prealarm, technical prealarm, technical alarm or failure.

In addition to the blinking icons and the writing indicating the event, the display provides all necessary information to identify the source of the alarm: control panel name and number, name and number of the affected zone/device, description of the possible cause and date and time of the event.

If the control panel collects other alarm events before acknowledgment, the display automatically changes the view, highlighting the category and the source of the last alarm and listing the previous alarms at the top.



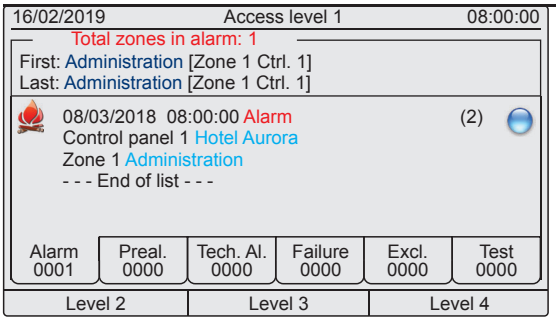
Active acknowledged event
The acknowledgment of an event causes the muting of the speaker and the automatic display of the contents of the storage folder of the acknowledged event.

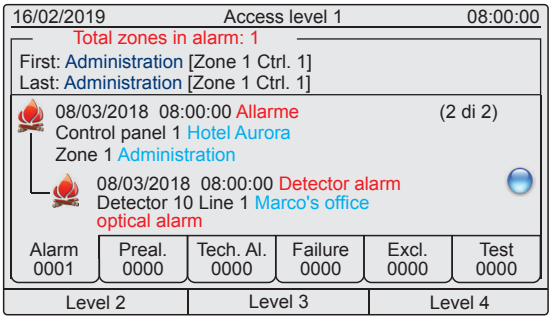
At the bottom, the display shows 6 folders in which the events are stored according to their category. Each folder provides a counter that displays the total number of events stored in it.

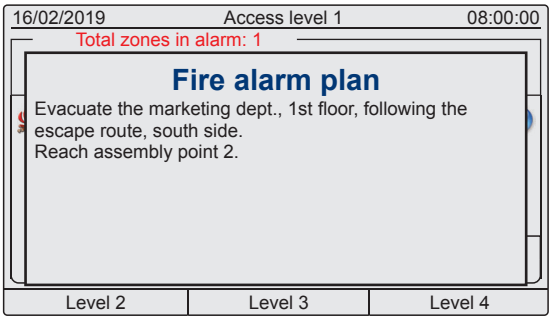
The folders are automatically displayed when at least one event is stored in them and they remain visible until the next reset of the control panel. The reset clears the folders and resets the counters.

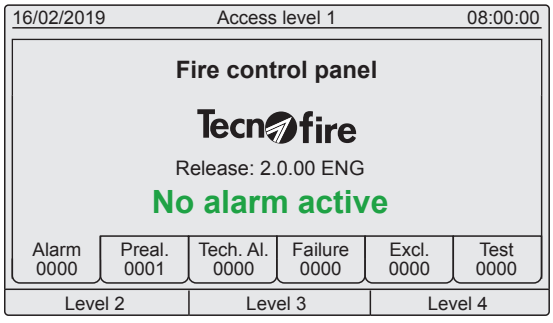
EVENT STORAGE FOLDERS					
Name	**Icon**	**Description**	**Name**	**Icon**	**Description**
Alarm 0000		The folder logs and counts all fire alarms divided by zone	**Failure 0000**		The folder logs and counts all zone and system failures
Preal. 0000		The folder logs and counts all fire prealarms divided by zone	**Excl. 0000**		The folder logs all excluded items (i.e. put out of service)
Tech.Al. 0000		The folder logs and counts all technical alarms and prealarms divided by zone	**Test 0000**		The folder logs all alarms recorded by the devices under test

N.B. The folders can contain up to a maximum of 8192 events. The folders are cleared and the counters are reset each time the control panel is reset.
The events remain stored in the event buffer of the control panel.









Consultation of the event storage folders

To view and browse the contents of the folders, use the navigation keys.

	▶	Select the next folder
	◀	Select the previous folder
	▼	Scroll the event list down
	▲	Scroll the event list up
	OK	Expand the display of the event pointed by the cursor
ESC		Exit the expanded view

Each event in the list is identified by the event type icon, date, time, alarm type and source.
The last event of the list is indicated by the words **End of list**.

N.B. Since the control panel controls the zones, the failures and the alarms of the individual detectors and modules are not added up in the count, but they are considered integral to the individual zones. Accordingly, for the events related to a zone, to the left of the cursor a number is displayed, indicating how many detectors and/or modules of the zone are affected by the event.
Selecting the event with the cursor and pressing the **OK** key the view of the zone is expanded showing the detail of the devices.

With the pointer over an event, pressing the acknowledgment key, the speaker issues the description of the event.

In the case of an alarm and if the zone has an associated alarm plan, by pressing again the acknowledgment key, a pop-up window appears that displays the text of the alarm plan.
The alarm plan remains visible for 10 seconds.
To exit the alarm plan display, press the **ESC** key.

If you select a folder whose counter shows a number other than 0000, as in the example the folder **Preal.**, the relative events are displayed.

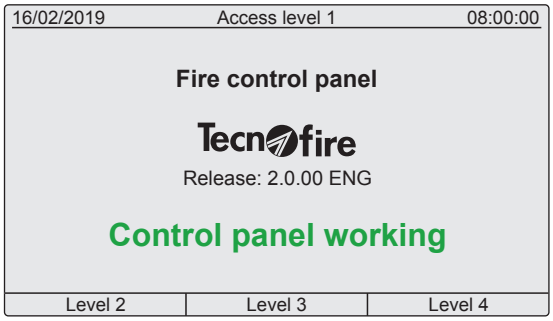
5-6 - Notification of operating states

The operating states of the control panel are notified optically and acoustically and according to the level of priority (see below table).

Priority level	Operating state	Priority level	Operating state
1	Fire alarm	**4**	Technical prealarm
2	Fire prealarm	**5**	Failure
3	Technical alarm	**6**	Stand-by

STAND-BY STATE - NO ALARM ACTIVE

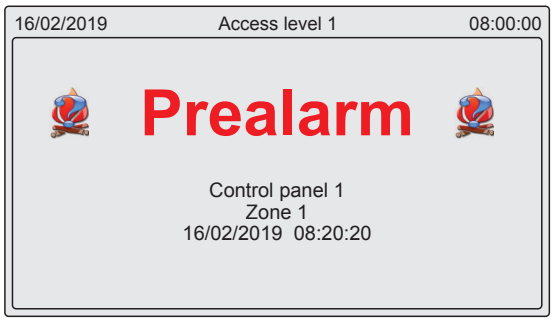
Normal operating state, no failure active, all detectors in stand-by.



Signaling	The display shows the normal operating state
	MAINS PWR OK LED on
	MONITORED LED on or off depending on the selected state
	TX CARRIED OUT LED off
	All the other LED are off
	No siren is active
	No output is active

FIRE PRELARM STATE

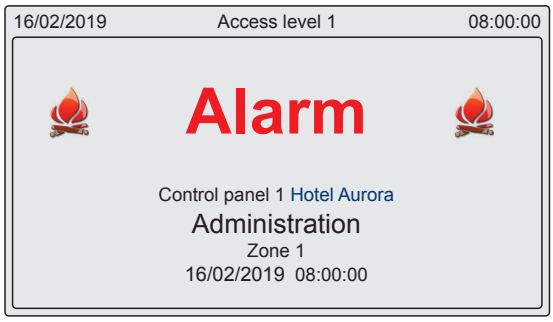
A double-knock zone in alarm or, with active monitored system mode, a single-knock zone in alarm, or a detector in prealarm state.



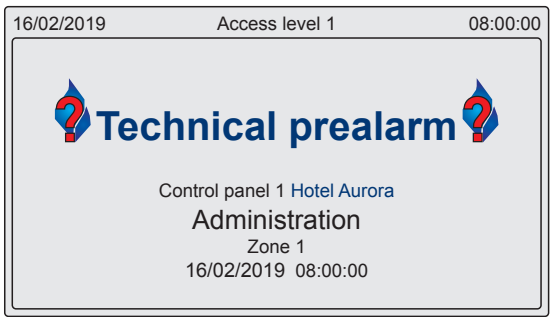
Signaling before acknowledgment	The speaker issues the audible prealarm signal
	The **PREALARM** LED flashes
	The output programmed for prealarm is triggered
	The display shows the prealarm state
Signaling after the first acknowledgment	The speaker is muted
	The **PREALARM** LED turns on steadily
	The display shows the list of active prealarms
Signaling after the second acknowledgment	The speaker issues the list of zones in prealarm state

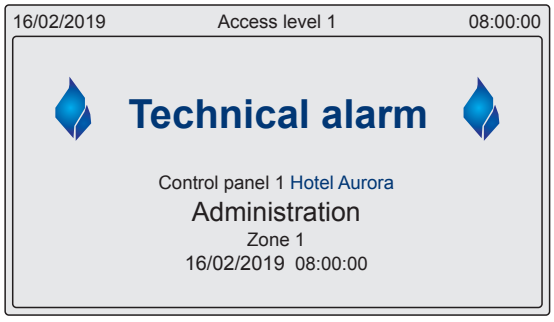
FIRE ALARM STATE

A single-knock zone in alarm, or multiple detectors of a double-knock zone in alarm or, with active monitored system mode, end of double-knock zone prealarm timeout.



Signaling before acknowledgment	The speaker issues the audible alarm signal
	The **ALARM** LED flashes
	The alarm relay is activated
	The display shows the alarm state
Signaling after the first acknowledgment	The speaker is muted
	The **ALARM** LED turns on steadily
	The display shows the list of active alarms
Signaling after the second acknowledgment	The speaker issues the list of zones in alarm state
	In case of a zone alarm, the display shows the associated alarm plan

TECHNICAL PRELARM STATE		
A technical double-knock zone in alarm or a detector in prealarm state.		
	**Signaling before acknowledgment**	The speaker issues the audible prealarm signal
		The **TECHNICAL ALARM** LED flashes
		The output programmed for technical prealarm is triggered
		The display shows the technical prealarm state
	Signaling after the first acknowledgment	The speaker is muted
		The **TECHNICAL ALARM** LED turns on steadily
		The display shows the list of active technical alarms
	Signaling after the second acknowledgment	The speaker issues the list of technical zones in prealarm state

TECHNICAL ALARM STATE		
A technical single-knock zone in alarm, or multiple detectors of a technical double-knock zone in alarm.		
	**Signaling before acknowledgment**	The speaker issues the audible alarm signal
		The **TECHNICAL ALARM** LED flashes
		The output programmed for technical alarm is triggered
		The display shows the technical alarm state
	Signaling after the first acknowledgment	The speaker is muted
		The **TECHNICAL ALARM** LED turns on steadily
		The display shows the list of active technical alarms
	Signaling after the second acknowledgment	In case of a zone alarm, the display shows the associated alarm plan.

FAILURE STATE		
Zone failure or system failure.		
	Signaling before acknowledgment	The speaker issues the audible failure signal
		The **GENERAL FAILURE** LED flashes
		The failure relay is activated
		The display shows the failure state
	Signaling after the first acknowledgment	The speaker is muted
		The **GENERAL FAILURE** LED turns on steadily
		The display shows the list of active failures
	Signaling after the second acknowledgment	The speaker issues the list of failures

N.B. Since the control panel controls the zones, the failures and the alarms of the individual detectors and modules are not added up in the count, but they are considered integral to the individual zones. Accordingly, for the events related to a zone, to the left of the cursor a number is displayed, indicating how many detectors and/or modules of the zone are affected by the event.
Selecting the event with the cursor and pressing the **OK** key the view of the zone is expanded showing the detail of the devices.

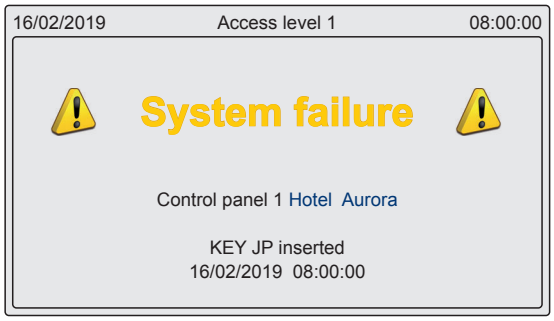
5-7 - Icons

The below table illustrates the icons that the control panel uses to optically support the notification of its operating states, alarms, failures etc.

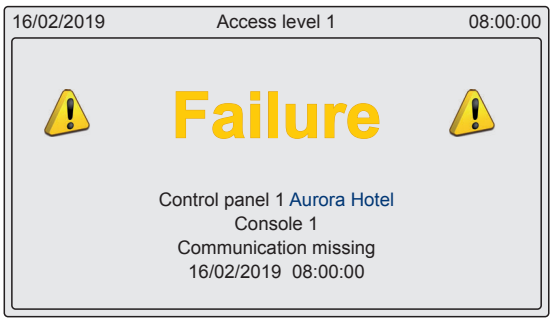
ICONS			
	No mains power This icon signals power failure.		**Battery charger failure** This icon signals that the power supply is not able to charge the battery.
	General failure This icon signals that the indicated device is in failure state.		**Low battery** This icon signals that battery voltage is low.
	Active technical prealarm This icon signals that the indicated device is in technical prealarm state.		**Battery failure** This icon signals that the battery is damaged and cannot be recharged.
	Active technical alarm This icon signals that the indicated device is in technical alarm state.		**Zone under test** This icon signals that the indicated device is under test.
	Active fire prealarm This icon signals that the indicated device is in prealarm state.		**Loop communication failure** This icon signals that the communication between the control panel and the devices connected on the loop has broken down.
	Active fire alarm This icon signals that the indicated device is in alarm state.		**Detectors maintenance request** This icon signals that the indicated optical detector needs maintenance (smoke chamber cleaning).
	Alarm by tested device This icon signals that the tested device is in alarm state.		**Reset delays** This icon signals that the delays have been reset.
	Control panel repeater exclusion The icon signals that the signaling outputs of the control panel are excluded.		**Notification carried out** This icon signals that the indicated notification has been transmitted.
	Device exclusion This icon signals that the indicated device is excluded.		**Monitored system mode** This icon signals that the monitored system mode has been activated.
	System failure This icon signals the presence of a system failure.		**Network communication failure** The icon signals that the network connection between the system devices connected on the serial bus has been broken down.
	System event This icon signals the presence of an event related to the system.		**Earth leakage** This icon signals that a cable or device of the system has recorded earth leakage current.

6 - FAILURE NOTIFICATIONS

The control panel manages two types of failures: system failures and general failures. System failures are a special category of failures that refer to the standard EN 54-2. General failures group all the other types of failures.



SYSTEM FAILURES		
Failure event	**Description**	**Automatic acknowledgment**
Reset by watchdog	The control panel has detected a reset signal that has been generated by the watchdog circuit.	No
KEY jumper inserted with an access level lower than level 4	The KEY jumper has been inserted while the control panel was not at access level 4.	Yes
Failure of control panel buffer	The RAM and FLASH memories of the control panel are automatically checked every 30 minutes. The detection of any malfunction during the test triggers the failure notification.	No
N.B. With the **Automatic system failure acknowledgment** option enabled, the notification is stopped when the failure state ends. With the **Automatic system failure acknowledgment** option disabled, the notification cannot be automatically stopped but continues even when the failure state is over. In this case, to stop the notification, it is necessary to reset the control panel.		



GENERAL FAILURES			
Failure event	**Automatic acknowledgment**	**Failure event**	**Automatic acknowledgment**
Communication missing among control panels or repeaters	Yes	Open loop	No
Low battery	Yes	Short-circuited loop	No
Battery failure	Yes	Overvoltage	Yes
Power failure	Yes	Siren termination resistor missing	Yes
Inconsistent programming	No	Ethernet interface failure	No
Earth leakage	Yes	Ethernet connection missing	Yes
Power supply failure	Yes	Communication missing (channel)	Yes
Open RS485 loop	Yes	No answer (channel)	Yes
N.B. With the **Automatic system failure acknowledgment** option enabled, the notification is stopped when the failure state ends. With the **Automatic system failure acknowledgment** option disabled, the notification cannot be automatically stopped but continues even when the failure state is over. In this case, to stop the notification, it is necessary to reset the control panel.			

7 - POWER SUPPLY

1 - Composition

The power supply section of the control panel complies with the requirements of the standard EN 54-4. It consists of a primary power supply (PS - power supply) and a secondary power supply (SD - storage device).
The primary power supply consists of a modular switching power supply, capable of providing 2.7A/28V direct current.
The secondary power supply consists of two 12V/7.2Ah batteries connected in series with each other. It is imperative that the batteries are always two. Never use batteries of different manufacturers, capacities and/or production lots.
Capacity lower than 7.2Ah, besides reducing the autonomy, distort the resistance values causing possible improper failure signaling.

2 - Mains power LED

In the normal operating state (no active failure), only the green **MAINS POWER** LED is on.

3 - Protection against battery reverse polarity

The power supply section is protected against reverse battery polarity by fuse (F 3.15A, 250V 5x20mm).

4 - Automatic system failure acknowlegment

With the option enabled, the return to normal operating conditions automatically acknowledges all the notifications and removes the failure notification from the event queue.
With the option disabled, the return to normal operating conditions does not automatically acknowledge all notifications.
It is necessary to reset the control panel.

5 - Switch on with battery power only

Control panel switch on with battery power only is normally inhibited. To enable it, insert the JP1 jumper on the CPU board.

Warning: when mains power is available, it is mandatory to remove the JP1 jumper. If the jumper remains inserted, there is a risk that:

- The automatic battery test provides incorrect results
- The automatic disconnection of the battery in case of deep discharge no longer works
- Power supply is overloaded

TECHNICAL AND FUNCTIONAL SPECIFICATIONS		
Power supply (PS)	Type	**2.7A/28.8V DC switching**
	Operating voltage	**230V AC +10% -15% 50Hz**
	Maximum consumption	**600mA**
	Maximum current available	**I max. (a) 2A**
	Maximum current available without battery charger	**I max. (b) 2.7A**
Batteries (SD)	Capacity	**2x 12V/7.2Ah**
	Battery test	**Automatic (every 30 minutes)**
	Charging time	**80% 24h - 100% 48h (2x 7.2Ah batteries)**
	Cut-off voltage	**<18V**
Available current for loads	Battery charger	**Max. 700mA**
	Self-consumption	**200mA**
	Loops	**Max. 500mA**
	Master Bus	**Max. 500mA**
	Wired outputs	**Max. 800mA**
Failure notifications	Primary power supply failure	**See table 1**
	Secondary power supply failure	**See table 2**
	Battery high impedance	**See table 3**
	Battery charger failure	**See table 4**
	Overvoltage	**See table 5**
	Low battery	**See table 6**
	Discharged battery	**See table 7**

7-1 - Failure notifications of the power supply section

TABLE 1 - PRIMARY POWER SUPPLY FAILURE	
The test is performed every second. The failure is notified when for the preset time the mains power is missing.	
Test frequency	1 second
Delay of failure notification	Programmable from 0 to 30 minutes
Signaling on occurence of failure	The **MAINS PWR OK** LED turns off
	The **PWR SPLY FAILURE** LED flashes
Signaling on notification of failure	The control panel display shows **POWER FAILURE**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **PWR SPLY FAILURE** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	The failure notifications are reset after detecting for the preset time, that the mains power voltage has been restored.
N.B. The MAINS PWR OK LED follows the state of mains power immediately without any delay.	

TABLE 2 - SECONDARY POWER SUPPLY FAILURE	
The test is performed only in the presence of mains power, with an interval of 10 seconds, on each battery. The failure is notified if the test detects for 5 minutes a battery voltage without load below 10V.	
Test frequency	10 seconds
Delay of failure notification	5 minutes
Signaling on occurence of failure	The **BATTERY** LED flashes
Signaling on notification of failure	The control panel display shows **BATTERY FAILURE**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **BATTERY** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	The failure notifications are reset after detecting, for 30 seconds, a battery voltage without load above 10V

TABLE 3 - BATTERY HIGH IMPEDANCE	
The test is performed only in the presence of mains power, with an interval of 30 minutes, on each battery. The failure is notified if the test detects an impedance above the failure threshold (1,5Ω which cannot be changed).	
Test frequency	30 minutes
Delay of failure notification	2 hours
Signaling on occurence of failure	The **BATTERY** LED starts flashing
Signaling on notification of failure	The control panel display shows **BATTERY FAILURE**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **BATTERY** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	The failure notifications are reset after detecting, for 30 seconds, that the impedance of the battery has returned to a value below the failure threshold.

TABLE 4 - BATTERY CHARGER FAILURE	
The test is performed every second. The failure is notified when the test detects for more than 5 minutes the presence of mains power, but not the battery charging current.	
Test frequency	1 second
Delay of failure notification	5 minutes
Signaling on occurence of failure	The **PWR SPLY FAILURE** LED starts flashing
Signaling on notification of failure	The control panel display shows **FAIL. PWR SUP./BATT. CHARGER**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **PWR SPLY FAILURE** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	The failure notifications are reset after detecting the battery charging current for 5 minutes.

TABLE 5 - OVERVOLTAGE	
The test is performed every second. The failure is notified when the test detects, for more than 60 seconds, that the power supply voltage required by the external devices exceeds 30V.	
Test frequency	1 second
Delay of failure notification	60 seconds
Signaling on occurence of failure	The **PWR SPLY FAILURE** LED starts flashing
Signaling on notification of failure	The control panel display shows **OVERVOLTAGE FAILURE**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **PWR SPLY FAILURE** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	The failure notifications are reset after detecting, for 60 seconds, that the power supply voltage required by the external devices has returned to the rated value of 30V.

TABLE 6 - LOW BATTERY	
The test is performed only in case of power failure, with an interval of 1 second. The failure is notified when the test detects for more than 15 minutes a battery voltage below 21.6V.	
Test frequency	1 second
Delay of failure notification	15 minutes
Signaling on occurence of failure	The **BATTERY** LED starts flashing
Signaling on notification of failure	The control panel display shows **LOW BATTERY**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **BATTERY** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated
Reset of faillure notifications	Failure notifications are reset after detecting, for at least 30 seconds, a battery voltage above 22.8V.

TABLE 7 - DISCHARGED BATTERY	
The test is performed only in case of power failure. If the test detects for 15 minutes a battery voltage below 18V, the power supply section disconnects the batteries and shuts down.	
Signaling 10 seconds before power supply shut down	The control panel display shows **BATTERY FAILURE**
	The failure notification is stored in the failure folder and the relative counter is incremented
	The **BATTERY** LED turns on steadily
	The **GENERAL FAILURE** LED starts flashing
	The failure relay is activated

8 - DETECTION ZONES

8-1 - Zones

The 199 detectors and 99 modules that can be connected to the control panel's detection loop must be assigned to the zones of the control panel. The devices not assigned to any zone, will be automatically assigned to the default zone.

ZONE CONFIGURATION RULES	
1	It can include only detectors
2	It can include only modules
3	It can include both detectors and modules
4	It cannot share its devices with other zones
5	It must include minimum 1 device
6	It can include a total of 32 devices (limitation valid only for fire zones)

Zone types
The zones of the control panel can be either fire or technical zones. Both zones type can be set as double-knock or single-knock zone.

Default zone
All devices, detectors and modules of the control panel, that have not been assigned to any fire or technical zone, are automatically assigned to the default zone. The default zone allows these devices to perform their function anyway.

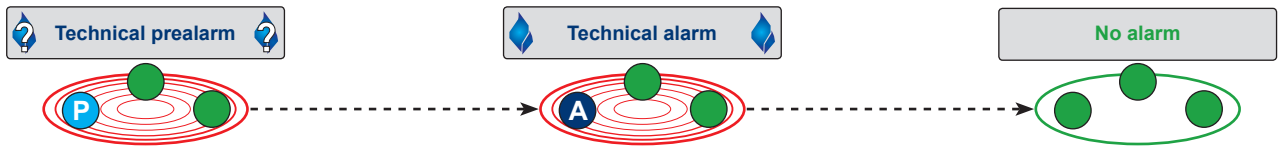
N.B. The default zone can be bypassed.

DEFAULT ZONE FEATURES	
1	It is a non-programmable single-knock fire zone
2	It includes all the programmed devices not assigned to the zones
3	Its composition is not directly editable

Fire zone
The fire zone consists of one or more devices, typically fire detectors and actuating devices.
The alarm of the zone triggers the alarm procedure programmed for the zone and the evacuation siren.

Technical zone
The technical zone consists of one or more devices, typically flood, gas detectors etc. and actuating devices.
The monitoring of these phenomena is not covered by the standard EN 54-2, but the presence and management of such detectors does not affect the control panel mandatory functions.
The alarm of the zone triggers the alarm procedure programmed for the zone and the output programmed as Technical alarm.
If the **Follow device state** option has been enabled for the technical zone, the technical prealarm and alarm notifications are automatically acknowledged as soon as the devices that triggered the alarm return to stand-by state.

TECHNICAL ZONE WITH "FOLLOW DEVICE STATE" OPTION - ALARM OR PREALARM



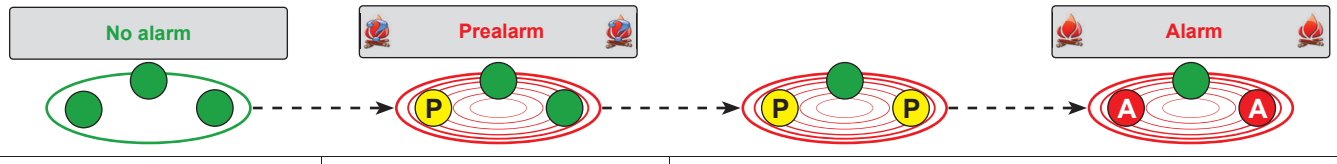
With a device in prealarm state the zone switches to prealarm	With a device in alarm state the zone switches to alarm	With all devices in stand-by state the zone automatically switches to stand-by

Legend							
	Manual call point (stand-by)		Detector (stand-by)	P	Detector (technical prealarm)		Zone (alarm or prealarm)
A	Manual call point (alarm)	P	Detector (fire prealarm)	A	Detector (technical alarm)		Zone (stand-by)
		A	Detector (fire alarm)				

8-2 - Fire zones

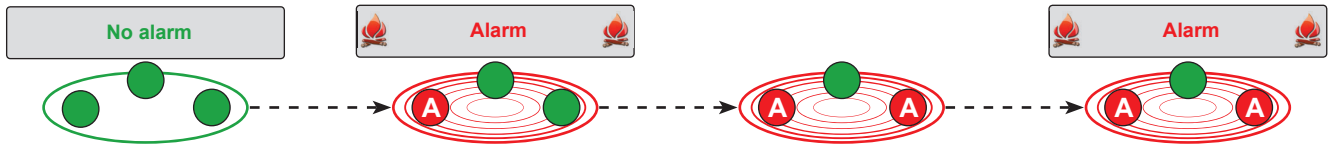
Single-knock fire zone
The alarm of a single device (single-knock) is sufficient to generate the alarm of the zone and initiate the alarm procedure programmed for the zone and the evacuation siren. If a device generates a prealarm, the zone will switch to prealarm state.

SINGLE-KNOCK FIRE ZONE - PREALARM TRIGGERING



The zone is in stand-by state	With one device in prealarm state the zone switches to prealarm	One more device in prealarm state switches the zone to alarm and triggers the alarm notifications

SINGLE-KNOCK FIRE ZONE - ALARM TRIGGERING



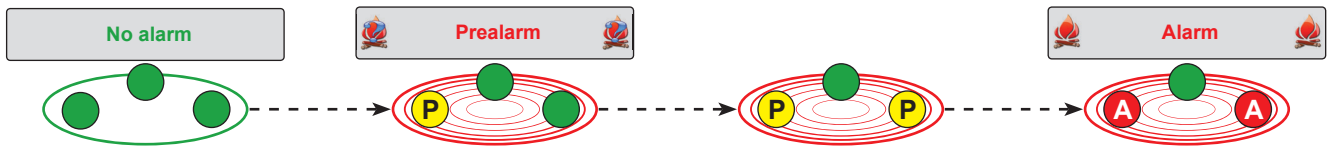
The zone is in stand-by state	With one device in alarm state the zone switches to alarm	One more device in alarm state triggers another alarm notification

Double-knock fire zone
The prealarm or alarm of a single device generates a prealarm in the zone, the intervention of a second device causes an alarm in the zone. However, if the first device is a manual call point, the double-knock zone immediately issues an alarm.

Double-knock zone prealarm timeout
It is possible to set the maximum prealarm time for the double-knock zones.
If a zone in prealarm state at the end of the set timeout has switched to stand-by state, the prealarm is automatically cleared.
If, however, the prealarm condition persists, the zone remains in prealarm state until the detector switches to stand-by or another detector of the zone switches to alarm. The timeout can be set by steps of 5 minutes from 0 (infinite) to 60 minutes.

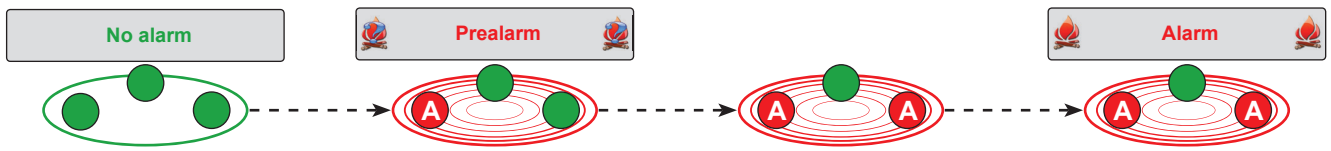
N.B. The **Behavior after prealarm** setting can have an effect on the alarm release.

DOUBLE-KNOCK FIRE ZONE - PREALARM TRIGGERING



The zone is in stand-by state	With one device in prealarm state the zone switches to prealarm	One more device in prealarm state switches the zone to alarm and triggers the alarm notifications

DOUBLE-KNOCK FIRE ZONE - ALARM TRIGGERING

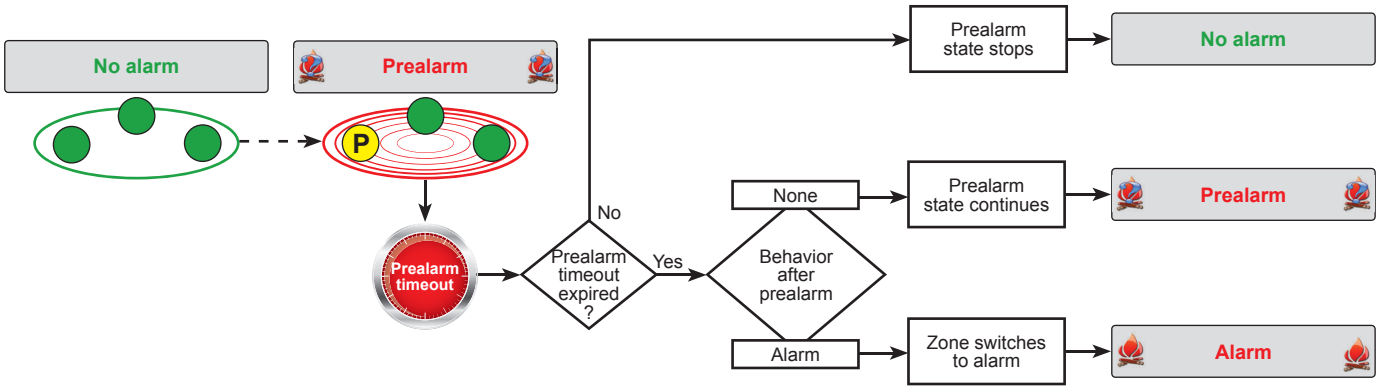


The zone is in stand-by state	With one device in alarm state the zone switches to prealarm	One more device in alarm state switches the zone to alarm and triggers the alarm notifications

DOUBLE-KNOCK FIRE ZONE - ALARM TRIGGERING FROM A MANUAL CALL POINT

The zone is in stand-by state	An alarm from a manual call point in alarm state (pressed) immediately triggers the alarm notifications

FIRE ZONE - BEHAVIOR AFTER PREALARM



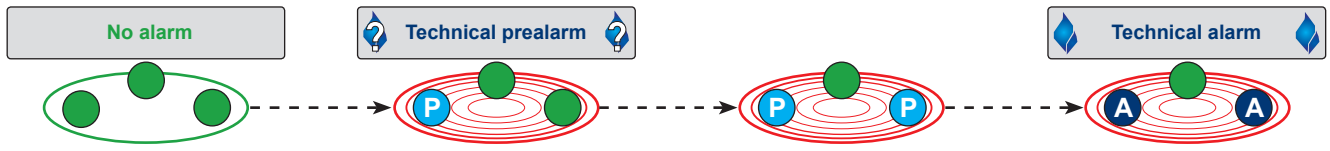
The zone is in stand-by state	A device in prealarm state switches the zone to prealarm	Double-knock zone prealarm timeout	Behavior after prealarm	On the basis of the setting, the zone remains in prelarm or switches to alarm

8-3 - Technical zones

The prealarm and alarm outputs of the technical zone must be programmed, specializing the programmable outputs for these functions.

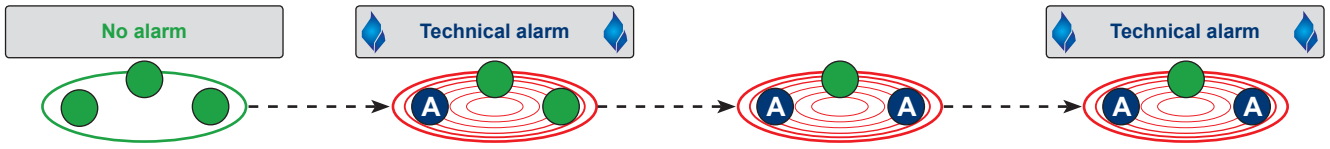
Single-knock technical zone
The alarm of a single device (single-knock) is enough to generate a technical alarm of the zone and trigger the output specifically programmed for technical alarm. If a device generates a prealarm, the zone will switch to prealarm state.

SINGLE-KNOCK TECHNICAL ZONE - PREALARM TRIGGERING



The zone is in stand-by state	With one device in prealarm state the zone switches to prealarm	One more device in prealarm state switches the zone to alarm and triggers the alarm notifications

SINGLE-KNOCK TECHNICAL ZONE - ALARM TRIGGERING



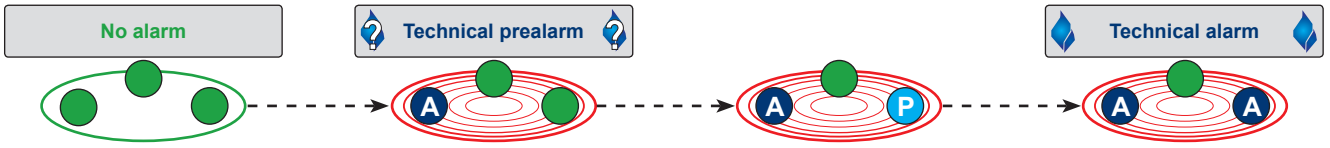
The zone is in stand-by state	With one device in alarm state the zone switches to alarm	One more device in alarm state triggers another alarm notification

Double-knock technical zone
The prealarm or alarm of a single device generates a technical prealarm in the zone, the intervention of a second device causes a technical alarm in the zone.

Double-knock zone prealarm timeout
It is possible to set the maximum prealarm time for the double-knock zones. If a zone in prealarm state at the end of the set timeout has switched to stand-by state, the prealarm is automatically cleared. If, however, the prealarm condition persists, the zone remains in prealarm state until the detector switches to stand-by or another detector of the zone switches to alarm.
The timeout can be set by steps of 5 minutes from 0 (infinite) to 60 minutes.

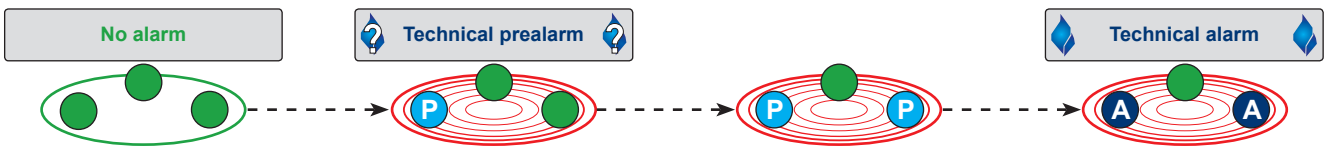
N.B. The **Behavior after prealarm** setting can have an effect on the alarm release.

DOUBLE-KNOCK TECHNICAL ZONE - PREALARM TRIGGERING



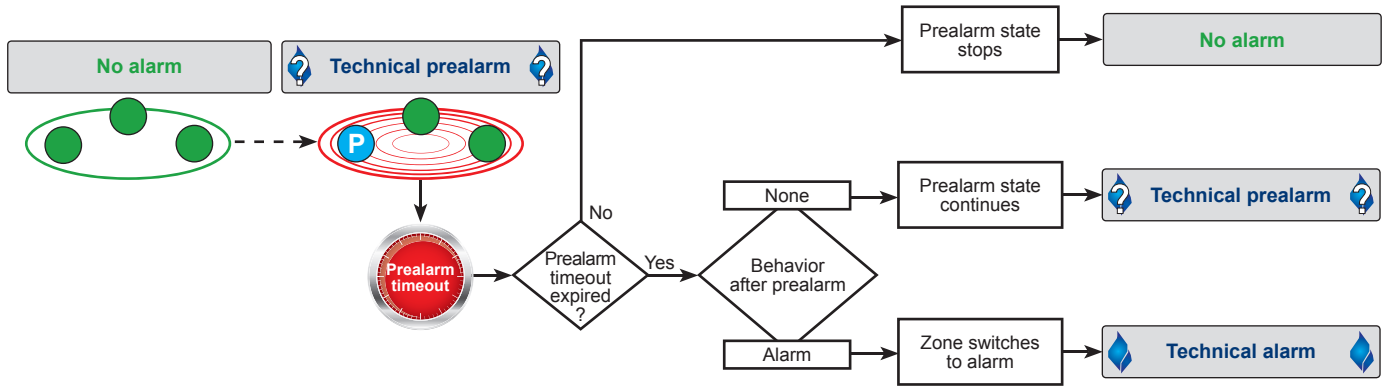
The zone is in stand-by state	With one device in alarm state the zone switches to prealarm	One more device in prealarm state switches the zone to alarm and triggers the alarm notifications

DOUBLE-KNOCK TECHNICAL ZONE - ALARM TRIGGERING



The zone is in stand-by state	With one device in prealarm state the zone switches to prealarm	One more device in prealarm state switches the zone to alarm and triggers the alarm notifications

TECHNICAL ZONE - BEHAVIOR AFTER PREALARM



The zone is in stand-by state	A device in prealarm state switches the zone to prealarm	Double-knock zone prealarm timeout	Behavior after prealarm	On the basis of the setting, the zone remains in prealarm or switches to alarm

8-4 - Monitored system mode

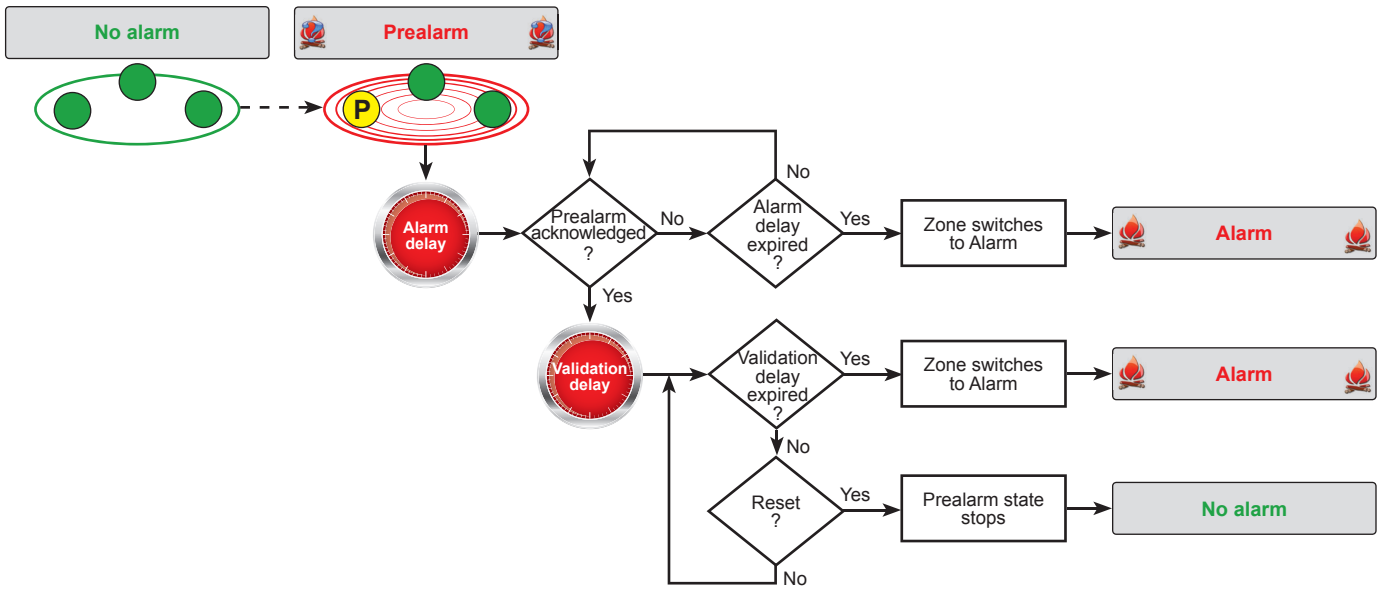
Attention: the monitored system mode may only be used if the control panel is under the direct control of authorized personnel. It is only available if its use was enabled during setup.
The activation and deactivation of the monitored system mode requires a level 2 code. Its activation is indicated by the relevant LED on the control panel which turns on. At the same time, the repeater panel displays the icon that indicates the monitored system mode.
With the operation mode active, the alarms generated by the devices are reported by the control panel as prealarm.
However, if the alarm is generated by a manual call point, an alarm is reported immediately.
The monitored system mode has no effect on the operation of the technical zones.

Access period
The activation of the monitored system mode can be subjected to an access period. In this case, the operator can activate the operating mode only during the set access period. At the end of the access period, the operating mode is automatically deactivated.

Operating logic
On generation of the prealarm, the control panel activates the alarm delay. If the prealarm is not acknowledged by the operator within the alarm delay, the prealarm is automatically converted into an alarm. If the prealarm is acknowledged by the operator, the validation delay activates. If a reset is performed within this delay, the prealarm state stops, whereas if no reset is performed, the prealarm is converted into an alarm.

If the prealarm turns out to be a false alarm, the operator can perform the reset from the control panel or from any device that manages the reset function.
If the alarm proves to be real, the staff can wait for the expiry of the validation delay or can generate the alarm either by activating the evacuation (using a level 2 code) or via a manual call point.

MONITORED SYSTEM MODE - ALARM TRIGGERING



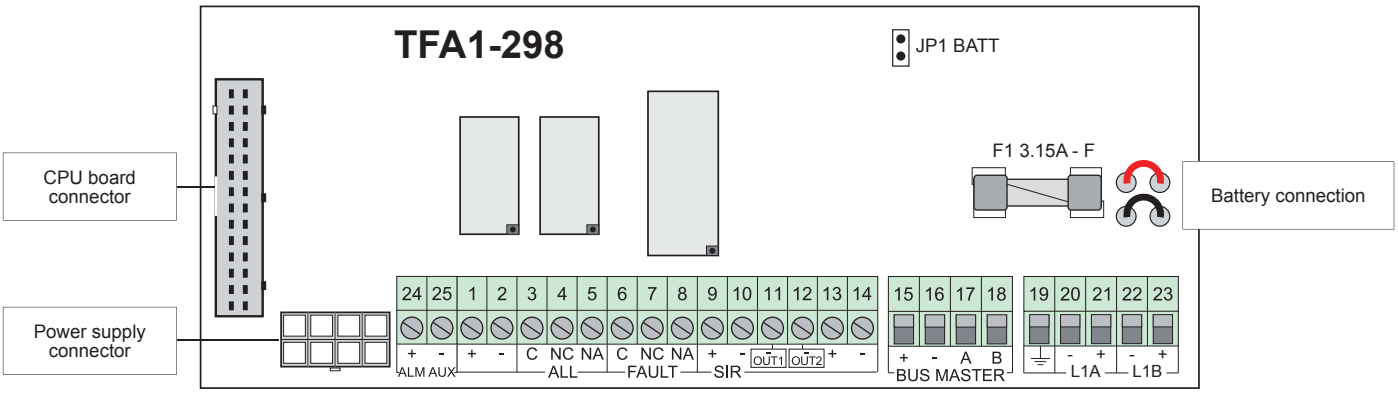
The zone is in stand-by state	With one device in alarm or prealarm state the zone switches to prealarm	If the prealarm is not acknowledged after the expiry of the alarm delay, the alarm automatically activates. If the prealarm is acknowledged but not reset within the validation delay, the alarm automatically activates.

MONITORED SYSTEM MODE - ALARM TRIGGERING FROM A MANUAL CALL POINT	
The zone is in stand-by state	An alarm from a manual call point in alarm state (pressed) immediately triggers the alarm notifications

9 - ELECTRONIC BOARDS

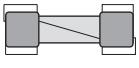
The control panel electronics are divided into two parts, the CPU board and the terminal board.

9-1 - Terminal board

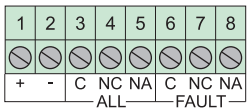


Warning: the outputs OUT1 (terminal 11), OUT2 (terminal 12) and the alarm relay output ALL (terminals 3, 4, 5) are not supervised (type C, E, J according to EN 54-1 nomenclature) and therefore, in accordance with EN 54-2, may not be used to control fire alarm devices or transmission devices for fire or failure alarm.
The failure relay output FAULT (terminals 6, 7, 8) is not supervised (type J according to EN 54-1 nomenclature) and therefore, in accordance with EN 54-2, may not be used to control transmission devices for failure alarm.

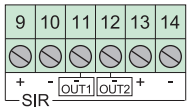
PROTECTION AGAINST DEEP DISCHARGE		
JP1 BATT	●●	Automatic battery disconnection for Vbat <18V DC
	■	Protection against deep discharge disabled

	Fuse F1
	Protection against battery reverse polarity (type 3.15A - F 5x20)

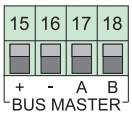
9-2 - Terminals



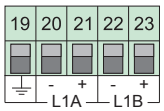
	Outputs	Notes	Max. current
1	Positive power supply voltage	Supply output for external loads	500mA 24V DC
2	Negative power supply voltage		
3	Common contact	Alarm relay output with free contact	1A 30V DC
4	Normally closed contact		
5	Normally open contact		
6	Common contact	Failure relay output with free contact	
7	Normally closed contact		
8	Normally open contact		



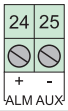
	Outputs	Notes	Max. current
9	Positive power supply voltage for siren	Controlled siren output (reversed polarity in alarm)	750mA 24V DC
10	Negative power supply voltage for siren		
11	Signaling output 1	Programmable open collector outputs (negative voltage or high impedance)	150mA
12	Signaling output 2		
13	Positive power supply voltage	Power supply output for external loads	500mA 24V DC
14	Negative power supply voltage		



	Master Bus	Notes	Max. current
15	Positive power supply voltage for serial bus	Power supply output for expansion devices	500mA 24V DC
16	Negative power supply voltage for serial bus		
17	Channel A serial bus	Master Bus communication channels (connection of expansion devices)	
18	Channel B serial bus		



	Loop	Notes	Max. current
19	Shield connection	Terminal for the cable shield	
20	Negative power supply voltage for line 1A	Outward loop	500mA 24V DC
21	Positive power supply voltage for line 1A		
22	Negative power supply voltage for line 1B	Return loop	
23	Positive power supply voltage for line 1B		



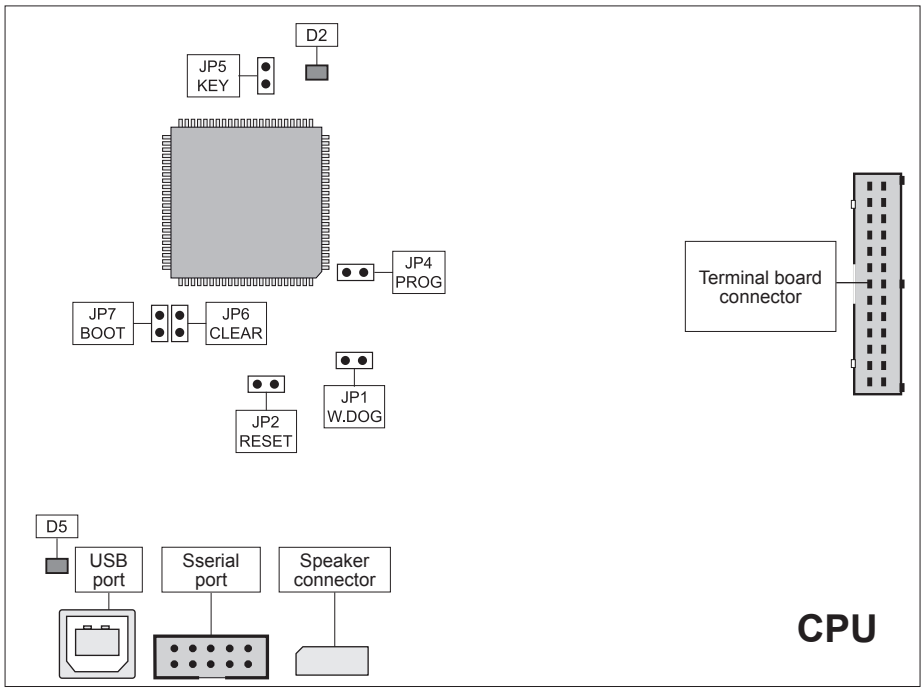
	Auxiliary power supply	Notes
24	Positive input for power supply	24V DC input for connection of TFPS-5 power supply
25	Negative input for power supply	

N.B. The maximum current available for external loads is shared between terminals 1 and 13.
The state indicated for the terminals 7 and 8 is in the condition of unpowered control panel. With the control panel powered, the state of the terminals is reversed: terminal 7 is in NO state and terminal 8 is in NC state.
The additional power supply connected to terminals 24 and 25 must not be regarded as a resource to increase the availability of current of the control panel.
The power supply should be considered for the current that its batteries make available to increase the autonomy of the system in case of power failure.

PROGRAMMABLE OUTPUTS			
Function	**Acknowledgeable**	**Function**	**Acknowledgeable**
Fire alarm	Yes	Status: Power failure	No
Fire prealarm	Yes	Status: Power supply failure/battery charger failure	No
Technical alarm	Yes	Status: Earth leakage	No
Delayed alarm	No	Status: SIR output failure	No
General failure	No	Exclusion of at least one device (including outputs)	No
Alarm from device under test	No	Exclusion of control panel outputs	No
System failure	No	At least one zone under test	No
Evacuation	No	Control panel under maintenance	No
Low battery	No	Status: Communication with device	No
Battery failure	No	Status: Control panel network connected and working	No
Power failure	No		
Power supply failure/battery charger failure	No	System OK	No
Earth leakage failure	No	Open RS485 loop	No
SIR output failure	No	Monitored control panel	No
KEY jumper inserted	No	Prog. enabled	No
Status: battery	No	Control panel reset	No
Status: battery failure	No	Technical prealarm	Yes

9-3 - CPU board

The CPU board is equipped with all the key jumpers which permit high-level management of the control panel, such as firmware upgrade, reset of system configuration, access to the 4th (manufacturer) access level etc.
The CPU board also hosts the USB and TTL ports for connecting a PC and a serial printer to the control panel.



Key jumpers

Special high-level procedures, such as firmware upgrade, reset of system configuration etc., require the use of specific jumpers available on the CPU board of the control panel:

JP1 W.DOG - The jumper disables the WATCHDOG circuit of the control panel.
In normal operating conditions, the jumper must always be open.
In some procedures, such as firmware upgrade via serial port, the jumper must temporarily be closed.

JP2 RESET - The jumper is used to reset and restart the microprocessor.
In normal operating conditions, the jumper must always be open.
In some procedures, such as firmware upgrade, the jumper must temporarily be closed.

JP4 PROG - The jumper is used to perform the firmware upgrade of the control panel.
In normal operating conditions, the jumper must always be open.
During firmware upgrade via serial port, the jumper must temporarily be closed.

JP5 KEY - The jumper enables the access to the level 4 menu.
In normal operating conditions, the jumper must always be open.

JP6 CLR - The jumper is used to clear programming and restore the default settings.
In normal operating conditions, the jumper must always be open.
During the reset of system configuration, the jumper must be temporarily closed.

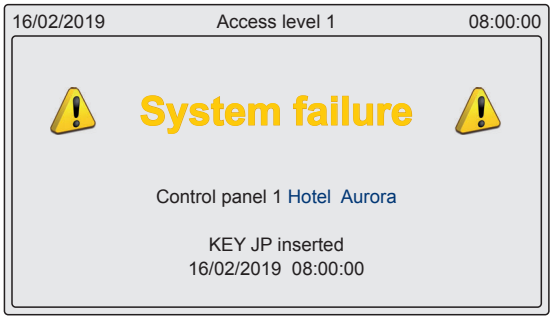
JP7 BOOT - The jumper is used along with the CLR jumper to perform the firmware upgrade via USB port.
In normal operating conditions, the jumper must always be open.

SPECIAL PROCEDURES		
JP1 - W.DOG	Leave open during normal operating conditions (jumpers reserved for firmware upgrade and reset of system configuration)	Supervised position
JP2 - RESET		
JP4 - PROG		
JP5 - KEY		
JP6 - CLR		
JP7 - BOOT		

Supervision of jumpers

The control panel oversees the open or closed state of the jumpers to prevent that they are forgotten in the wrong position after use, causing potential undesirable behaviors or malfunctioning of the control panel.
The control panel notifies the condition of anomaly, through a screen that indicates **System failure** and **KEY jumper inserted**. The signaling remains visible until the relevant key jumper is correctly positioned.

N.B. If the Automatic system failure acknowledgment function is not enabled, it is also necessary to perform a manual acknowledgment to cancel the **System failure** notification.



LED		Signaling
D2	**Green**	Flashing = Run indication (proper running of control panel firmware)
D5	**Red**	On = USB cable connected

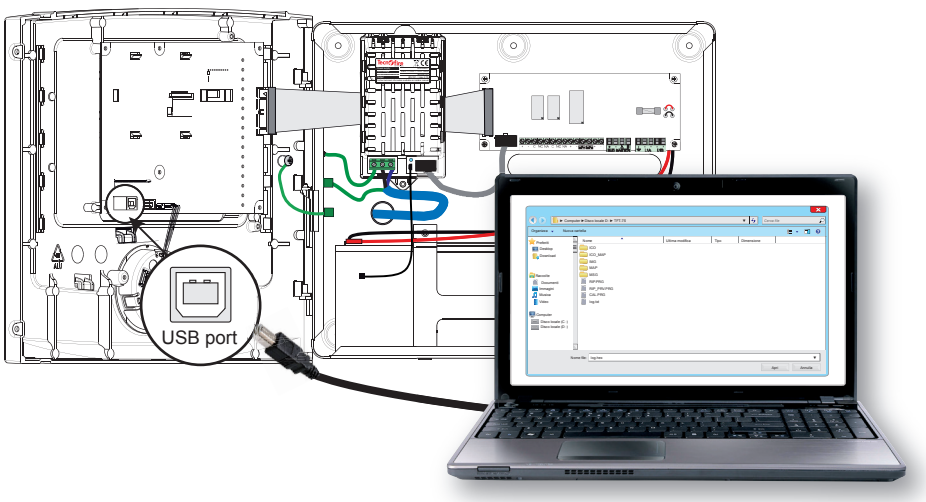
USB port

The USB port allows to connect the control panel directly to a PC, for programming of the control panel and upgrade of its firmware. This connection supports only the standard Tecnofire protocol from the Tecnoalarm and TECNOMONITOR software. The USB interface can also be enabled by an access level 3 or 4 code, to allow access to the data Flash memory of the control panel as a disk drive and customize the vocabulary using the Tecnoalarm software.

Serial port

The TTL port allows to connect a PC via the PROG32 or PROG USB interface, for programming of the control panel and upgrade of its firmware. This port has longer transfer times compared to the USB port. The TTL port also allows to connect a serial printer.

Port	Function
USB	PC connection for programming and firmware upgrade
SERIAL	Serial printer or programming interface connection



9-4 - Power supply

The TFA1-298 control panel is equipped with a switching power supply type ALSW2827 providing a maximum output current of 2.7A @ 24V DC (default calibration 28.8V DC @ 25°C). The connection to the control panel is made via a polarized connector. The wiring transfers to the control panel the power supply as well as diagnostics.

N.B. The voltage value measured at the battery charger output is subject to variations, due to the temperature of the battery. The battery temperature is measured by a probe mounted on the battery surface.

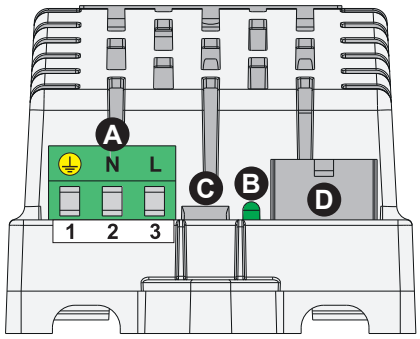
Input protection

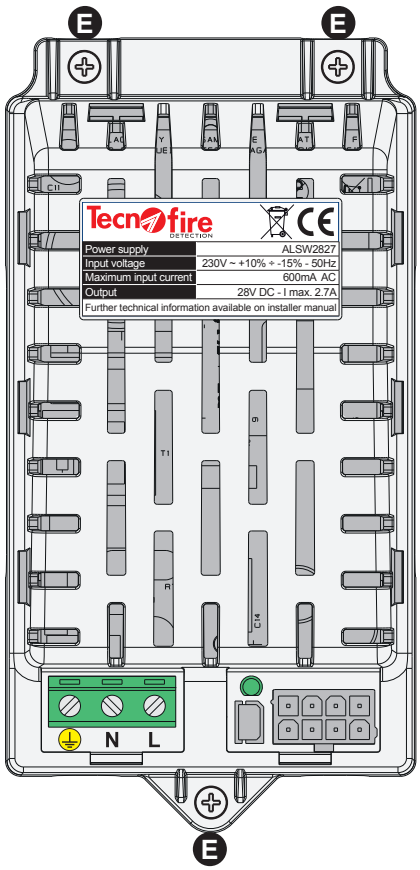
The 230V AC mains input is protected against overvoltage by varistors and by a non replaceable fuse integrated in the electronics (F1:1A - T). Fuse blowing is necessarily attributed to a failure, or an exceptionally violent electromagnetic discharge that would inevitably require repair.

Current	Blow time
1.5A	Approx. 1 hour
2A	Approx. 2 minutes
4A	150ms to 3 seconds

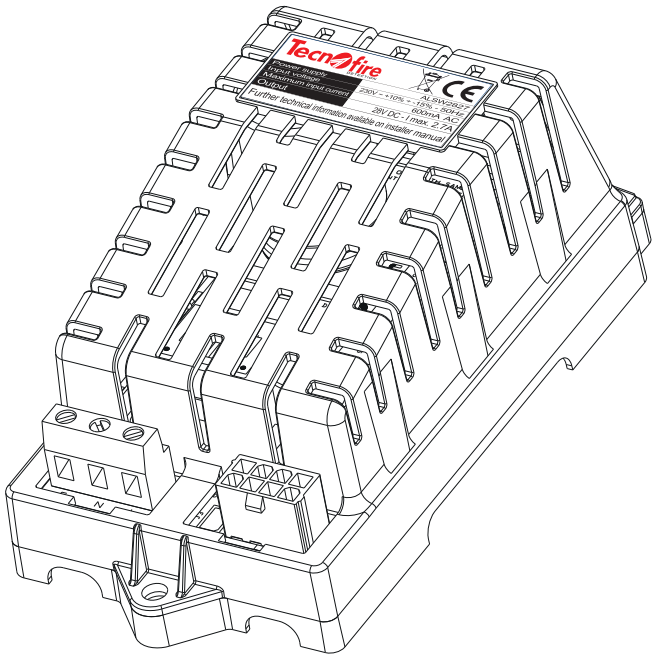
Output protection

The output section of the power supply is automatically protected against short circuits and overloads. If one of these conditions occurs, the device deactivates and then reactivates automatically when the cause of the cut-off is removed or normal operating conditions are restored.





		Terminals		
A	N L 1 2 3	1	⏚	Ground connector
		2	N	Neutral conductor 230V AC
		3	L	Phase conductor 230V AC
B		LED		
		Green		On = normal operating conditions
C		Battery check probe connection		
D		Pre-wired polarized control panel connector		
E	Mounting holes for fixing to control panel casing			



10 - CONNECTION

This chapter explains how to connect the detection loop, the sirens and the Master Bus.

N.B. All detectors and modules connectable on the loop are equipped with a dual loop isolator (inbound and outbound), in compliance with the standard EN 54-2 which provides for an isolator at least every 32 devices.

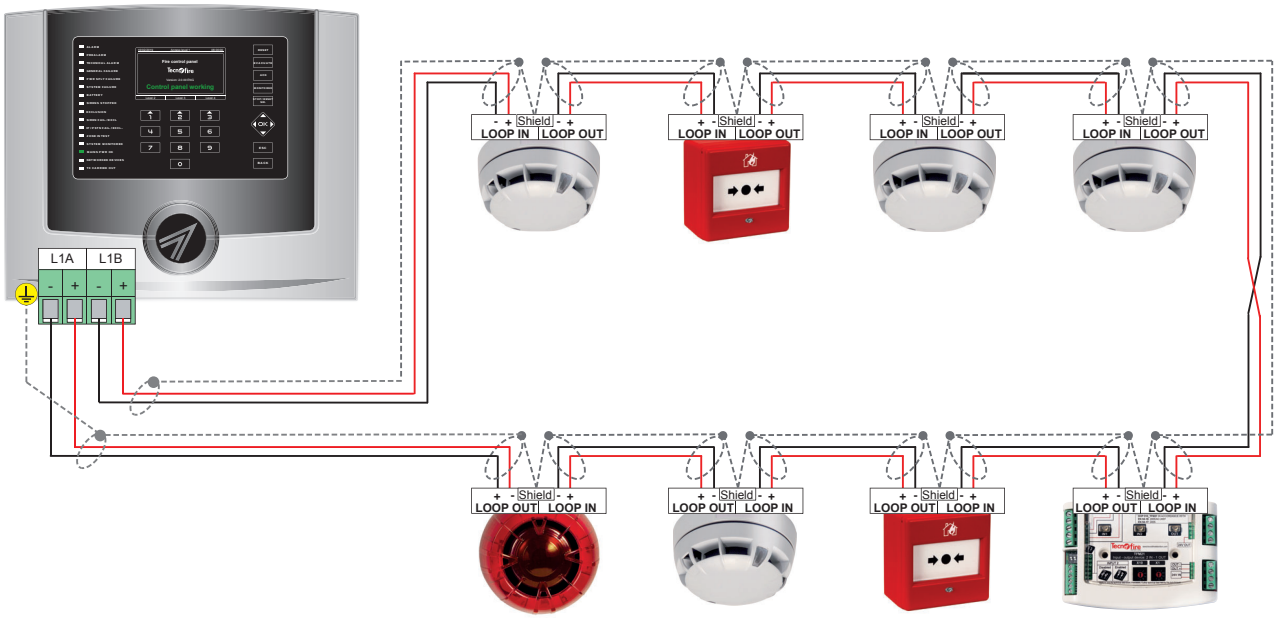
10-1 - Detection loop connection

On the detection loop of the control panel it is possible to connect up to 199 detectors and up to 99 modules.
The detection loop can be connected in open or closed loop mode. In open loop mode, pursuant to the standard EN 54, it is possible to connect a total of 32 devices (detectors or modules) on each branch of the detection loop.

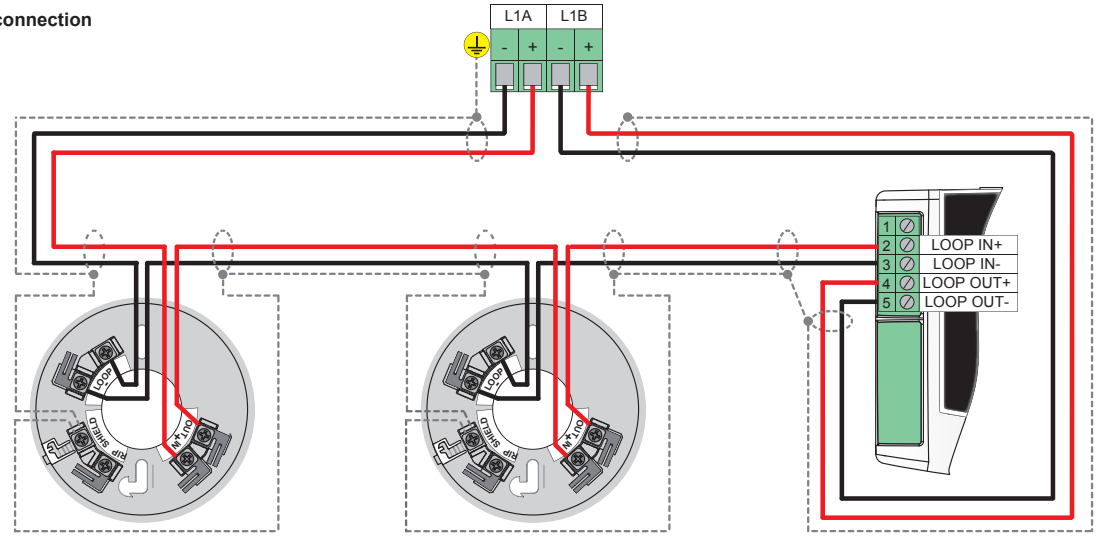
For loop connection, we recommend to use a shielded 2-poles twisted-pair cable with flexible conductors, whose minimum section required is 0.5mm².
For reasons of electrical safety, the shieldings of the cables must be connected in order not to stop their path and must be grounded inside the casing of the control panel.

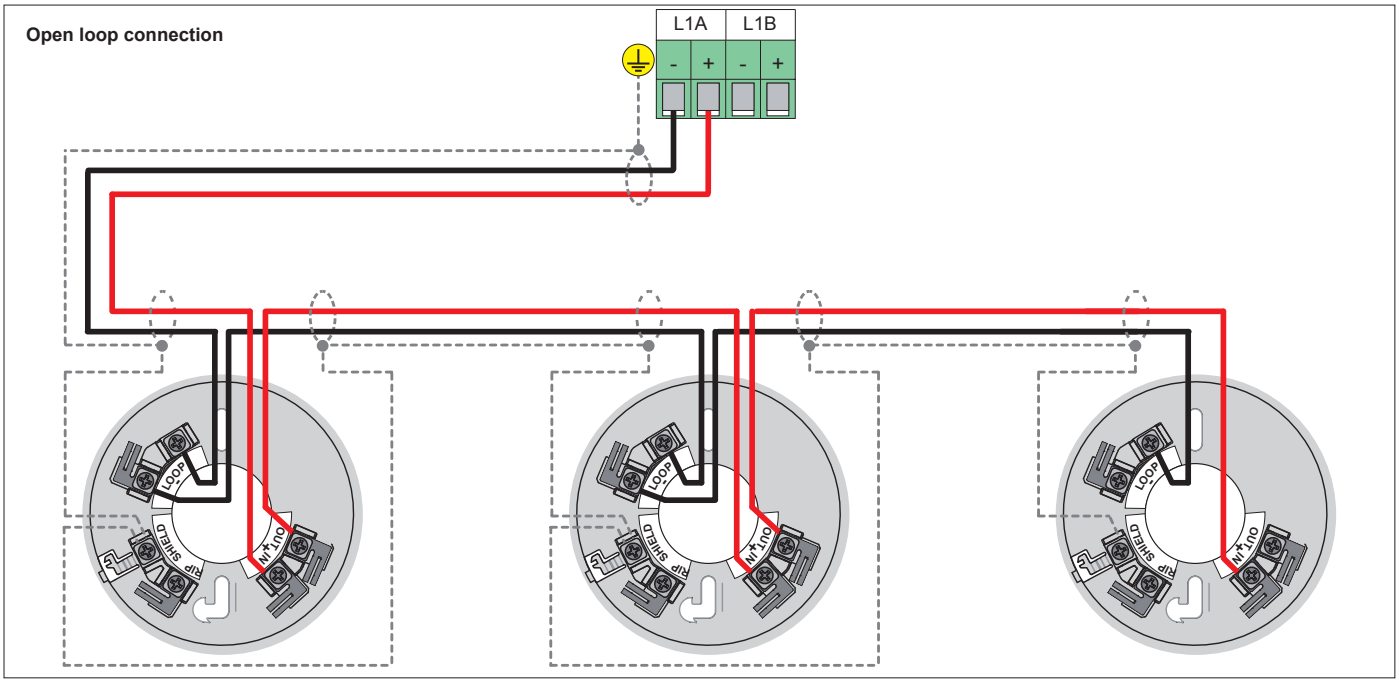
The maximum length allowed for the laying of the detection loop is 3000 meters, as defined by the low voltage directive LVD 2006/95/EU.

Detection loop



Closed loop connection



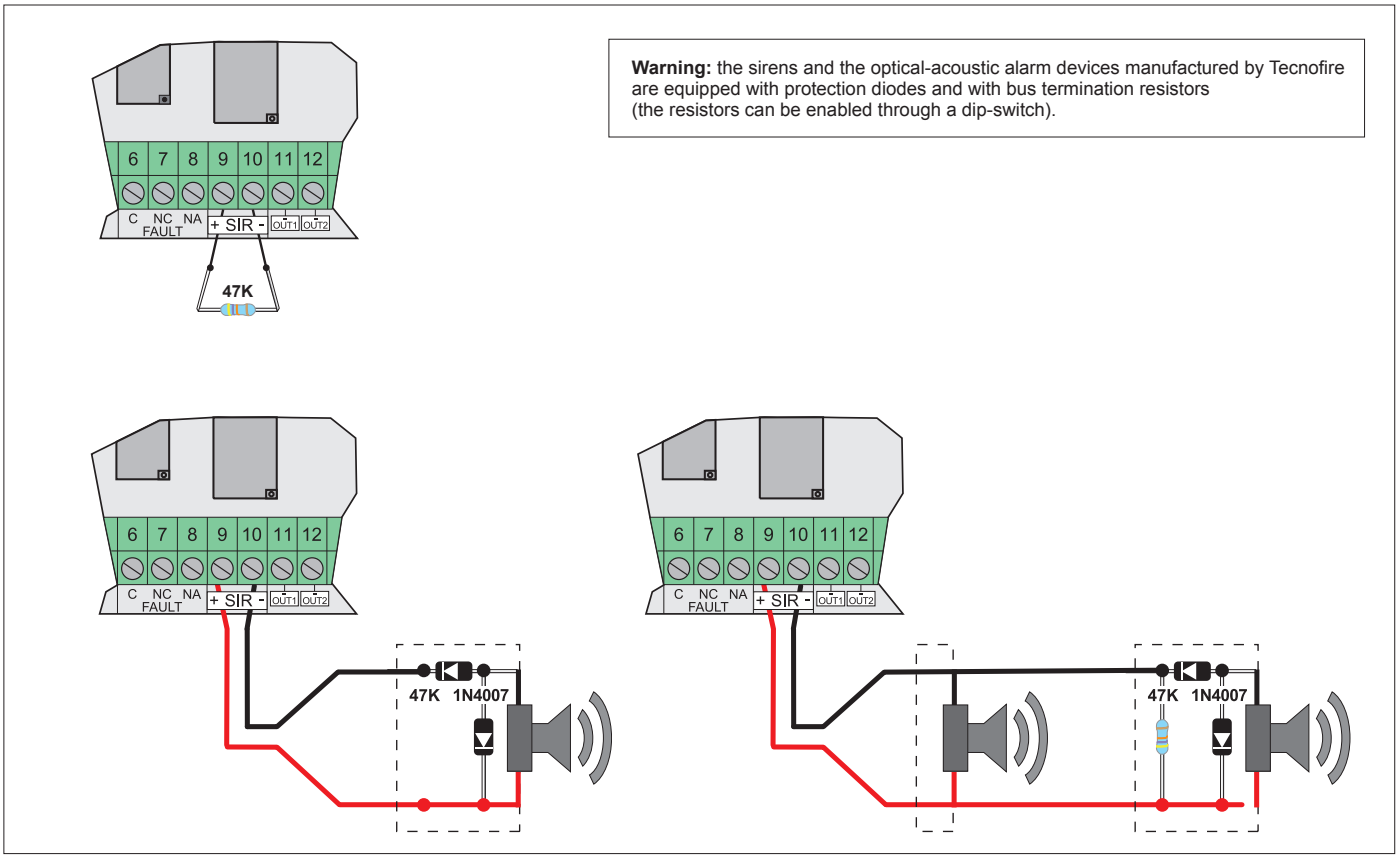


10-2 - Siren connection

The sirens are connected via a controlled output (terminals 9 SIR+ and 10 SIR-).
The line must must be terminated with a 47K resistance:

- If no siren is connected, a 47K bus termination resistor must be connected between terminals 9 and 10.
- If one siren is connected, a 47K resistor must be connected in parallel next to the siren.
- If multiple sirens are connected, a 47K resistor must be connected in parallel next to the last siren.

N.B. The polarity of the terminals refers to the alarm state, in stand-by the polarity is reversed.



Warning: the sirens and the optical-acoustic alarm devices manufactured by Tecnofire are equipped with protection diodes and with bus termination resistors (the resistors can be enabled through a dip-switch).

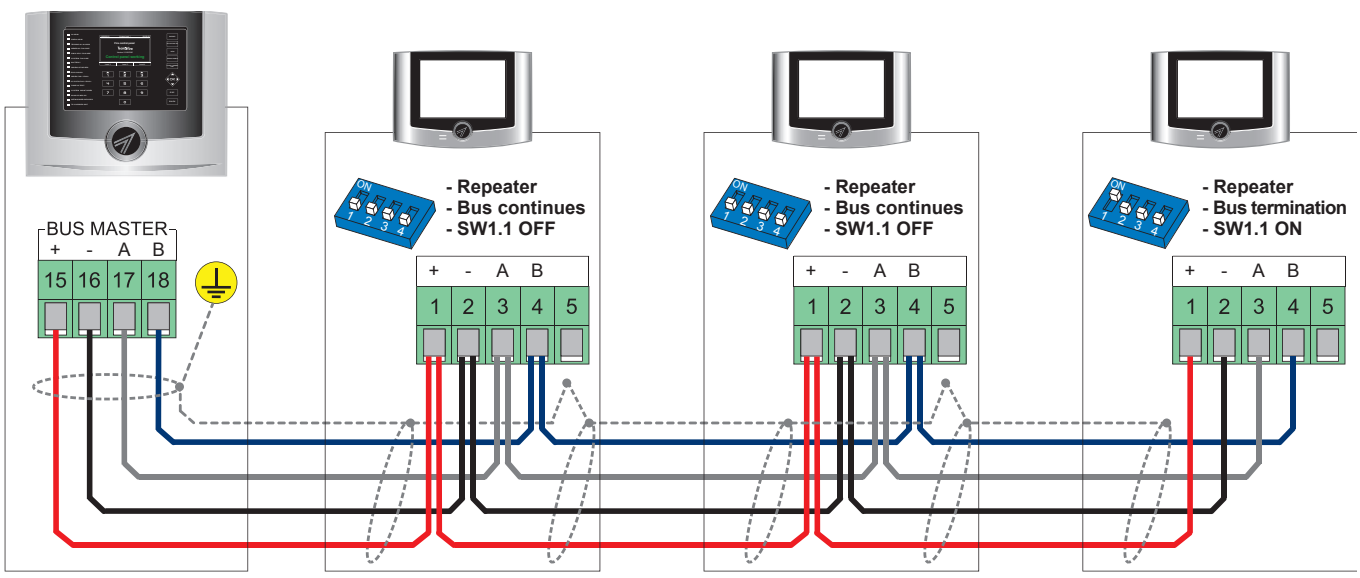
10-3 - RS485 bus connection

The control panel provides a RS485 port used to connect up to 5 expansion devices.
The RS485 bus must be connected in open loop mode, and must be balanced with a resistor inserted on the last device of the bus.

For Master Bus connection, it is recommended to use shielded multipolar twisted-pair cables with flexible conductors.
The minimum section of the conductors must be in proportion to the extension of the bus and to the consumption of the connected devices.
For reasons of electrical safety, the shieldings of the cables must be connected in order not to stop their path and must be grounded inside the casing of the control panel.

The maximum length allowed for the RS485 bus (Master Bus) is 1000m. For greater distances use a fiber optic connection by connecting a TFSFC01 RS485-fiber optic converter.

Open loop connection to Master Bus



10-4 - Potentiation of the secondary power supply

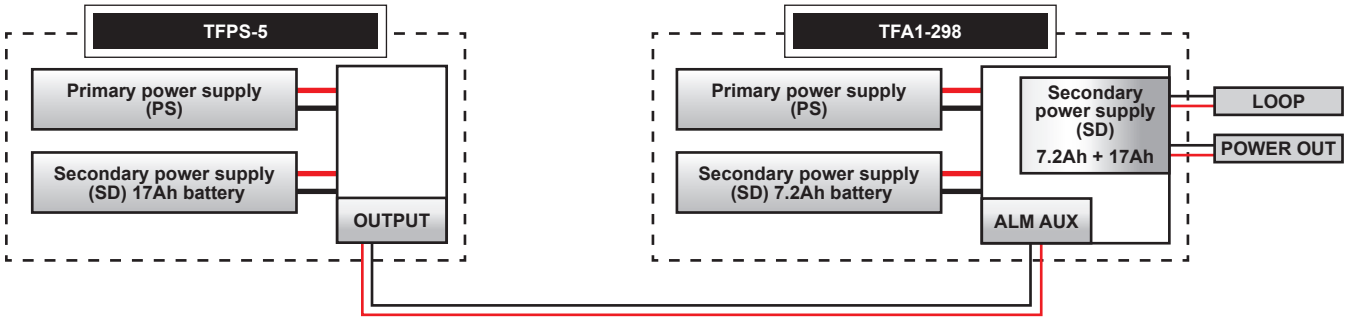
Normative references

The European standards indicate the conditions and parameters necessary to dimension the secondary power supply on the basis of the current requirements.

The secondary power supply shall be dimensioned to ensure, in the event of main power failure, the autonomous operation of the system. The autonomy must be equal to the sum of the times required for notifying, servicing and system recovery and in any case must not be less than 24h. Moreover, the alarms should be transmitted with devices certified to EN 54-21 to one or more recipients. On expiry of the minimum autonomy, the secondary power supply shall ensure in any case the operation of the system for at least another 30 minutes starting from the issue of the first alarm.

Additional power supply source

In the case where the consumption of the system exceeds the available current of the battery, it becomes necessary to connect an additional power supply. For this purpose, the control panel is equipped with dedicated terminals for the connection of one or more power supplies TFPS-5, compliant to EN 54-4. The operation of the TFPS-5 connected on the loop is supervised by the system and therefore it is sufficient to connect the output of the power supply directly to the ALM AUX input of the control panel.



10-5 - Additional power supply connection

Connection of one additional power supply

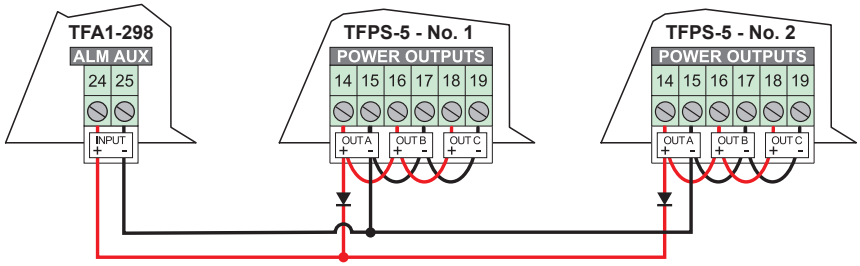
The outputs OUT A, OUT B and OUT C of the TFPS-5 power supply must be connected in parallel and must then be connected to the terminals 24 and 25 of the control panel.

TOTAL CURRENT PROVIDED	
TFA1-298	7.2Ah
TFPS-5	17Ah
Total	24.2Ah

Connection of two or more additional power supplies

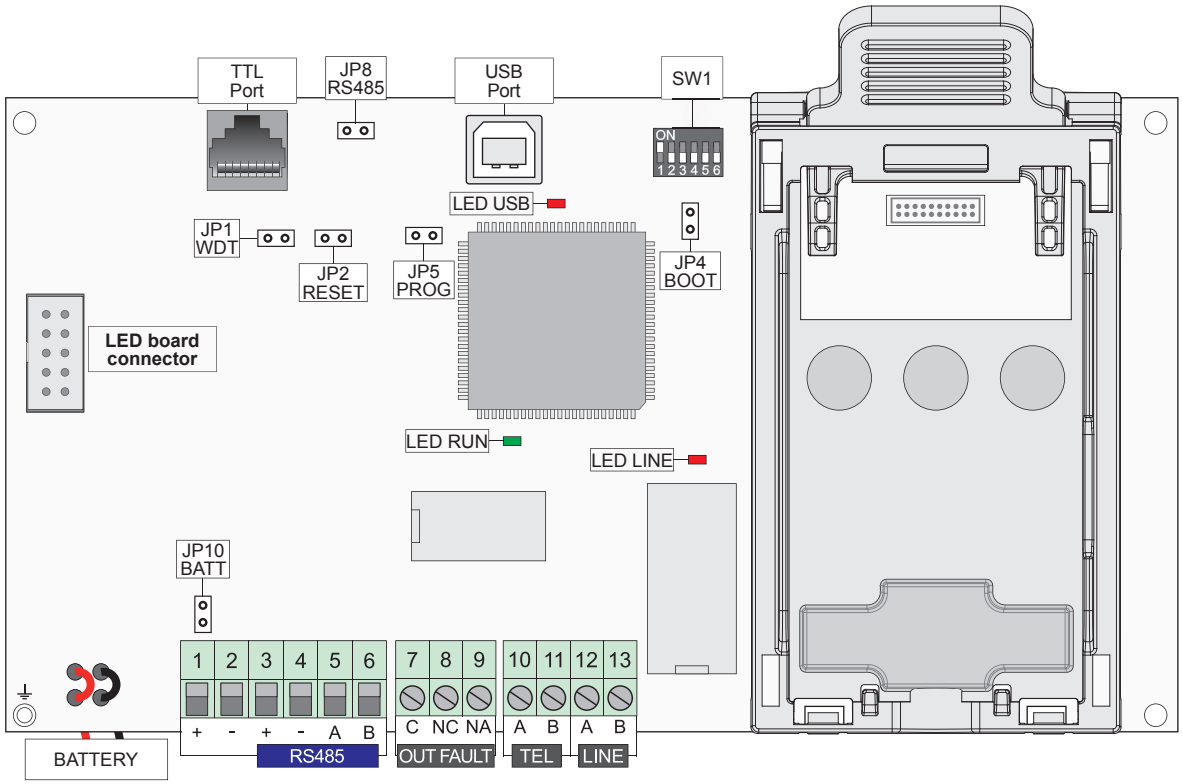
The outputs of each TFPS-5 power supply must be connected in parallel. The negative voltages of the power supplies must be connected in common, the positive voltages must be uncoupled with a Schottky diode SB1240 (12A-40V) and downstream must be connected in common. The resulting pair of wires must be connected to the terminals 24 and 25 of the control panel.

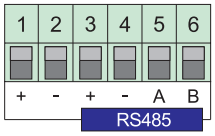
TOTAL CURRENT PROVIDED	
TFA1-298	7.2Ah
TFPS-5 - No. 1	17Ah
TFPS-5 - No. 2	17Ah
Total	41.2Ah



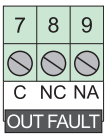
10-6 - Telephone communicator

The electronics of the TFCOM telephone communicator are divided into two parts, the CPU board and the LED board.

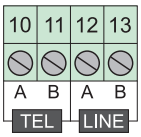




	RS485 serial bus	Notes
1	Positive power supply voltage	24V DC power supply input
2	Negative power supply voltage	
3	Positive power supply voltage	24V DC power supply output
4	Negative power supply voltage	
5	Channel A serial bus	Serial bus communication channels
6	Channel B serial bus	



	Failure output	Notes
7	Common contact	Failure relay output with free contact PTC protected (I max. 0.75A)
8	Normally closed contact	
9	Normally open contact	
N.B. The state indicated for the terminals 8 and 9 is in the condition of unpowered telephone communicator. With the telephone communicator powered, the state of the terminals is reversed: terminal 8 is in NO state and terminal 9 is in NC state		



	Telephone line		Notes
10	**A (TEL)**	Telephone line output A	PSTN telephone line (DC)
11	**B (TEL)**	Telephone line output B	
12	**A (LINE)**	Telephone line input A	
13	**B (LINE)**	Telephone line input B	

EN 54

Warning: the failure output OUT FAULT (terminals 7, 8, 9) is not supervised (type J according to EN 54-1 nomenclature) and therefore, in accordance with EN 54-2, should not be used to control transmission devices for failure alarm.
In accordance with EN 54-21, the serial bus power supply consists of two pairs of power supply terminals (terminals 1, 2, 3, 4).

LED		Signaling
LED RUN	**Green**	Flashing = normal operatiing conditions
LED LINE	**Red**	On = PSTN telephone line busy
LED USB	**Red**	On = USB cable connected

END-OF-SERIAL BUS	
JP8 RS485	Insert on the last device of the serial bus

PROTECTION AGAINST DEEP DISCHARGE		
JP10 BATT		Automatic battery disconnection for Vbat <8.9V DC
		Protection against deep discharge disabled

Key jumpers
Special high-level procedures, such as firmware upgrade, reset of the configuration etc., require the use of specific jumpers available on the CPU board of the telephone communicator:

JP1 WDT - The jumper disables the WATCHDOG circuit of the telephone communicator.
In normal operating conditions, the jumper must always be open.
In some procedures, such as firmware upgrade via serial port, the jumper must temporarily be closed.

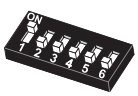
JP2 RESET - The jumper is used to reset and restart the microprocessor.
In normal operating conditions, the jumper must always be open.
In some procedures, such as firmware upgrade, the jumper must temporarily be closed.

JP4 BOOT - The jumper is used to perform the firmware upgrade via USB port.
In normal operating conditions, the jumper must always be open.

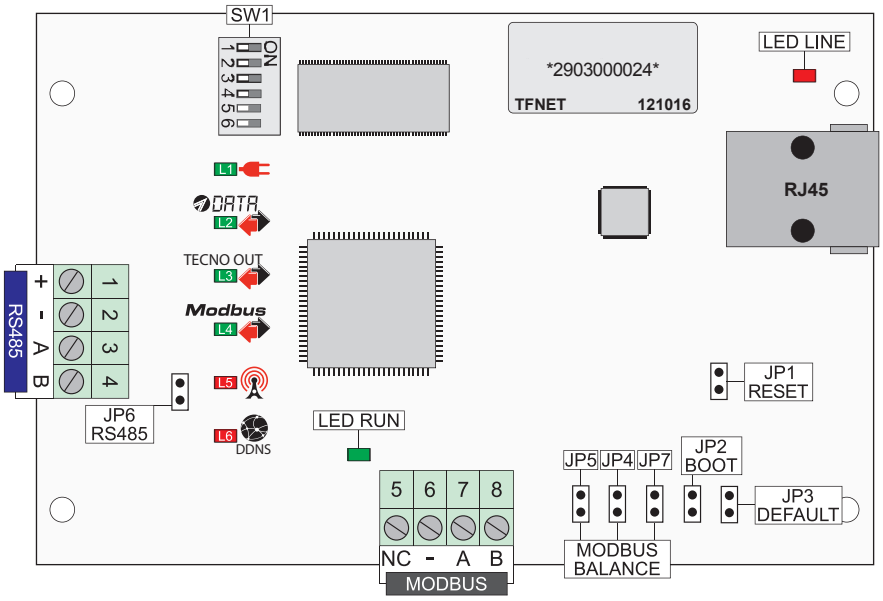
JP5 PROG - The jumper is used to perform the firmware upgrade of the telephone communicator.
In normal operating conditions, the jumper must always be open.
During firmware upgrade via serial port, the jumper must temporarily be closed.

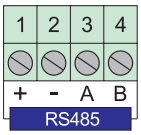
Supervision of jumpers
The telephone communicator oversees the open or closed state of the jumpers to prevent that they are forgotten in the wrong position after use, causing potential undesirable behaviors or malfunctioning of the telephone communicator.
The telephone communicator notifies the condition of anomaly to the control panel.

SPECIAL PROCEDURES		
JP1 - WDT	Leave open during normal operating conditions (jumpers reserved for firmware upgrade and reset of the configuration)	Supervised position
JP2 - RESET		
JP4 - BOOT		
JP5 - PROG		

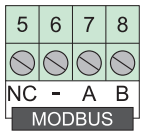
SW1	Address													
	**Address**	**SW1.1**	**SW1.2**	**SW1.3**	**SW1.4**	**SW1.5**	**SW1.6**	**Address**	**SW1.1**	**SW1.2**	**SW1.3**	**SW1.4**	**SW1.5**	**SW1.6**
	0	OFF	OFF	OFF	OFF	OFF	OFF	**9**	**ON**	OFF	OFF	**ON**	OFF	OFF
	1	**ON**	OFF	OFF	OFF	OFF	OFF	**10**	OFF	**ON**	OFF	**ON**	OFF	OFF
	2	OFF	**ON**	OFF	OFF	OFF	OFF	**11**	**ON**	**ON**	OFF	**ON**	OFF	OFF
	3	**ON**	**ON**	OFF	OFF	OFF	OFF	**12**	OFF	OFF	**ON**	**ON**	OFF	OFF
	4	OFF	OFF	**ON**	OFF	OFF	OFF	**13**	**ON**	OFF	**ON**	**ON**	OFF	OFF
	5	**ON**	OFF	**ON**	OFF	OFF	OFF	**14**	OFF	**ON**	**ON**	**ON**	OFF	OFF
	6	OFF	**ON**	**ON**	OFF	OFF	OFF	**15**	**ON**	**ON**	**ON**	**ON**	OFF	OFF
	7	**ON**	**ON**	**ON**	OFF	OFF	OFF	**16**	OFF	OFF	OFF	OFF	**ON**	OFF
	8	OFF	OFF	OFF	**ON**	OFF	OFF							
	N.B. The address 0 disables the telephone communicator. Accepted addresses range from 1 to 5. All the other addresses are reserved.													

10-7 - External Ethernet interface

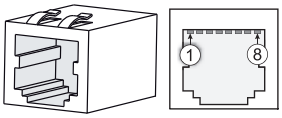




RS485		
1	+	Positive power supply voltage for serial bus
2	-	Negative power supply voltage for serial bus
3	A	Channel A serial bus
4	B	Channel B serial bus



MODBUS		
5	NC	Not connected (terminal not used)
6	-	Negative reference voltage
7	A	Channel A Modbus
8	B	Channel B Modbus



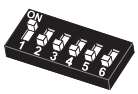
Ethernet connector RJ45			
1	White/green	5	White/blue
2	Green	6	Orange
3	White/orange	7	White/brown
4	Blue	8	Brown

LED		Signaling
LED RUN	Green	Flashing = normal operating conditions
LED LINE	Red	On = Ethernet line busy

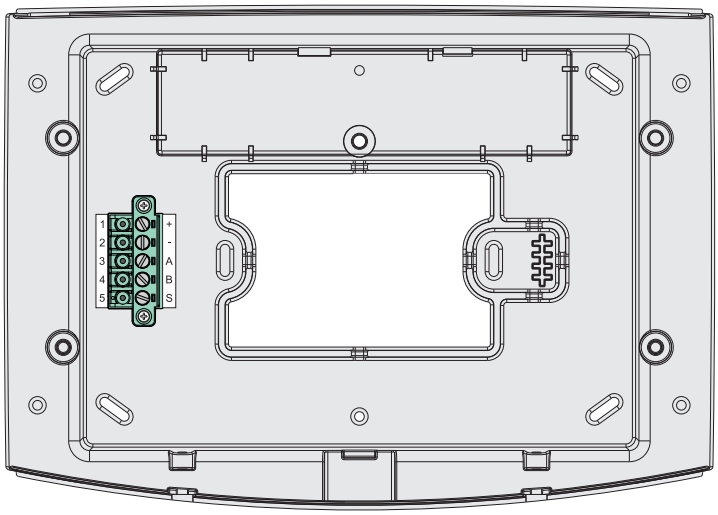
SPECIAL PROCEDURES		
JP1 - RESET	Leave open during normal operating conditions (jumpers reserved for firmware upgrade and reset of the configuration)	Supervised position
JP2 - BOOT		
JP3 - DEFAULT		

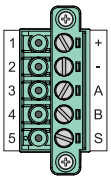
MODBUS TERMINATION		
JP4 - JP5 - JP7 MODBUS BALANCE	● ●	Modbus not terminated (unbalanced)
	▬	Modbus terminated (balanced)

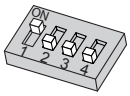
END-OF-SERIAL BUS	
JP6 RS485	Insert on the last device of the serial bus

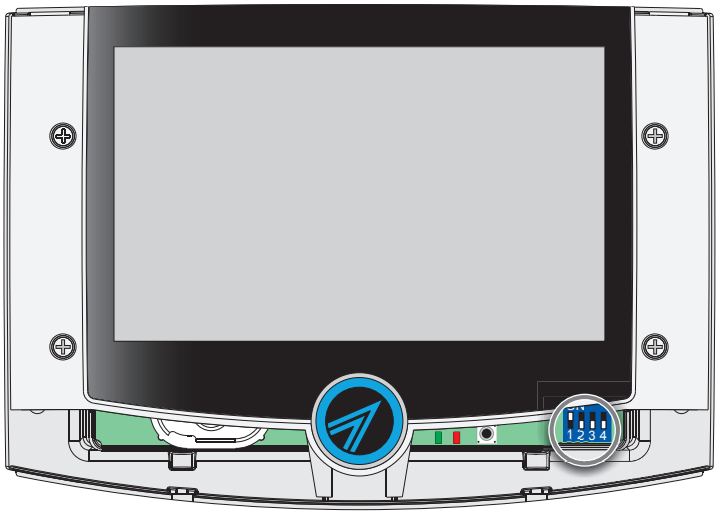
SW1	Address													
	Address	SW1.1	SW1.2	SW1.3	SW1.4	SW1.5	SW1.6	Address	SW1.1	SW1.2	SW1.3	SW1.4	SW1.5	SW1.6
	0	OFF	OFF	OFF	OFF	OFF	OFF	9	ON	OFF	OFF	ON	OFF	OFF
	1	ON	OFF	OFF	OFF	OFF	OFF	10	OFF	ON	OFF	ON	OFF	OFF
	2	OFF	ON	OFF	OFF	OFF	OFF	11	ON	ON	OFF	ON	OFF	OFF
	3	ON	ON	OFF	OFF	OFF	OFF	12	OFF	OFF	ON	ON	OFF	OFF
	4	OFF	OFF	ON	OFF	OFF	OFF	13	ON	OFF	ON	ON	OFF	OFF
	5	ON	OFF	ON	OFF	OFF	OFF	14	OFF	ON	ON	ON	OFF	OFF
	6	OFF	ON	ON	OFF	OFF	OFF	15	ON	ON	ON	ON	OFF	OFF
	7	ON	ON	ON	OFF	OFF	OFF	16	OFF	OFF	OFF	OFF	ON	OFF
	8	OFF	OFF	OFF	ON	OFF	OFF							
	N.B. The address 0 disables the external Ethernet interface. Accepted addresses range from 1 to 5. All other addresses are reserved.													

10-8 - Repeaters



Terminals			Description	Signal
	1	+	Positive power supply voltage for serial bus	+24V DC
	2	-	Negative power supply voltage for serial bus	-
	3	A	Channel A serial bus	Serial
	4	B	Channel B serial bus	Serial
	5	S	Cable shield connection	-

SW1	1	Bus termination
	**ON**	Bus terminated (only if last device)
	OFF	Bus not terminated (only if not last device)
	2	**Unused (reserved)**
	3	**BOOT function**
	ON	Programming mode (BOOT function enabled)
	OFF	Normal operating mode
	4	**CLR function**
	ON	Programming mode (CLR function enabled)
	OFF	Normal operating mode



NOTES

Tecnofire DETECTION by Tecnoalarm

ISO 9001

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