TSA1

Addressable system of detection and extinguishing



Installation manual

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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:
TSA1 Detection and Extinguishing Control Panel
Control Panel complies: EN 54-2:1997 + A1:2006 - EN 12094-1:2003
Power supply unit complies: EN 54-4: 1997 + A1:2002 + A2:2006
Certification number: 0051-CPR-2816
Number of declaration of performance: 044_TSA1
Year of CE marking: 22

TSM1 Detection and Extinction Module
Module complies with: EN 54-18:2005/AC:2007 - EN 54-17:2005 - EN 12094-1: 2003
Certification number: 0051-CPR-2816
Number of declaration of performance: 049_TSM1
Year of CE marking: 22

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

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1 - WARNINGS

1-1 - Obligations and requirements

Introduction
Read this manual carefully before installing the TSA1 System as it provides the necessary information and instructions for correct installation.

Operational limits and purposes of fire detection systems
It is essential to know that a fire detection system does not ensure protection and immunity against material damage of any kind and size caused by or as a result of fires.
It is essential to state that any fire detection system used for detection, extinguishing, actuations, evacuation, etc. must be installed correctly and kept in optimal working condition in line with the instructions provided by the manufacturer and/or the designer.
Tecnofire fire detection systems are able to quickly notify personnel in charge of any dangerous fires. The System can also automatically manage events and therefore, according to the programming methods, to send messages that request the evacuation of protected premises; to activate automatic extinguishing systems; to activate remote control systems, CCTV systems and to provide, through implementations, the compartmentalisation and blocking of systems and equipment, which can by their nature accelerate or fuel the fire, with the aim of preserving the safety of people, safeguarding the protected premises and the assets contained therein.

Cautions and warnings
This document contains the procedures necessary to correctly install the TSA1 system.
However, the interpretation and correct application of its content cannot must accompany training of the technical personnel responsible for installing the products covered in this manual.
In particular, the technical personnel carrying out the installation must have the required basic technical training, must know and correctly apply the current regulations, relating to the installation of fire detection systems, and more generally must know all the regulations in force, concerning installation, maintenance and electrical safety standards. In addition, technical personnel must possess extensive knowledge of the product, gained by attending specific training courses at Tecnofire (fire-fighting division of Tecnoalarm Srl).

Environmental requirements
The control unit and all components of the fire-fighting system must be installed inside structures or buildings with temperature and humidity (non-condensing) characteristics that do not exceed the values set during product approval. The specific operating temperature and humidity values of Tecnofire products are shown in the relevant technical specification tables.

Operating provisions
In order to avoid damage to the control unit, or even worse, dangerous malfunctions, in detecting fires and in action management, responsible for controlling devices and systems that depend on the Tecnofire extinguishing System, it is mandatory to use only the components and devices indicated by Tecnofire; the interfacing of complementary systems built by third parties must be carried out with the Tecnofire input and output modules, verifying each time they are perfectly compatible. Contact Tecnofire's Technical Support Service if in doubt.

Technical support service
Tecnofire's Technical Support Service is always at your disposal to solve technical installation problems, clarify functions and applications of Tecnofire products.

Power supply sources
When designing the system, it is important to take into account that the operating autonomy required by the regulations is respected, correctly sizing the primary (from the mains) and secondary (from backup batteries) power sources.
Please note that in the event of power failure, the system ensures its operation through the backup batteries for a limited period of time, which must correspond to the provisions of current legislation.

Damage
Before operating on any component of the System, in order to avoid damage to the equipment, during installation and in subsequent maintenance, it is necessary to always disconnect all the power sources of the system: primary (mains) and secondary (backup batteries). To avoid damage caused by electrostatic voltages, handle the electronic boards of the devices with extreme care, avoid touching the electronic components directly.

1-2 - Routine maintenance of the System

To ensure the fire detection and extinguishing system stay in optimal condition, it is the customer's responsibility to provide a scheduled preventive maintenance programme. The frequency of checks depends on several factors; however, an assessment carried out on average every 6 months is recommended (unless otherwise specified).
Maintenance must be entrusted to specialised personnel who have the knowledge and equipment necessary to carry out adequate checks and maintenance operations.
It is assumed that the information needed for carrying out adequate maintenance can be provided by the person who developed the project and/or installed the fire detection system.
Maintenance guidelines are provided in the Italian standard UNI 11224.

The most important checks are as follows:

- Operating status of the power supplies and accumulators (APS) of the Control unit and the power supply modules of the System.
- Accumulator status of self-powered devices (sirens, communicators).
- Operating checks of the sensors and modules that make up the system.
- Checks on the cleanliness of the analysis chambers of the optical sensors, and of the optical units of the linear smoke detectors.
- Command efficiency of the control unit and repeaters.
- Functional and operational efficiency of the Silencing, Evacuation and System Restoration procedures.
- Efficiency of the manual alarm button modules.
- Efficiency of optical and acoustic signalling modules.
- Efficiency of telephone communicators (telephone calls testing).
- Implementation check of the System entrusted to the input and output interface modules, etc.
- Checking cables are properly connected to the terminal boards.
- Drawing up a final inspection report, signed by the maintenance technician and accepted by the customer.

2 - REQUIREMENTS

2-1 - Scope and conditions of use

The TSA1 control unit was designed as part of an ISO 9001 quality management system, which provides for the application of a set of rules for the project and plans all the subsequent testing and control activities necessary for the production of all the elements that make it up. All the components used for the construction have been selected for the intended purposes, their characteristics are ensured when the environmental conditions outside the container cabinet correspond to those specified for class A - EN 12094-1: 2003.

Indoor use: the control unit must be installed in a position protected from the elements, checking temperature and humidity is not required in the installation environments.

In Italy, device installation is regulated by UNI standards and national regulations, including Ministerial Decree 37 of 22-1-2008, which requires that fire protection systems be carried out only by authorised companies and operators, in possession of the professional technical requirements (Articles 3-4-5) with regard to the final design, installation and maintenance.

2-2 - Options with requirements

EN 12094-1	**The TSA1 control unit complies with the following options with requirement from the standard EN 12094-1:2003**
	Environmental class: A. Number of flooding zones: 1. For flooding zones: CO2, inert gas, halocarbon gas
Par. 4.17	Delay of extinguishing signal: from 0 to 60s
Par. 4.18	Signal representing the flow of extinguishing agent
Par. 4.19	Monitoring of the status of components
Par. 4.20	Emergency hold device
Par. 4.21	Control of flooding time
Par. 4.22	Initiation of secondary flooding
Par. 4.23	Manual only mode
Par. 4.24	Triggering signal to equipment within the system
Par. 4.25	Extinguishing signals to spare cylinders
Par. 4.26	Triggering of equipment outside the system
Par. 4.27	Emergency abort device
Par. 4.28	Control of extended discharge
Par. 4.30	Activation of alarm devices with different signals
Flooding zones: 1 (2 with secondary flooding and extinguishing signals to spare cylinders)	
Provided options: **Delay of extinguishing signal:** **- Response delay activated condition: maxi 3s** **- Response delay triggering of outputs: maxi 1s**	

EN 54-2	**The TSA1 control unit complies with the following options with requirement from the standard EN 54-2: 1997+ A1:2006**
	Table B.1: Optional functions OPTION SEE CLAUSE
Par. 7.8	OUTPUTS - Fire alarm device(s)
Par. 7.10	OUTPUTS - Automatic fire protection equipment
Par. 7.11	CONTROLS - Delay of the actioning of outputs
Par. 7.12	CONTROLS - Co-Incidence detection (Type B)
Par. 8.3	INDICATIONS - Fault signals from points
Par. 9.5	CONTROLS - Disablement of each address point
Par. 10	CONTROLS - Test condition

EN 54-4	**The power supply section of the TSA1 control unit complies with the requirements of the standard EN 54-4:1997+ A2:2006**
Par. 5.1	Power supply from the main power source
Par. 5.2	Power supply from the standby power source (battery)
Par. 5.3	Charger
Par. 5.4	Faults

2-3 - TSM1 Module- Line Separator Electrical Specifications

Parameters Short circuit isolator_EN54 -17_EN-IT			
EN54 -17 Dec 2005 - § 4.8 required characteristics for qualification test - 24Vdc - Ann. A (Voltage sensing regulator)			
Parameter *Parametro*		**Description** *Descrizione*	**Declared Value** *Valore dichiarato*
1	V_{max}	**Maximum line voltage (V max)** *Tensione di linea massima (V max)*	**30V**
2	V_{nom}	**The nominal line voltage (Vnom)** *Tensione di linea nominale*	**24V**
3	V_{min}	**Minimum line voltage (V min)** *Tensione di linea minima*	**18V**
4	$V_{SO\ max}$	**The maximum voltage at which the device isolates (i.e. switches from closed to open)** *Tensione massima alla quale il dispositivo isola (cioè commuta da chiuso ad aperto)*	**4.2V**
5	$V_{SO\ min}$	**The minimum voltage at which the device isolates (i.e. switches from closed to open)** *Tensione minima alla quale il dispositivo isola (cioè commuta da chiuso ad aperto)*	**1.95V**
6	$V_{SC\ max}$	**The maximum voltage at which the device reconnects (i.e. switches from open to closed)** *Tensione massima alla quale il dispositivo riconnette (cioè commuta da aperto a chiuso)*	**1.65V**
7	$V_{SC\ min}$	**The minimum voltage at which the device reconnects (i.e. switches from open to closed)** *Tensione minima alla quale il dispositivo riconnette (cioè commuta da aperto a chiuso)*	**0,85V**
8	$I_{C\ max}$	**The maximum rated continuous current with the switch closed** *Corrente continua massima nominale con il commutatore chiuso*	**250mA**
9	$I_{S\ max}$	**The maximum rated switching current (e.g. under short circuit conditions)** *Corrente di commutazione massima nominale (per es. in condizioni di cortocircuito)*	**1A**
10	$I_{L\ max}$	**The maximum leakage current with the switch open (isolated state)** *Corrente di dispersione massima con il commutatore aperto (stato isolato)*	**5mA**
11	$Z_{C\ max}$	**The maximum series impedance with the switch closed** *Impedenza di serie massima con il commutatore chiuso*	**0.20 Ohm (2 x 0.10)**

NOTE
- The data of line 4 and 6 are to be considered indicative and not binding, as detailed the norm.
- The isolators are of the type "A" (voltage).
- There is no microcontroller management. The insulator only reports the information to the microcontroller.
- Tollerancies. Consider for all the technical data +/- 10% @ 25°C +/- 3°C.
- In extreme environmental conditions further drift are possible.

Rev. Sheet 5.0 September, 20, 2019

2-4 - TSA Control Unit - Fittings and Equipment

The TSA1 detection and extinguishing control unit is available in three configurations: BASE, LIMITED, EXTENDED. The BASE and LIMITED configurations can be upgraded through purchasing licenses, which let you convert the BASE configuration into the LIMITED and the LIMITED configuration into the EXTENDED.

Supplies	TSA1 BASE	TSA1 LIMITED	TSA1 EXTENDED
Detection lines	1	1	1
EDU Integrated Extinguishing Unit	1	1	1
Addressable detectors	32	64	199
Addressable modules	16	32	99
EDU addressable extinguishing modules	-	5	9
Repetition and telecommunication modules	5	5	5
Conventional zones	3	3	3
Addressable zones	5	50	150
Virtual zones	5	50	150
Alarm plans	100	100	100
Formulas	5	50	100
Time slots	8	8	8
Access levels	4	4	4
Enabling codes	10	10	10

3 - SYSTEM FEATURES

3-1 - TSA1 EXTENDED control unit - Technical features and functions

General information	Addressable fire detection and extinguishing control panel	**TSA1 EXTENDED**
	EDU extinguishing units managed	**1 integrated + 9 modules**
Control panel equipment	Detection loop	**1**
	EDU extinction channels	**1**
	System bus	**Master Bus Slave Bus**
	Display	**Color TFT 4.3" 480 x 272 pixel**
	Event buffer capacity	**8.192**
Detection section	Addressable detectors	**199**
	Addressable modules	**99**
	Addressable EDU modules	**9**
	Detection zones	**150**
	Virtual detection zones	**100**
	Default Zone	**1**
	Specialised relay outputs Max 1A @ 30V DC	**Alarm Fault**
	Monitored relay output Max 1A @ 30V DC	**Siren**
	Open collector outputs Max 50mA @ 24V DC	**2 programmable**
Extinguishing section EDU	Management mode	**Automatic or manual**
	Dedicated detection zones	**3 conventional zones**
	Alternative detection zones	**Control panel zones**
	Monitored inputs	**Pressure switch Flow switch Door Manual activation Ascertainment Abort Reserve activation**
	Monitored relay output Max 750mA @ 24V DC	**Evacuation siren Extinction siren Valve 1 Valve 2**
	Specialised relay outputs Max 1A @30V DC	**Extinction Ascertainment Abort Manual mode EDU excluded**
Cycle of extinction	Cycle run command	**Local or centralised**
	Execution modes programmable options	**Standard Pilot mode Secondary flooding Reserve Sorting**
System management	Access levels	**4**
	Access codes	**10**
Automated managements	Formulas	**100**
	Alarm plans	**100**
	Time periods	**8**
	Programmable calendar	**Quadrennial or perpetual**

Communication protocols	Detection loop	**FIRE-SPEED**
	Master and Slave Bus	**FIRE-BUS**
Equipment	Management interface	**USB port**
System expandability	Expansion devices	**Max. 5**
	Management devices	**TFT-4.3C TFT-7C TFT-7SC**
	Telecommunication devices	**TFCOM TFNET TFCLOUD**
	Role in a network of control panels	**Slave**
Electrical specifications	Consumption	**200mA @ 24V DC**
	Supply voltage for external devices	**20V...27.6V DC**
Power supply	Modular power supply	**Type A (switching)**
	Operating voltage	**230V AC +10% -15% 50Hz**
	Max. consumption	**600mA AC**
	Nominal values	**2.7A @ 27.6V DC**
	Maximum output current	**I max 2.7A**
	Ripple max	**≤230mVpp (<1%)**
	Protection fuse	**T-1A**
Battery	Battery housing	**2 x 12V-7.2Ah**
	Flammability class	**UL94-V2 or superior**
	Internal resistance	**Max. 1.5Ω**
	Release voltage	**For Vbat <17.6V**
	Charging time (2 x 12V-7.2Ah)	**100% in 24h**
Physical specificatons	Environmental class	**A - EN 12094-1:2003**
	Operating temperature	**-5°C...+40°C**
	Relative humidity (without condensation)	**10%...93%**
	Protection class	**IP3x**
	Casing	**ABS - Steel**
	Dimensions (L x H x D)	**440 x 345 x 146mm**
	Weight	**6.8kg**
Conformity	Fire detection and extinguishing control panel	**EN 54-2: 1997+ A1:2006 EN 12094-1:2003**
	Power supply	**EN 54-4:1997 + A1:2002 + A2:2006**
	System compatibility	**EN 54-13:2020**
	Certification number	**0051-CPR-2816**
	Year of CE marking	**22**
	Number of declaration of performance	**044_TSA1**
	Notified body	**IMQ**

3-2 - TSM1 Module- Technical Features and Functions

General information	Addressable detection and extinction module	**TSM1**
	Connection	**Detection loop**
EDU equipment	EDU extinction channels	**1**
	Addressing	**Digital**
	Polling frequency	**Programmable**
	Expansion Bus	**RS485**
	Display	**Capacitive touch screen Color TFT2.4" 320 x 240 pixel**
	Dedicated detection zones	**3 conventional zones**
	Alternative detection zones	**Control panel zones**
	Monitored inputs	**Pressure switch Flow switch Door Manual activation Ascertainment Abort Reserve activation**
	Monitored relay output Max 750mA @ 24V DC	**Evacuation siren Extinction siren Valve 1 Valve 2**
	Specialised relay output Max 1A @ 30V DC	**Fault**
	Specialised open collector outputs Max 50mA @ 24V DC	**Extinction Ascertainment Abort Manual mode**
	Open collector outputs Max 50mA @ 24V DC	**2 programmable**
Cycle of extinction	Cycle run command	**Local or centralised**
	Execution modes programmable options	**Standard Pilot mode Secondary flooding Reserve**
EDU management	Access levels	**4**
	Access codes	**10**
	Management mode	**Automatic or manual**
Communication protocols	Detection loop	**FIRE-SPEED**
	Bus	**FIRE-BUS**

Equipment	Management interface	**USB port**
Expansion devices	TFT-4.3C repeater panel	**Max. 3**
	TFT-4.3C consumption	**50mA @ 24V DC**
	Repeater panel function	**Module management**
Loop Electrical Characteristics	Nominal voltage	**24V DC**
	Operating voltage	**20V...27.6V DC**
	Absorption from Loop	**No**
	Loop isolator	**Double insulator**
Electrical specifications	Module power supply	**From external power supply**
	Module power supply control	**Report voltage fault <15V DC**
	Nominal voltage	**24V DC**
	Operating voltage	**20V...27.6V DC**
	Consumption in stand-by	**90mA @ 24V DC**
	Maximum consumption	**360mA @ 24V DC**
	Supply voltage for external devices	**20V...27.6V DC**
Physical specificatons	Environmental class	**A - EN 12094-1:2003**
	Operating temperature	**-5°C...+40°C**
	Relative humidity (without condensation)	**10%...93%**
	Protection class	**IP3x**
	Casing	**ABS**
	Dimensions (L x H x D)	**189 x 117 x 61mm**
	DIN rail mounting	**10.5 modules**
	Weight	**0.5kg**
Conformity	Addressable detection and extinction module	**EN 54-18:2005/AC:2007 EN 54-17:2005 EN 12094-1:2003**
	System compatibility	**EN 54-13:2020**
	Certification number	**0051-CPR-2816**
	Year of CE marking	**22**
	Number of declaration of performance	**049_TSM1**
	Notified body	**IMQ**

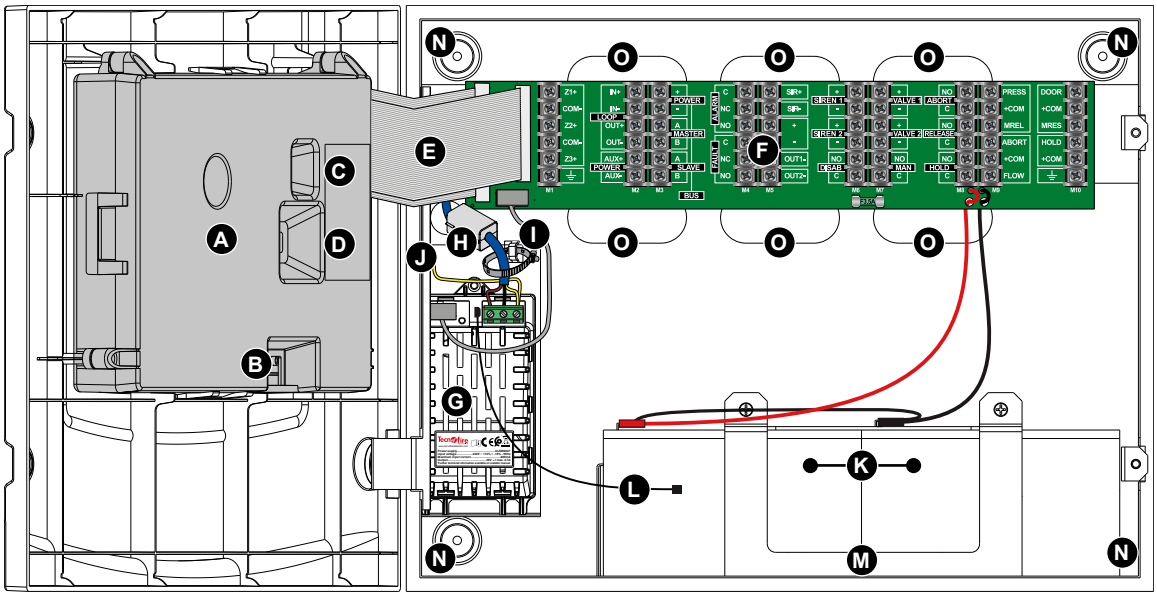
4 - TSA1 CONTROL UNIT INSTALLATION INSTRUCTIONS

4-1 - Overall view

The control unit consists of an ABS and steel cabinet, capable of containing two 12V-7.2Ah batteries and three macro elements: a controller board, called CPU that integrates the user interface consisting of the display and the management and programming keyboard, a 24V - 2.7A switching power supply (ALSW2827) and a cable connection board on which the terminal blocks for connecting the system devices are arranged.



A	4.3" display	C	Navigation key area	E	LED signalling the functions of the control unit
B	Numeric key area	D	Management key area	F	LED signalling EDU functions



A	CPU Board Cover	F	Cable connection board	K	2 x 12V-7.2Ah Batteries
B	USB port	G	ALSW2827 power supply	L	Battery Temperature Control NTC Probe
C	Serial Bus Balancing Jumpers	H	Ferrite core for 220V AC cable	M	Battery Lock Bracket
D	Service jumpers	I	220V AC cable slot and cable tie	N	Holes for fixing the cabinet
E	Flat cable boards connection	J	Ground connection to the cabinet	O	Cable entry slots

4-2 - Installation Mode

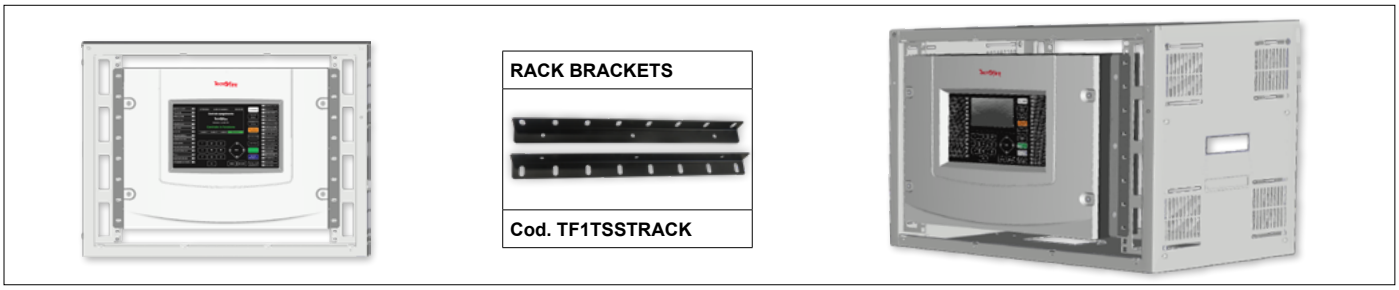
The control unit cabinet must be installed in a position protected from accidental impacts, at a height that ensures operators and authorised personnel full access to the management keys and full visibility of the display and the signalling LEDs of the front panel of the control unit.
To facilitate operation during installation and subsequent maintenance, it is advisable not to install the left side of the control unit near a corner, but to always ensure at least 38cm clearance.
The maximum size of the cabinet with the door open is L.82cm x W.56cm.
Secure the levelled control unit cabinet using 4 x 8mm diameter dowels.

General Notes - Operator Safety
As indicated for any electrical appliance, there must be no dripping or splashes of water on the control unit, no objects containing liquids must be placed nearby. The control unit must be installed at a suitable distance from heat sources (radiators, etc.). The control unit must be guaranteed sufficient ventilation, its container must not be covered by objects that prevent correct heat dissipation.



4-3 - 19" Rack mounting

The control unit can be mounted in 19" rack cabinets, the unit occupies a height of 8U.
The assembly can be performed with a pair of fitting brackets supplied as accessories.



4-4 - Connecting cables

The cables used to connect the devices must comply with European CPR regulation EU 305/2011.
When laying cables, it is necessary to comply with the installation rules established by the standards.
The European reference directive is the LVD Low Voltage Directive LVD 2014/35/EU.
The installer is responsible for inquiring about the standards and obligations that must be met.
For reasons of electrical safety, the connection of the cable shield must maintain electrical continuity along its path, without interruption; one of the two ends must be connected to the ground of the electrical system, the connection must be made inside the control unit cabinet.

For the Loop line it is recommended to use a multipolar twisted duplex with flexible and shielded conductors.
For the sizing of the cable cross section to be used for the Loop line, refer to the table that indicates the minimum cross section of the conductors according to the length of the Loop line.
For the sizing of the cross section of the 24V power lines, calculate the electrical load and the voltage drop according to the line length.

The maximum length of the detection loop must not exceed 3000 metres.
The maximum length of the RS485 bus line is 1000 metres. It is possible to reach greater distances with a fibre optic connection, made with an RS485 fibre optic converter model TFSFC01.

LOOP LENGTH AND CABLE CROSS SECTION TABLE			
Loop Length	**Minimum cross section required**	**Loop Length**	**Minimum cross section required**
750 meters	0,75mm²	1500 meters	1,5mm²
1000 meters	1mm²	3000 meters	2,5mm²

4-5 - Instructions for connection and use of the system outputs

Instructions for connection and use of the system outputs
The relays and electrical outputs available on the control unit and on the addressed modules, are part of an "ES1" (EN 62368-1) type power supply network. Therefore, these relays and outputs can only be interfaced with other circuits that fall within the safety voltages defined as "ES1".

Usage restrictions of TSA1 control unit outputs
The ALARM output (terminals 19, 20,21) is an uncontrolled output.
The FAULT output (terminals 22, 23, 24) is an uncontrolled output.
The OUT1 (terminal 29) and OUT2 (terminal 30) are uncontrolled outputs.
In accordance with EN 54-2, the ALARM , FAULT, OUT1 and OUT2outputs must not be used to control fire alarm devices and/or transmission devices of fire alarm and fault signalling notifications.

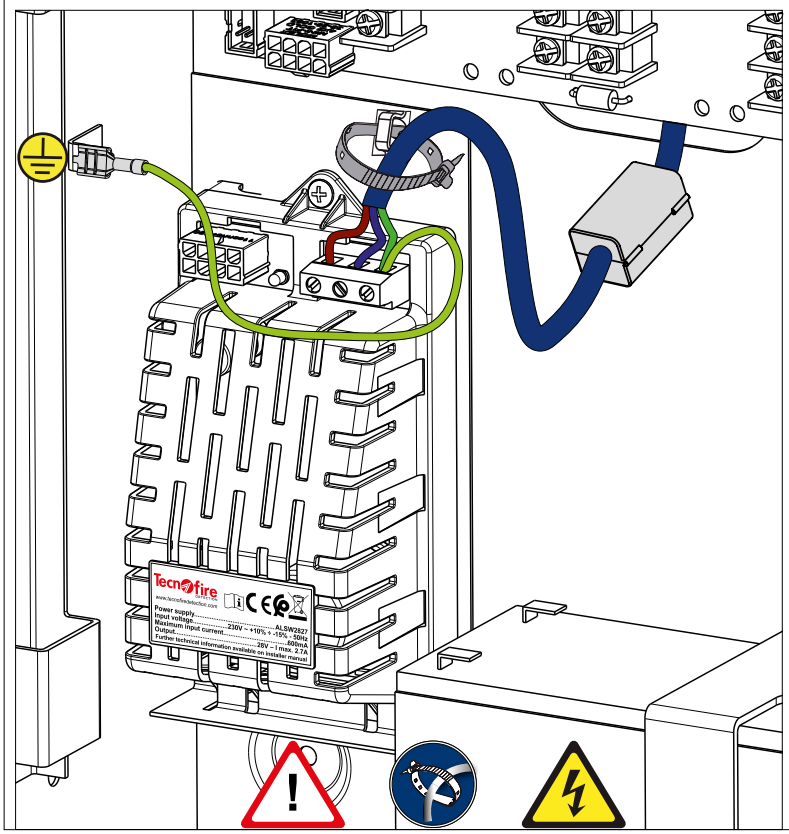
4-6 - Compliance with EN 62368-1 - Electrical safety

Earthing System
The earthing system to which the control unit is connected must have the certification requirements as stipulated by current regulations.
Remember to connect the earth cable to the power supply and to extend the connection of the earth cable to the metal wall of the cabinet.

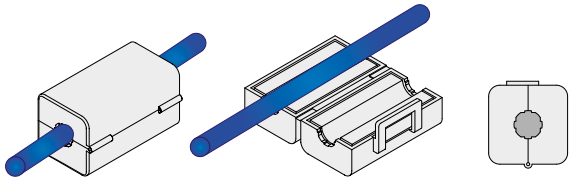
External cut-off device
The power supply to the unit does not have a device for cutting off from the mains voltage. In compliance with EN 62368-1 electrical safety standards, it is mandatory to provide on the electrical power supply system (230V AC) an isolating device such as thermal magnetic breaker, or residual current device 2-pole - 10 A curve C with contact distance of at least 3mm. The device must be placed in the immediate vicinity of the control unit, or in an electrical panel where the name of the protected utility is clearly identifiable..

Connection of the 230V AC primary mains power supply cable
The mains power cable is not supplied with the control unit. To avoid the risk of accidental electric shock under normal operating conditions from the power supply, it is necessary that:

- The power supply is connected to the mains using a double insulated cable (equipped with an insulating sheath).
- The network cable with a minimum cross-section of 1.5mm2 connected to the power supply input terminal block must be anchored with the supplied cable tie or with similar means to the fixing slot mounted on the bottom of the cabinet (see figure).
- For the purpose of electrical safety and for correct equipment operation, it is important to connect the ground conductor on the power supply together with the earth wire supplied, the other end of the wire headed with the faston must be connected on the male faston welded inside the cabinet (see figure).



Ferrite core
For EMC compliance it is mandatory to fit the supplied ferrite core to the mains power cable. The core must be mounted in the immediate vicinity of the power supply connection terminal block.



Connecting the power supply cable
Connect and secure the mains cable, with a cable tie and extend the earth connection to the cabinet, the connection must be made as shown in the figure.

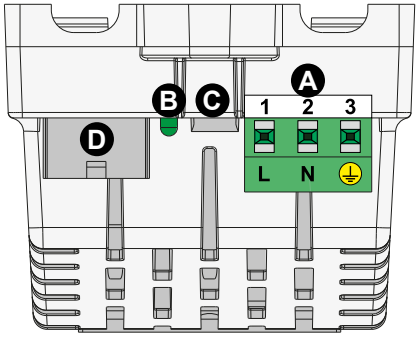
4-7 - Power supply - Primary power supply

The TSA1 control unit is equipped with a switching power supply model ALSW2827.
The power supply is connected with a polarised wiring on the cable connection board.
In addition to the power supply, the wiring also transfers diagnostic signals to the control unit. The maximum current supply of the power supply is 2.7A, the rated voltage of 24V DC, the factory regulated output voltage is 28.8V DC @ 25°C.
N.B. the voltage value measured on the battery charger output is subject to dynamic variations, influenced by the battery temperature. The battery temperature is detected by the probe, which must be fixed in contact on the battery container.

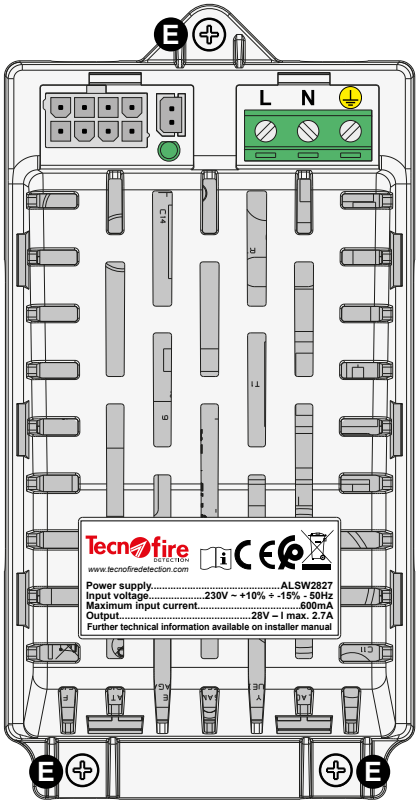
Output protections
The output section of the power supply is self-protected against short circuits and overloads; in the event of one of these conditions occurring, the device switches off, and then automatically reactivates when the cause that caused it is resolved, that is, when normal operating conditions are restored.

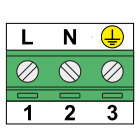
Input protections
The 230V AC mains input is protected against overvoltages, by varistors and an integrated fuse on the electronics.
Fuse blowing is however a rare event, due to exceptional events, such as lightning or excessive mains overvoltage.The fuse cannot be replaced by the user, only competent technical personnel can do so.

Input Protection Fuse	Current	Interruption time
Delayed type F1:1A - T	1,5A	Approximately 1 hour
	2A	About 2 minutes
	4A	From 150ms to 3 seconds
N.B. the interruption time of the fuse varies according to the value of the interrupted current with respect to the rated current value.		

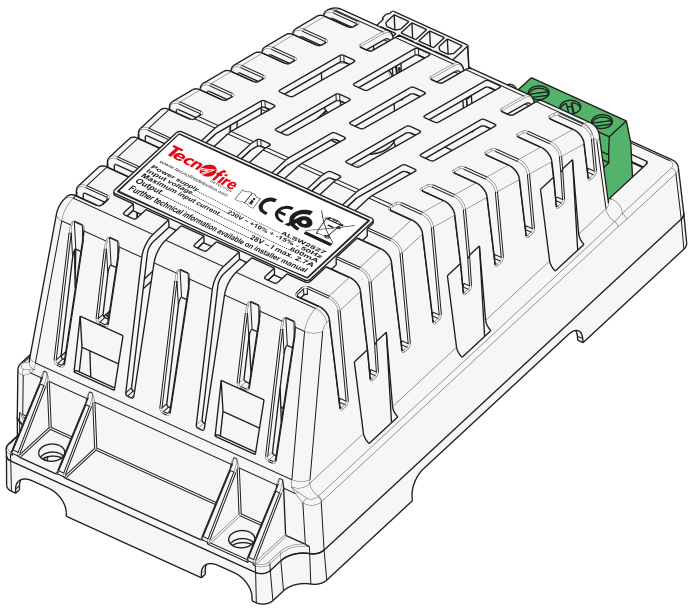


A	Terminal block for connecting the power cable from the mains
B	Green LED indicates the presence of the power supply from the mains
C	Polarised connector for the connection of the temperature detection probe
D	Polarised connector for connecting power supply wiring
E	Power supply fixing screws





		230V AC power supply connection terminal block
1	L	Phase conductor connection
2	N	Neutral conductor connection
3	⏚	Ground conductor connection



4-8 - Batteries - Secondary Power supply

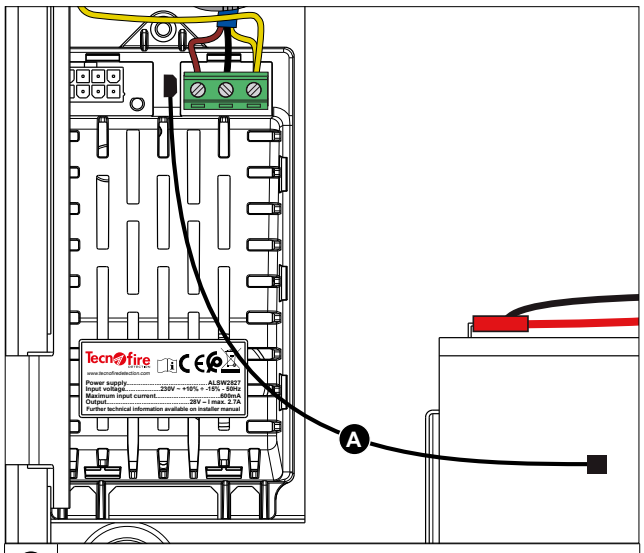
Battery warnings
There must always be two batteries.
Always use batteries from the same manufacturer and of the same capacity; capacities lower than 7.2Ah, in addition to reducing the hourly autonomy, falsify the measures related to the internal resistance causing possible incorrect fault alerts..

Self-regulation of the charging voltage
The power supply reads the battery temperature via the control probe, and based on the thermal value found dynamically adjusts the charge voltage of the batteries.

Temperature control probe
The temperature control probe must be connected to the polarised connector of the power supply dedicated to the function, the sensitive end of the probe must be fixed in contact with the battery container, to fix the probe use insulating tape.

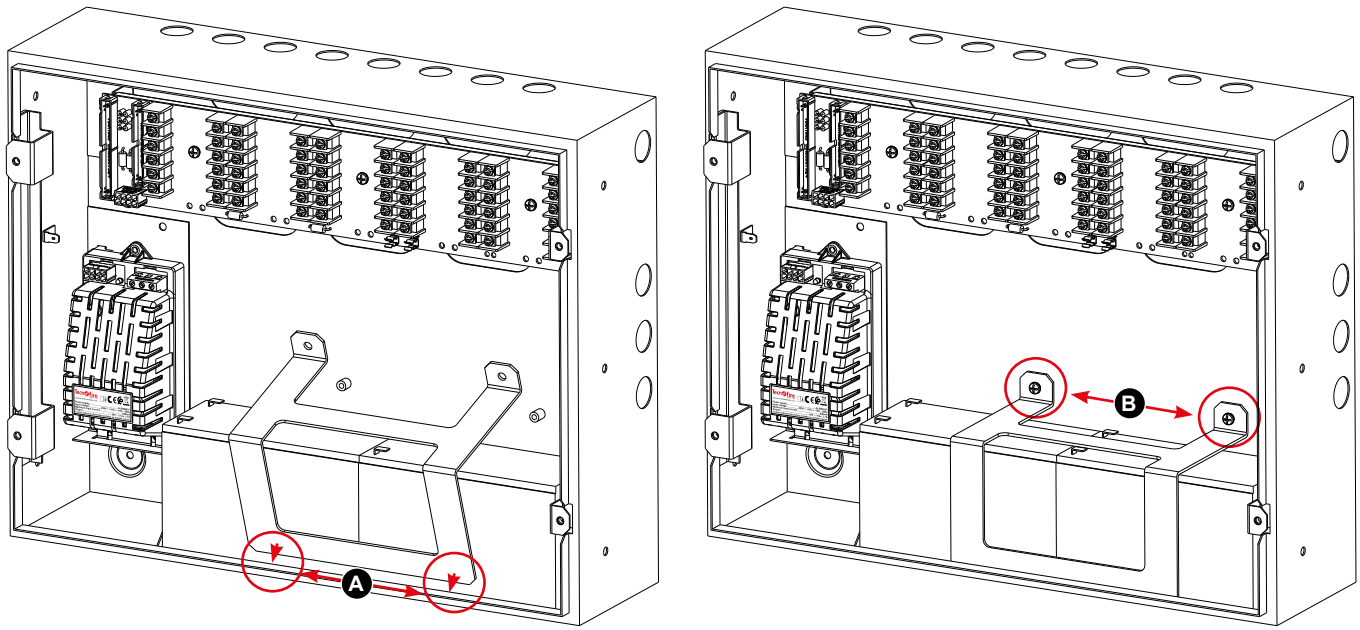
Locking the batteries
In compliance with EN 54 standards, it is mandatory to lock the two batteries by using the appropriate fixing bracket, the bracket must be screwed on the bottom of the cabinet.

Auto disconnect
In case of operation in the absence of the primary power supply voltage (230V AC mains), the batteries automatically come into operation. When the voltage of the batteries drops to a value ≤ 17.6V for a duration of 15 minutes, the automatic disconnection of the batteries is required, to stop them from completely draining and resulting performance deterioration.



A	Battery temperature control probe

Fixing the battery bracket



A	Place the batteries and insert the bracket into the two anchoring slots, located at the bottom.
B	Rotate the bracket towards the bottom of the cabinet, secure the bracket using the two screws provided

4-9 - Boosting Secondary Power supply

Regulatory reference

The UNI 9795 standard indicates the conditions and parameters necessary to size, the availability of secondary power supply current.

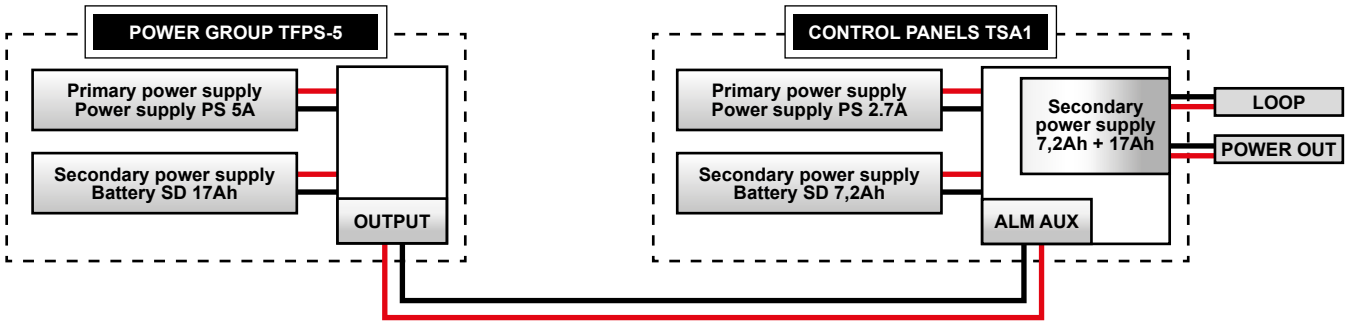
The secondary power supply must be sized to ensure, in the event of interruption of the primary power supply, correct autonomous operation of the entire system. The autonomous operating time must be equal to the sum of the times necessary for signalling, working on and restoring the System, and in any case must not be less than 24 hours, in addition the alarms must be transmitted with EN 54-21 certified devices to one or more receiving stations.

At the end of the minimum 24h required, the secondary power supply must in any case guarantee the operation of the entire System for at least another 30 minutes from the signal of the first alarm.

Additional Power Supply

In the event that, under during autonomy, the power consumption of the System goes beyond the current availability of the battery housed in the control unit, it becomes necessary to bolster the current resources of the secondary power supply, for this purpose the Tecnofire TSA1 control unit has dedicated terminals for connecting an additional power supply.

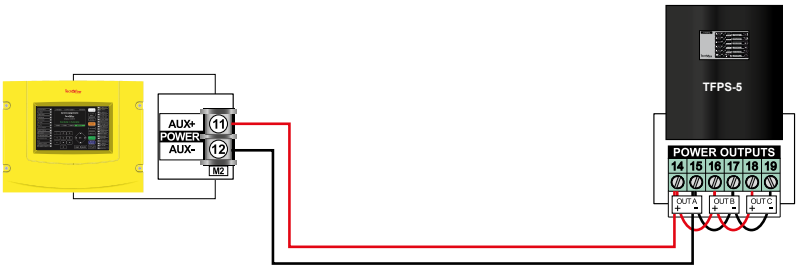
The supplementary power supply must comply with EN 54-4, for this use we recommend one or more TFPS-5 power supply units, the operation of the TFPS-5 module connected on the Loop line is supervised by the System, therefore it is sufficient to connect the power output of the unit directly to the terminals of the control unit used to connect the supplementary power supply.



Connecting a Power Supply Unit

The example diagram illustrates the connection mode of a TFPS-5 power supply unit. The power outputs of unit A, B and C must be connected to each other in parallel, the resulting pair of power cables is connected to terminals 11 and 12 of the TSA1 control unit.

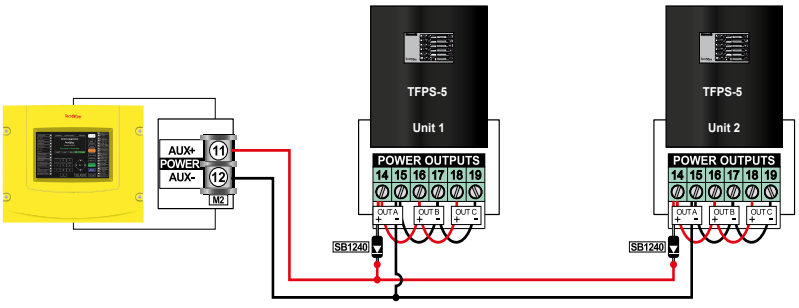
SECONDARY POWER SUPPLY	
TSA1	7,2Ah
TFPS-5	17Ah
Total current	24,2Ah



Connecting two or more power supply units

The example diagram illustrates how to connect two TFPS-5 power supply units. The power outputs of each individual unit must be connected to each other in parallel, the output negative of the two units must be shared, the output positive of each individual power unit must be decoupled with a diode, the two positives must be shared downstream of the decoupling diodes, the resulting pair of power cables is connected to terminals 1 and 12 of the TSA1 control unit. For decoupling use a schottky diode SB1240 (12A-40V).

SECONDARY POWER SUPPLY	
TSA1	7,2Ah
TFPS-5 - No. 1	17Ah
TFPS-5 - No. 2	17Ah
Total current	41,2Ah



4-10 - Power supply section

1 - Composition of the power supply section
The power supply section of the control unit complies with the requirements of EN 54-4/A2. It consists of a primary power supply (PS Power Supply) and a secondary power supply (SD Backup Batteries). The primary power supply consists of a modular switching power supply, capable of delivering a constant current of 2.7A at 28V.
The secondary power supply consists of 2 x 12V 7.2Ah batteries connected in series with each other. There must always be 2 batteries, never use batteries that are from different manufacturers, of different capacities and/or production periods.
Besides reducing the hours of autonomy, using batteries with a capacity of less than 7.2Ah creates erroneous measuring related to the internal resistance causing possible incorrect fault reports.

2 - Mains presence LED
When the power supply section of the control unit is in normal operating state or when there are no faults, the only LED lit is the green LED "MAINS PRESENCE".

3 - Battery reverse polarity protection
The power supply section is protected against polarity reversal of the batteries. If this happens, the fuse (F 3.15A L, 250V 5x20mm) blows protecting the electronics from damage due to incorrect connection.

4 - Restoring the fault alerts
With the "Automatic Silence Faults" option enabled, resolving the Fault automatically restores all alerts and removes the fault notification from the event queue. With the option disabled, resolving the Fault does not automatically restore all the alerts, so it is necessary to manually restore the control unit.

POWER SUPPLY SECTION FEATURES		
Power supply Power supply (PS)	Modular power supply	**28,8V DC 2,7A switching**
	Mains power supply	**230V AC +10% -15% 50Hz**
	Operating voltage	**180÷250 V AC 50Hz**
	Maximum current consumption	**600mA AC**
	Maximum deliverable current	**Imax (a) 2A**
	Maximum current that can be delivered without a battery charge	**Imax (b) 2,7A**
Backup batteries Storage device (SD)	Voltage	**12V**
	Maximum allocable capacity	**2 x 12V 7,2Ah**
	Battery Test	**Automatic every 30 minutes.**
	Charge time	**80% 24h - 100% 48h (2 7,2Ah batteries)**
	Battery release	**Automatic with voltage less than 17,6V DC**
Current breakdown available	Current for battery charger	**Max. 700mA**
	Control unit consumption	**Max. 200mA**
	Loop Line Current	**Max. 300mA**
	Master and Slave BUS current	**Max. 500mA**
	Current for connected utilities on outputs	**Max. 800mA**
Managed fault alerts	Main source loss	**See table 01**
	Secondary source loss	**See table 02**
	High internal battery resistance	**See table 03**
	Battery charge loss	**See table 04**
	Power supply overvoltage	**See table 05**
	Low battery in the absence of mains	**See table 06**
	Flat battery in the absence of mains	**See table 07**

4-11 - Power supply section fault reports

The methods for reporting and managing faults affecting the power supply section of the control unit are illustrated in the following tables. For each type of fault, the tables indicate: the test frequency, the validation and reporting time, the actions generated and the conditions and methods of return from the fault alert.

TABLE 01 - MAIN SOURCE LOSS FAULT	
Il test viene effettuato ogni secondo, il guasto viene generato quando il test verifica la mancanza di alimentazione da rete elettrica allo scadere del tempo di verifica programmato.	
Test Frequency	1 second
Fault Generation	Programmable from 0 to 30 minutes (verification time required for fault generation)
Actions generated on fault onset	The "MAINS" LED turns off
	The "POWER SUPPLY FAULT" Led flashes
Actions generated by the fault	The control unit display indicates "MAINS FAULT" The breakdown of the fault alert is entered in the Fault folder
	The general fault counter is increased
	The "POWER SUPPLY FAULT" Led lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT”relay is activated
Conditions of return from fault	The fault alerts return after checking for a time equal to the programmed verification time that the mains supply voltage has been restored.
N.B. The "POWER ON" LED signal follows the mains presence status immediately without any delay	

TABLE 02 - SECONDARY SOURCE LOSS FAULT	
The test is carried out every 10 seconds, on each individual battery. The test checks if the no-load battery voltage is below 10V. If the verified voltage is below the set alert threshold (value cannot be modified) for 5 minutes, the fault alert is generated.	
Test Frequency	10 seconds
Fault Generation	5 minutes (verification time required for fault generation)
Actions generated on fault onset	The “BATTERY FAULT” Led flashes
Actions generated by the fault	The control unit display indicates "BATTERY FAULT OR ABSENT" The breakdown of the fault alert is entered in the Fault folder
	The general fault counter is increased
	The "BATTERY FAULT" Led lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT” relay is activated
Conditions of return from fault	The fault alerts return after having found, for a period of at least 30 seconds, that the no-load voltage of each individual battery is greater than the value of 10V. Fault alerts will only be automatically reset if the "Automatic System Fault Silence" function is enabled.
N.B. The test is performed only in the presence of power from the main source.	

TABLE 03 - FAULT FOR HIGH INTERNAL BATTERY RESISTANCE	
The test is performed every 30 minutes. To calculate the internal resistance of the battery, the no-load and load voltage are measured. If the resistance exceeds the set alert threshold (1.5Ω unchangeable value) the fault alert is generated.	
Test Frequency	30 minutes
Fault Generation	2 hours (verification time required for fault generation)
Actions generated on fault onset	The “BATTERY FAULT” Led starts flashing
Actions generated by the fault	The control unit display indicates "BATTERY FAULT". The breakdown of the fault alert is entered in the Fault folder.
	The general fault counter is increased
	The "BATTERY FAULT" Led lights up
	The “GENERAL FAULT” LED starts flashing
	The “FAULT” relay is activated
Conditions of return from fault	The fault alerts return after having found, for a period of at least 30 seconds, that the value of the internal resistance of the battery is lower than the threshold value. Fault alerts will only be automatically reset if the "Automatic System Fault Silence" function is enabled.
N.B. The test is performed only in the presence of power from the main source.	

TABLE 04 - POWER SUPPLY FAULT - BATTERY CHARGER LOSS	
The test is carried out every 1 second, the fault is generated when the test verifies for more than 5 minutes the presence of the power from the mains, but does not detect the supply, from the power supply, of the current necessary to recharge the batteries	
Test Frequency	1 second
Fault Generation	5 minutes (verification time required for fault generation)
Actions generated on fault onset	The “POWER SUPPLY FAULT” Led starts flashing
Actions generated by the fault	The control unit display indicates "POWER SUPPLY FAULT" The breakdown of the fault alert is entered in the Fault folder.
	The general fault counter is increased
	The "POWER SUPPLY FAULT" Led lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT” relay is activated
Conditions of return from fault	The fault alerts return after having found, for a period of 5 minutes, that the power supply provides the current necessary for recharging the batteries. Fault alerts will only be automatically reset if the "Automatic System Fault Silence" function is enabled

TABELLA 05 - POWER SUPPLY OVERVOLTAGE	
The test is carried out every 1 second, the fault is generated when the test verifies that for more than 60 seconds the value of the supply voltage of the external devices exceeds the value of 30V.	
Test Frequency	1 second
Fault Generation	60 seconds (verification time required for fault generation)
Actions generated on fault onset	The “POWER SUPPLY FAULT” Led starts flashing
Actions generated by the fault	The control unit display indicates "OVERVOLTAGE FAULT" The breakdown of the fault alert is entered in the Fault folder.
	The general fault counter is increased
	The "POWER SUPPLY FAULT" Led lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT” relay is activated (guasto)
Conditions of return from fault	The fault alerts return after having found, for a period of at least 60 seconds, that the power supply voltage value has returned below 30V. Fault alerts will only be automatically reset if the "Automatic System Fault Silence" function is enabled.

TABLE 06 - LOW BATTERY IN THE ABSENCE OF MAINS	
The test is carried out only when the main power voltage is absent, test frequency every 10 seconds, the fault is generated when the test verifies for more than 15 minutes that the voltage value of the batteries has fallen below 21.6V.	
Test Frequency	1 second
Fault Generation	15 minutes (verification time required for fault generation)
Actions generated on fault onset	The “BATTERY FAULT” Led starts flashing
Actions generated by the fault	The control unit display indicates "LOW BATTERY FAULT". The breakdown of the fault alert is entered in the Fault folder
	The general fault counter is increased
	The "BATTERY FAULT" Led lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT” relay is activated
Conditions of return from fault	The fault alerts return after having found, for a period of at least 30 seconds, that the battery voltage value is higher than the value of 22.8V. Fault alerts will only be automatically reset if the "Automatic System Fault Silence" function is enabled.

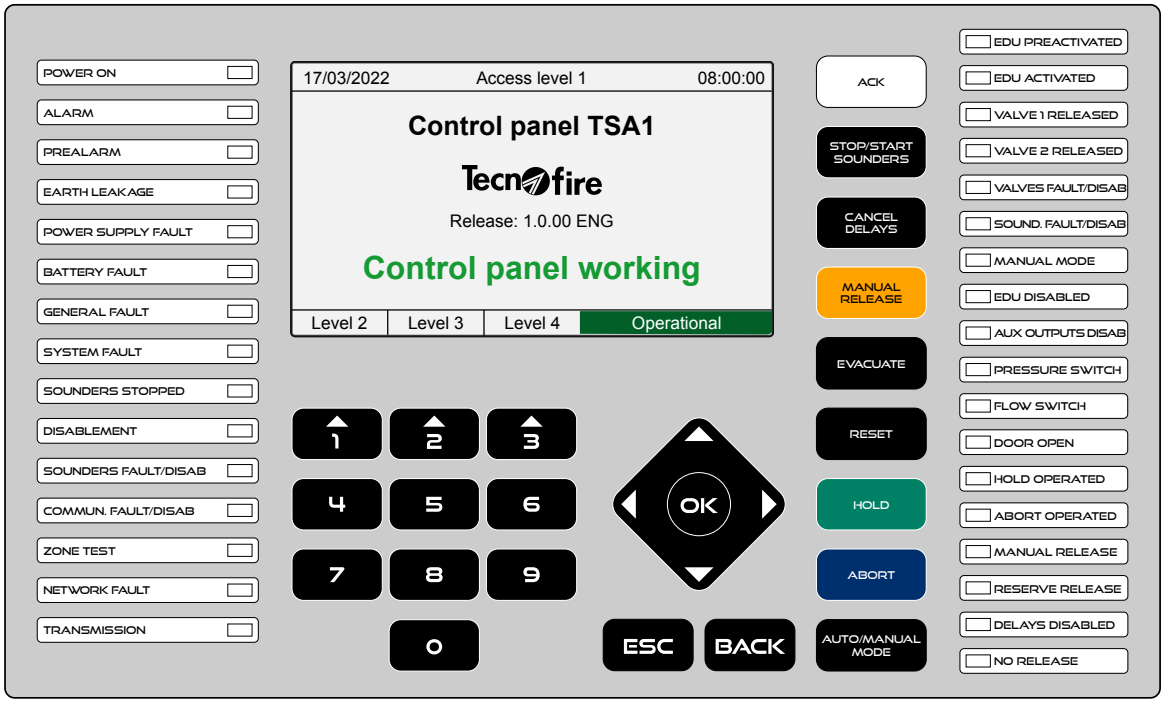
TABLE 07 - FLAT BATTERY IN THE ABSENCE OF MAINS	
The power supply has a control that prevents the batteries from going completely flat (to preserve their subsequent recharge). If the power supply is without mains power and the battery level drops below 18 Volts, after a 15-minute check time the power supply disconnects the batteries and switches off.	
Actions generated 10 seconds before switching off the power supply	The control unit display indicates "BATTERY FAULT". The breakdown of the fault alert is entered in the Fault folder
	The general fault counter is increased
	The "BATTERY FAULT" Les lights up
	The “GENERAL FAULT” Led starts flashing
	The “FAULT” relay is activated


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5 - TSA1 CONTROL UNIT MANAGEMENT INTERFACE

5-1 - Control unit panel

The front panel of the TSA1 control unit is composed of a 480 x 272 pixel colour TFT display, 33 LED indicators, 9 function keys, 7 navigation keys and 10 numerical keys. Depending on the level of access, via the front panel users can manage the detection and extinction system and/or program it.
The management interface is completed by the Buzzer.



5-2 - TSA1 Control Unit - Access Levels

The control unit has 4 access levels: Level 1 Level 2 Level 3 Level 4.
Level 1 is always available, access to higher levels is subject to the recognition of a code.
Access Level 2 is reserved for users, eight User codes can be programmed.
Access level 3 is reserved for the installer / maintenance technicians, only one code can be programmed.
Access level 4 is reserved for the manufacturer, only one code can be programmed.

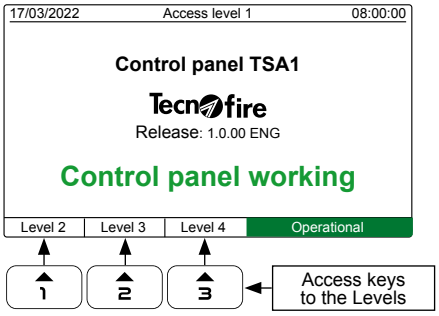
Level 1
The control unit in sleep makes functions reserved for Level 1 available.
At Level 1 you can do the following:
A - Access levels: 2, 3, 4, press 1 or 2 or 3 and enter the Levels access code.
B - Acquire the alarm by pressing the SILENCE key
C - View the alarms in progress, previously acquired, stored in the event category folders.

Level 2
To access the Level, press key 1 and enter the relevant code.
At Level 2 you can perform all the operations of the previous level and also perform the following operations:
A - Use of all the function keys of the control panel
B - Access the list of menus reserved for Level 2.

Level 3
To access the Level, press key 2 and enter the relevant code.
Level 3 is reserved for the installer / maintenance technicians. At Level 3 you can perform all the operations of the previous levels and access the menus reserved for Level 3.

Level 4
To access the Level, close the jumper of the CPU board, JP5 KEY, press key 3 and enter the relevant code.
Level 4 is reserved for technical personnel authorised by the manufacturer to carry out relevant technical operations.
At Level 4 you can perform all the operations of the previous levels and in addition you can access the menus reserved for Level 4.

5-3 - Access to Operational Levels



Access Methods and Factory Codes	
Access Level 1 is always available	
Access to level 2	↑1 + ↑1 ↑1 ↑1 ↑1 ↑1 + ↑1
Access to level 3	↑2 + ↑1 ↑2 ↑3 4 5 + ↑1
Access to level 4	↑3 + 5 4 ↑3 ↑2 ↑1 + ↑1

5-4 - Front Panel Keys

The table describes the function of the control panel keys, how to implement the commands and the related signals

Key	Function	Implementation procedures
↑1 ↑2 ↑3	Numeric keys 1, 2 and 3 are accompanied by an upward-facing triangle. The triangles have the function of indicating the corresponding fields displayed on the screen: Level 2, Level 3, Level 4	The function of the keys changes depending on the operating context indicated by the display fields; depending on the situation, the keys can perform the function of numeric keys or hot keys. Use the Hot Keys to select Access Levels.
0 9	Numeric keys	Numeric keys allow you to type passwords and select directly: menus, devices, etc.
OK	Navigation and confirmation keys. The arrow keys allow you to select menu items. Depending on the context, they allow you to change the page displayed and/or increase or decrease the programming parameters. The OK key has the function of confirming the choice indicated by the cursor.	▲ Move Cursor Up - Increase Value ▼ Move Cursor Down - Decrease Value ◀ Move Cursor Left - Decrease value ▶ Move Cursor Right - Increase the value OK Confirm the choice indicated by the cursor
ESC	Exit key	You exit the menu or function displayed
BACK	Key to go back	When writing text - causes the cursor to move to the previous position deleting the character. In the selection criteria - cancels the operation indicated by the display.
ACK	Pressing the key certifies that the operator has acquired the alarm shown for the events of: Alarm, Pre-alarm, Extinguish, Fault. In addition, the control unit speakers and system repeaters are silenced. Warning: The key does not silence the sirens and activation devices managed by the System (output modules, sirens, etc.)	1 - Press **ACK** Password is not required The **PREALARM and/or ALARM** and/or **GENERAL FAULT** Leds that before were flashing light up on steady. The display alarm signals remain visible
STOP/START SOUNDERS	Pressing the key followed by entering the password causes the silencing or resetting of all the General Siren alarm signals programmed for the events of: Alarm, Pre-alarm, Extinguish, Fault. Warning: The silence function can also act on the individual implementation devices managed by the system: output modules, sirens, etc., only if for each of them the silence function has been programmed	1 - Press **STOP/START SOUNDERS** 2 - Type the Level 2 Password The **SOUNDERS STOPPED** Led turns on
CANCEL DELAYS	Pressing the key followed by entering the password, enables or disables all implementation delay times managed by the control unit for the detection section and for the extinguishing section.	1 - Press **CANCEL DELAYS** 2 - Type the Level 2 Password The **DELAYS DISABLED** Led turns on
MANUAL RELEASE	Pressing the key followed by entering the password causes the extinguishing cycle to be activated. The extinguishing cycle runs normally, respecting the scheduled timings.	1 - Press **MANUAL RELEASE** 2 - Type the Level 2 Password 3 - Confirm operation The **MANUAL RELEASE** and **EDU ACTIVATED** Leds turns on The Display shows the Counting if activation is delayed at the end of the countdown shows **Release in Progress**

Key	Function	Operating procedure
EVACUATE	Pressing the key followed by entering the password activates the procedure programmed for the **Evacuation** alarm. It activates the general system sirens and all the output modules programmed to be implemented by the **Evacuation** alarm procedure.	1 - Press **EVACUATE** 2 - Type the Level 2 Password 3 - Confirm operation The **ALARM** Led turns on The Display shows **Evacuation in Progress**
RESET	Pressing the key followed by entering the password causes the reset of all the signals of: Alarm, Pre-alarm, Extinguishing, Fault and restores the control unit to normal operating condition. The **RESET** key has no function during the activation phase of the EDU.	1 - Press **RESET** 2 - Type the Level 2 Password Clears All Alarm Signals reported by the LEDs and the display
HOLD	Pressing the key followed by entering the password, during the countdown of the extinguishing cycle, causes the countdown to be suspended and activates the Recognition status. Pressing the key again completes the previously suspended countdown.	1 - Press **HOLD** 2 - Type the Level 2 Password The **HOLD OPERATED Led** turns on The Display shows **Recognition in Progress**
ABORT	Pressing the key followed by entering the password causes the definite interruption of the extinguishing cycle. To restart the extinguishing cycle, the control unit must be reset.	1 - Press **ABORT** 2 - Type the Level 2 Password The **ABORT OPERATED** Led turns on The Display shows **Extinguishing Block**
AUTO/MANUAL MODE	Pressing the **AUTO/MANUAL MODE** key followed by entering the password allows access to the **"EDU Functionality"** menu. The menu consists of 4 items: **1 EDU -** Enabling/Disabling the operation of the EDU **2 EDU mode -** Operating mode: Automatic/Manual **3 Panels and Actuators -** Active / Excluded Operation **4 Auxiliary Outputs -** Active / Excluded Operation	**EDU** **Enabled:** The EDU may perform the extinguishing function. **Disabled:** The EDU no longer performs the extinguishing function. **EDU mode** **Automatic:** the extinguishing cycle starts by pressing the buttons and/or the detection of the Zones associated with the EDU. **Manual:** the extinguishing cycle starts only by pressing the buttons and/or using the **MANUAL RELEASE** command. **Panels and Actuators** **Active:** normal operating status the Notification Panels and Actuators (Valves) are enabled. **Excluded:** status that allows the extinguishing cycle test to be carried out, excluding the operation of the Notification Panels and valves. **Auxiliary outputs** **Active:** the operation of the auxiliary outputs is enabled. **Excluded:** the operation of the auxiliary outputs is disabled.

5-5 - Control unit panel LED indicators

The table describes the functions and the LED signalling modes visible on the control unit front panel.
As required by EN 54/2 regulations on light signals, the frequency of LEDs ON/OFF flashing is:

- 0.5sec. ON / 0.5sec. Off (fast flashing) for fault signals.

Leds positioned on the left side of the control panel monitor the operating status of the system.				
Signal	**Colour**	**Type of signal**	**Signal mode**	
POWER ON	Green	Indicates that the control unit is correctly supplied with mains voltage	**Off**	Power supply from mains power supply absent
			On	Power supply from mains power supply present
ALARM	Red	Indicates the fire alarm status	**Off**	No alarm signals in progress
			Flashing	Fire alarm in progress not silenced
			On	Fire alarm in progress silenced
PREALARM	Red	Indicates the fire pre-alarm status	**Off**	No pre-alarm signal in progress
			Flashing	Fire pre-alarm in progress not silenced
			On	Fire pre-alarm in progress silenced
EARTH LEAKAGE	Yellow	Indicates that there is electrical discharge within the system	**Off**	No discharge
			On	Fault status: electrical discharge
POWER SUPPLY FAULT	Yellow	Indicates the power supply fault status of the control unit (insufficient current to supply the control unit and/or to charge the batteries). See note 1.	**Off**	No power supply fault in progress
			Flashing	Power supply fault status in progress
			On	Power supply fault status saved
BATTERY FAULT	Yellow	Indicates low or flat battery status See note 1.	**Off**	Battery charged and working
			Flashing	Low battery (flat)
			On	Battery faulty or missing
GENERAL FAULT	Yellow	Indicates the presence in the system of any fault status See note 1.	**Off**	No fault alerts
			Flashing	Fault in progress not silenced
			On	Fault in progress silenced
SYSTEM FAULT	Yellow	Indicates the system fault status. See note 1.	**Off**	No fault alerts
			Flashing	System Fault in progress not silenced
			On	System Fault in progress silenced
SOUNDERS STOPPED	Yellow	Indicates the silent status of the sirens	**Off**	No device excluded
			On	At least one device excluded
DISABLEMENT	Yellow	Indicates the exclusion of devices from the System	**Off**	Nessun dispositivo escluso
			On	Almeno un dispositivo escluso
SOUNDERS FAULT/DISAB	Yellow	Indicates the fault or exclusion of the Siren output of the control unit.	**Off**	No Fault or Excluded Sirens
			Flashing	Siren Fault In Progress
			On	Siren excluded
COMMUN. FAULT/DISAB	Yellow	Indicates the fault or exclusion of the telecommunication devices of the System	**Off**	Telecommunications Devices OK
			Flashing	Fault of telecommunication device in progress
			On	Telecommunication device excluded
ZONE TEST	Yellow	Indicates the test status of the Zones	**Off**	No Zone under test
			On	At least one Zone under test
NETWORK FAULT	Yellow	**If the control unit is local (stand alone)** Indicates the status of connections between the devices connected on the BUS485.	**Off**	Communication with devices on BUS485 OK
			Flashing	Communication fault on BUS485
		If the control unit in a network of control units plays the role of Slave Indicates the status of connections between the devices connected on the BUS485.	**Off**	Communication with devices on BUS485 OK
			Flashing	Communication fault on BUS485
TRANSMISSION	Red	Signals the transmission of telephone notifications to remote receiving devices.	**Off**	No notification transmission activity
			Flashing	Telephone notification transmission in progress
			On	Telephone notification sent successfully

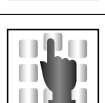
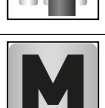
Note 1 - The switching on of each specific fault LED is always accompanied by the switching on of the Fault LED
Power Supply Fault LED - the Fault signal remains visible until the alarms are reset, only if automatic fault silencing is not enabled.
LED Fault and System Fault - in cases where the control unit is in reset or not working, the two LEDs are ON accompanied by an acoustic signal.
Battery LED - the signal remains visible until the alarms are reset, only if the automatic silencing of faults is not enabled.

LEDs positioned on the right side of the control unit panel monitor the operating status of the control unit's EDU section.				
Signal	**Colour**	**Type of signal**	**Signal mode**	
EDU PREACTIVATED	Red	Monitor of the Pre-Activation Status of EDU Displays the statuses of: sleep or pre-activation The LED is operational if the function is programmed	**Off** **On**	EDU in the sleep status EDU in pre-activation status
EDU ACTIVATED	Red	Monitor of the Pre-Activation Status of EDU Displays the statuses of: sleep or activation	**Off** **On**	EDU in sleep status EDU activated discharge cycle in progress
VALVE 1 RELEASED	Red	Monitor of valve 1 status. Displays the statuses of: sleep or release	**Off** **On**	Valve 1 in sleep status Valve 1 activated, in the release phase
VALVE 2 RELEASED	Red	Monitor of valve 2 status. Displays the statuses of: sleep or release	**Off** **On**	Valve 2 in sleep status Valve 2 activated, in the release phase
VALVES FAULT/DISAB	Yellow	Valve status monitor. Displays the statuses of: enabling, fault, exclusion	**Off** **Flashing** **On**	Discharge valves enabled Faulty discharge valves (no termination) Excluded discharge valves (out of service)
SOUND. FAULT/DISAB	Yellow	Monitor of the operating status of the optical-acoustic detectors. Displays the statuses of: enabling, fault, exclusion. See note 1.	**Off** **Flashing** **On**	Warning devices enabled Warning devices in fault status (no termination) Warning devices excluded (out of service)
MANUAL MODE	Yellow	Monitor of the programmed, manual or automatic operating mode. See note 2	**Off** **On**	Automatic operating mode Manual operation mode
EDU DISABLED	Yellow	Monitor of the operating status of EDU Displays the statuses of: enabling or disabling	**Off** **On**	EDU enabled EDU disabled (extinguishing out of service)
AUX OUTPUTS DISAB	Yellow	Monitor the status of OUT1 and OUT2 auxiliary outputs Displays the statuses of: enabling or disabling	**Off** **On**	Outputs enabled Outputs disabled
PRESSURE SWITCH	Yellow	Monitor of the Pressure switch controlled input status. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status (low pressure)
FLOW SWITCH	Yellow	Monitor of the Flow switch controlled input status. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status (flow anomaly)
DOOR OPEN	Yellow	Monitor of the controlled input status Door open. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status
HOLD OPERATED	Yellow	Monitor of the controlled input status Recognition command. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status
ABORT OPERATED	Yellow	Monitor of the controlled input status for the connection of the extinguishing block button. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status
MANUAL RELEASE	Yellow	Monitor of the controlled input status for the connection of the manual extinguishing button. Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status
RESERVE RELEASE	Yellow	Monitor of the controlled input status for the connection of the backup or secondary extinguishing button Displays the statuses of: sleep, activation, fault	**Off** **Flashing** **On**	Input in sleep status Input in fault status (no termination) Input in activation status
DELAYS DISABLED	Yellow	Indicates the activation of the command to disable delays.	**Off** **On**	Delays enabled Delays disabled
NO RELEASE	Yellow	Indicates that the extinguishing agent release cycle has not been executed. See note 3.	**Off** **On**	Normal status no signals The discharge cycle has not been performed

Note 1 - The exclusion and/or inclusion of optical-acoustic warning devices follows the inclusion/exclusion status of the control unit's sirens, (standard EN54-2).
Note 2 - The EDU programmed to operate in manual mode, the detectors cannot activate the extinguishing cycle.
Note 3 - The **"NO RELEASE"** Led lights up only if the times have not been respected: **"Before activating release"** and/or **"Minimum duration of flow emission".**

5-6 - Control unit display icon indicators

The table describes the icons used by the control unit to indicate the operating status of the TSA1 Fire Detection and Extinguishing System. The icons are also used as a visual aid, for indicating the events recorded in the event archive folders and in the control unit event log.

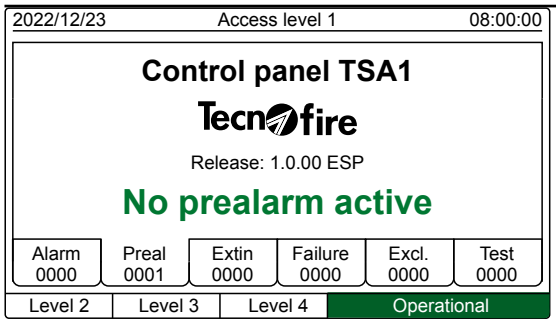
	**Faulty power supply signal from mains** The icon indicates a power fault from the mains. The alert is not instant, it is displayed at the end of the delay programmed for the lack of mains alert.		**Signalling that the extinguishing cycle is in progress** The icon indicates that the extinguishing agent is being released.
	**Flat battery fault alert** Monitor of the control unit battery secondary power. The icon indicates that the charging current of the Control unit battery is insufficient.		**Signalling that the reserve release is activated** The icon indicates that the extinguishing agent of the reserve cylinder is being released.
	**Battery fault alert** Monitor of the control unit battery secondary power. The icon indicates that the battery is disconnected or cannot be charged due to high internal resistance.		**Manual stop alert of the extinguishing cycle** The icon indicates that the extinguishing cycle has been blocked, with the command "Block extinguishing."
	**Power supply fault alert** Monitor of the control unit primary power. The icon indicates that the power supply of the control unit is faulty therefore it is not able to charge the battery.		**Recognition pause signalling in progress** The icon indicates that the extinguishing cycle has been forced in the pause status with the "Recognition" command.
	**Earth leakage fault alert** The icon indicates that a cable or device of the System has an abnormal earth leakage of the electrical system.		**Door open alert** The icon indicates that the door that closes the area subject to the release of the extinguishing agent is open.
	**System operation signal** The icon indicates System operations and/or the activation of the evacuation command from the central panel or from the keyboard.		**Siren exclusion alert** The icon indicates that the control unit signal outputs are excluded from operation.
	**System fault alert** The icon indicates the presence of a System fault. That is, all the faults associated with generic events of the Control unit or System. See table “Fault events”.		**Excluded device alert** The icon indicates that the device in the descriptive note is excluded from operation (device out of service).
	**System generic fault alert** The icon indicates that the device or function indicated is in Fault status. See table “Fault events”.		**Signalling of exclusion of repetitions of control unit outputs** The icon indicates that the repeat outputs of the control unit are excluded from operation (out-of-service outputs).
	**No communication or no termination** No communication to one or more devices or no termination, on a controlled input or on a controlled output.		**Exclusion alert for auxiliary outputs of EDU1** The icon indicates that the auxiliary outputs of EDU1: DISAB, MAN, ABORT, REL HOLD, OUT1 and OUT2 are excluded from operation (out-of-service outputs).
	**Fire pre-alarm alert in progress** The icon indicates that the device in the descriptive note: Sensor, Module or Zone is in Pre-Alarm status.		**Exclusion alert of panels and valves of EDU1** The icon indicates that the signalling panels and delivery valves of EDU1 are excluded from operation (out-of-service devices).
	**Fire alarm alert in progress** The icon indicates that the device in the descriptive note: Sensor, Module or Zone is in Alarm status.		**Detector maintenance request fault alert** The icon indicates that the detector in the descriptive note requires maintenance. Cleaning of the analytical chamber or optical detection devices.
	**EDU signal in pre-activation status** The icon indicates that the EDU extinguishing unit in the descriptive note is in the pre-activation status.		**EDU signalling in manual operation mode** The icon indicates that the EDU in the descriptive note has been forced into manual operation mode, therefore the EDU extinguishing unit cannot be activated automatically.
	**EDU signal in activation status** The icon indicates that the EDU extinguishing unit in the descriptive note is in the activation status.		**Excluded EDU disabled alert** The icon indicates that the EDU in the descriptive note has been disabled, excluded from operation (out-of-serviceEDU).
	**Extinguishing activation delay time alert** The icon indicates that the countdown of the "Main valve activation delay" time is in progress.		**Flow anomaly alert** The icon indicates that an anomaly of the delivery flow of the extinguishing agent has been detected.
	**Manual activation of the extinguishing cycle alert** The icon indicates that the extinguishing cycle has been activated manually.		**Low pressure alert** The icon indicates that an anomaly of the cylinder pressure has been detected.
	**Pilot valve activation alert** The icon indicates that the pilot valve has been activated.		**Alarm signal of the device under test** The icon indicates that the device in the descriptive note under test: Sensor, Module or Zone is in Alarm status.

5-7 - Event storage folders

The control unit display shows the six event archive folders automatically, after silencing events of: Alarm, Pre-alarm, Extinguish, Fault. The folders also appear after the Exclusion and Device Test operations have been performed.
Each folder records and totals in its counter the events of its category. Resetting the control unit only deletes the silenced events from the archive folders. The events recorded in the Exclusion and Test folders are only deleted by restoring the normal operating conditions of the System, that is, no device excluded or in test status.

Event storage folders					
Folder	**Icon**	**Function**	**Folder**	**Icon**	**Function**
Alarm 0000		The folder records and counts all events of Fire alarm divided by Zone	**Failure 0000**		The folder records and counts all events of Zone and/or System Fault
Preal 0000		The folder records and counts all the fire Pre-Alarm events divided by Zone	**Excl. 0000**		The folder records the status of all excluded devices (i.e. out of service)
Extin 0000		The folder records and counts all events of Extinguishing	**Test 0000**		The folder records all alarm events recorded by the devices placed in the Test status

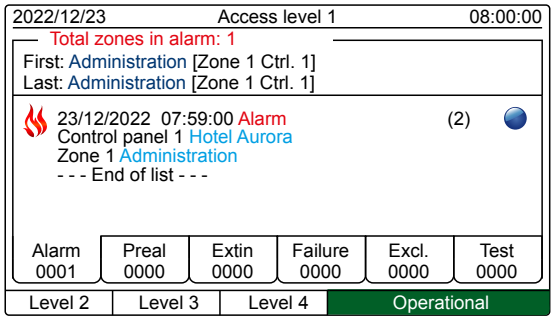
Notes:
1) Each folder can contain up to 4096 events.
2) Resetting the control unit deletes the silenced events and adjusts the number displayed by the event counter.
3) The cancelled events are still stored in the "Event history" archive of the control unit.
4) The contents of the Exclusion and Test folders can only be deleted by restoring the normal operation of the System to no Excluded or Test devices.



Viewing Event Archive Folders

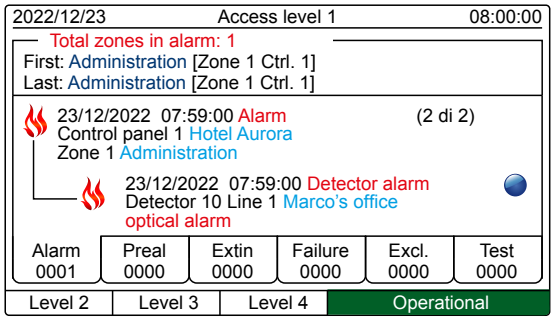
To view and browse the contents of folders, use the navigation keys.

	▶	Selects the next folder
	◀	Selects the previous folder
	▼	Scrolls down the event list
	▲	Scrolls up the event list
	OK	Expands the display of the event pointed by the cursor
ESC		Exits the expanded display mode of the event



If you select a folder with the counter indicating a number other than 0000, as in the example, the "Alarm" folder displays the list that contains the number of events indicated by the counter.

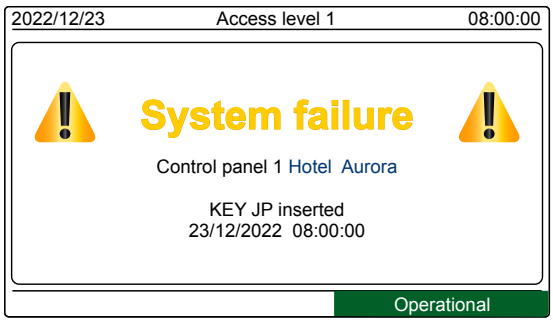
Each event in the list is marked by the event type icon and is accompanied by: date, time, description and origin.
The end of the list of events is indicated by the word "End of list".



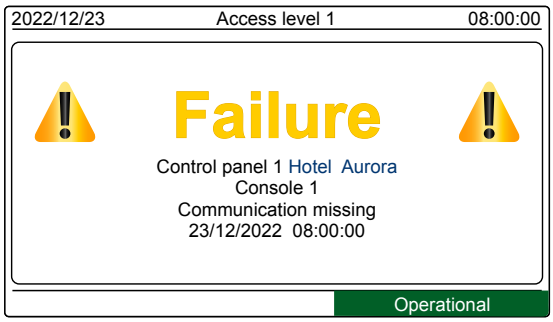
When the event relates to a zone, a number indicating how many sensors and/or modules in the zone are affected by the event is displayed to the left of the cursor in brackets.
To expand the Zone view and see device details, move the cursor over the event and press the OK key.

5.8 - Fault alerts

The control unit manages two types of fault: System Faults and General Faults. System Faults are part of a particular category that refers to EN 54-2 standards.
General faults are of a general nature that do not fall within the category of System Faults.



EVENT TABLE - SYSTEM FAULTS		
Fault Type	**Description**	**Auto-silenced**
Reset by WATCHDOG	The control unit is able to distinguish if its restart took place due to its power supply (normal situation) or if the reset signal was generated by the supervision circuit (WATCHDOG).	NO
Programming key "KEY" entered with an access level lower than Level 4	The fault signal is activated when the "KEY" jumper is entered and the level of access to the control unit is not Level 4.	YES
Controls on the control unit's memories	The RAM and FLASH memories of the control unit are checked automatically every 30 minutes. If the check detects a malfunction, it activates the fault alert.	NO
Warning: With the "Fault Auto-Silence" option enabled, the fault alerts will be auto-silenced when the fault condition ends. With the "Fault Automatic Silence" option disabled, the fault alerts will not be auto-silenced; to silence the signals it is necessary to enter a Level 1 or higher code and reset the control unit.		



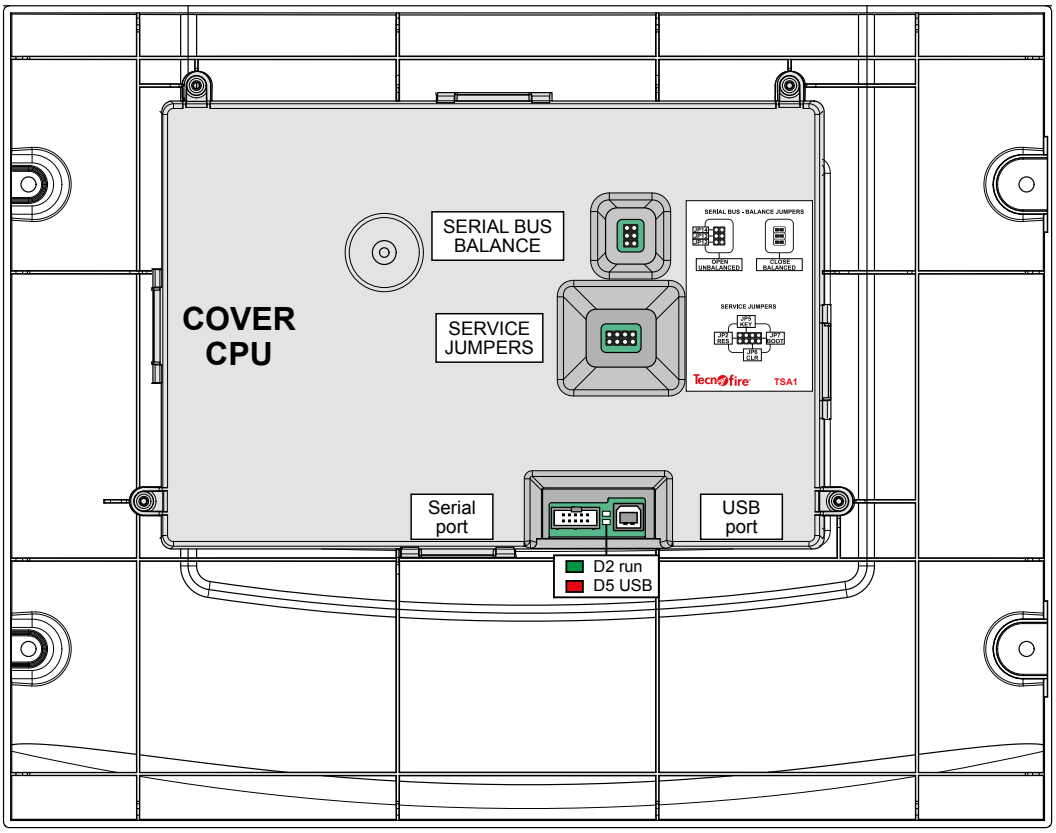
EVENTS TABLE - GENERAL FAULTS			
Fault Type	**Auto-silenced**	**Fault Type**	**Auto-tacitabile**
Loss of communication between control units or repeaters	YES	Power supply overvoltage	YES
Low Battery	YES	Siren termination missing	YES
Faulty battery	YES	Ethernet Interface fault	YES
Power failure	YES	Ethernet Connection missing	YES
Inconsistent programming	NO	Remote connection for communicator missing	YES
Ground discharge	YES	Communicator not responding	YES
Power supply fault	YES	EDU inputs fault	YES
Bus 485 open	YES	EDU valve output faults	YES
Opened line	NO	EDU panel outputs faults	YES
Line in short circuit	NO		
Warning: With the "Fault Auto-Silence" option enabled, the fault alerts will be auto-silenced when the fault condition ends. With the "Fault Automatic Silence" option disabled, the fault alerts will not be silenced, to silence them it is necessary to enter a Level 1 or higher code and reset the control unit.			

6 - BOARD DESCRIPTION

The control unit consists of two boards, the CPU board and the cable connection board.

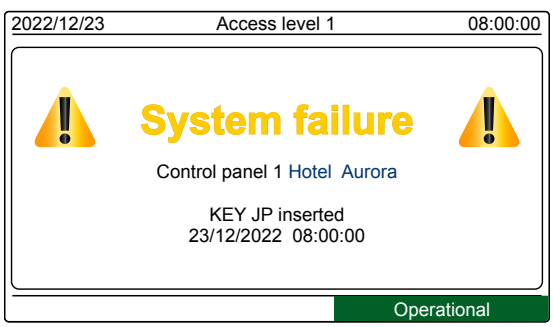
6-1 - CPU board

The CPU board is mounted on the inner side of the cabinet door, the board is protected with a plastic cover.
The compartments in which they are located are visible on the cover: the service jumpers, the Bus balancing jumpers and the USB and TTL ports.



SERVICE JUMPERS		
Under normal control unit operation, all service jumpers must be left in the "Open" position. The position of the jumpers is supervised by the control unit, a jumper left in the closed position prevents normal control unit operation		
JP2 - RESET	The jumper is useful for carrying out the reset and firmware update procedures of the control unit from the USB port.	Supervised position normally the jumpers must be in the open position
JP5 - KEY	The jumper enables the possibility of accessing the Level 4 programming menus.	
JP6 - CLR	The jumper resets the control unit programming and returns it to the factory programming.	
JP7 - BOOT	The jumper is used in conjunction with the CLR jumper in the USB port control unit firmware update procedure.	

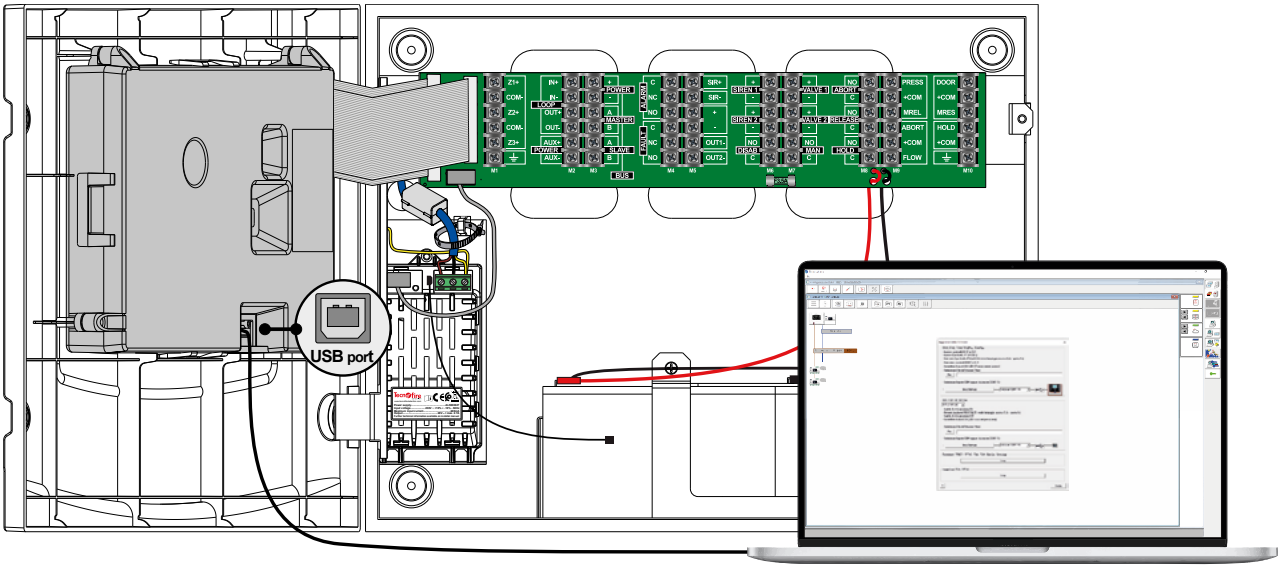
Supervision of service jumpers
The control unit supervises the status (open or closed) of the service jumpers, to prevent them from being left in the wrong position after their use, causing potential unwanted behaviour or malfunctions of the control unit.
The control unit signals the anomaly condition, via a screen indicating a System Fault with the indication of the jumper (key) that the control unit has found in the wrong position. The window remains displayed until the indicated jumper (key) is positioned correctly.
Warning: if the automatic silencing function is not enabled, it is also necessary to perform a manual silencing to cancel the System Fault alert.



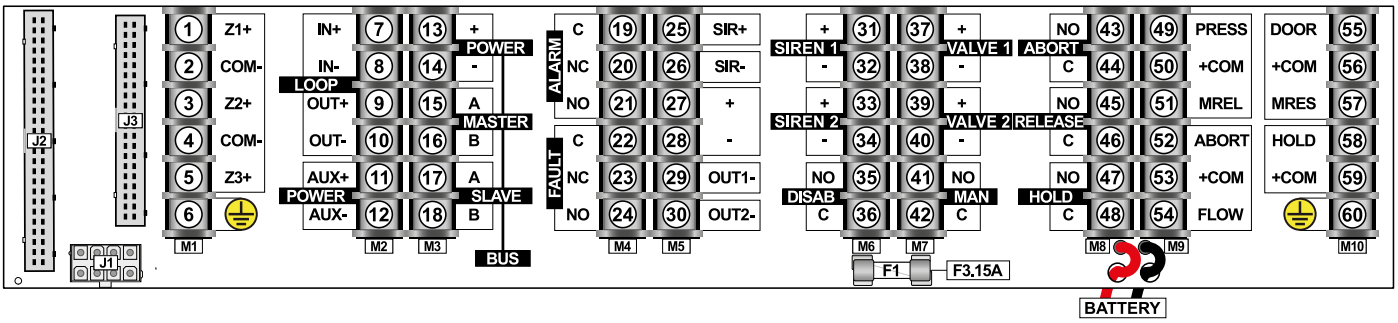
SERIAL BUS BALANCE JUMPERS					
The BUS termination jumpers provide the balance (termination) of the BUS Slave serial line of the control unit. The three jumpers according to the connection modes of the devices on the relative BUSES must all be open or all closed. For information on the various termination methods, see the application diagrams					
JP12 JP13 JP14		Jumpers open BUS Slave line not terminated	**JP12 JP13 JP14**		Jumpers closed BUS Slave Line terminated

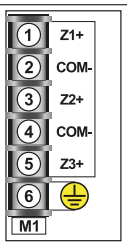
Led	Colour	Function
D2	**Green**	Flashing = Indicating running (regular execution of the control unit firmware)
D5	**Red**	ON = USB cable connected

MANAGEMENT INTERFACES		
The Serial port and USB port interface ports allow you to program the control unit, update the firmware and customise the vocabulary of the control unit. N.B.: The control unit is not equipped with a speaker for announcing messages.		
USB PORT		The USB port allows you to connect a personal computer directly to the control unit. The port supports the communication protocol of the CENTRO and TECNOMONITOR programs. The USB port lets you locally program the control unit, update its firmware and monitor its operation.
SERIAL PORT		The Serial port lets you connect the control unit to a Personal computer indirectly via the PROG-32 or PROG-USB interface devices. With the serial port it is possible to program the control unit, update its firmware and monitor its operation locally. The serial port has longer transfer times than the USB port.

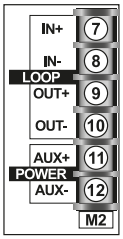


6-2 - Cable connection board



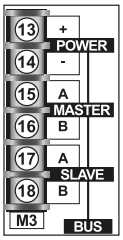


M1 - Description		Function	Restrictions
1	Conventional Zone 1 Input	Input usually used for connecting conventional detectors	Max 32 devices for zone. Only sensors or only buttons.
2	Negative reference for zone inputs		
3	Conventional Zone 2 Input	Input usually used for connecting conventional detectors	
4	Negative reference for zone inputs		
5	Conventional Zone 3 Input	Input for connecting conventional buttons	
6	Ground terminal	Cable shield earth connection	-

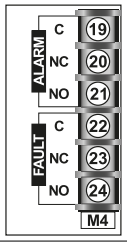


M2 - Description		Function	Restrictions
7	Input Loop +	Loop End Return	Maximum current 500mA @ 24V DC
8	Input Loop -		
9	Output Loop +	Loop Start Departure	
10	Output Loop -		
11	Positive input for auxiliary power supply	Input for the connection of an auxiliary power supply unit, to increase the operating autonomy of the system in the event of mains power supply failure	
12	Negative input for auxiliary power supply		

Warning: the additional power supply unit connected to terminals 11 and 12 must not be considered as a resource to increase the power availability of the Control unit. The unit must be considered, for the current that its batteries make available to increase the autonomy of the System, in case of power failure from the mains

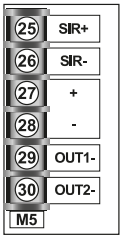


M3 - Description		Function	Restrictions
13	Positive RS485 Bus line power supply	Power output for the expansion devices. Do not use this power supply for other devices	Maximum current 500mA @ 24V DC
14	Negative RS485 Bus line power supply		
15	RS485 BUS MASTER communication channel A	The Bus Master and Slave are reserved for connecting expansion devices. The Bus Slave can also be used to connect the control unit to a network of control units	The control unit manages a maximum of 5 expansion devices
16	RS485 BUS MASTER communication channel B		
17	RS485 BUS SLAVE communication channel A		
18	RS485 BUS SLAVE communication channel B		

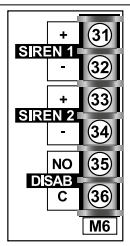


M4 - Description		Function	Restrictions
19	Common contact alarm output	Alarm alert output. Relay free contact. C-NC contact closed sleep status	Maximum current contact 1A @ 30V DC
20	Normally closed contact alarm output		
21	Normally open contact alarm output		
22	Common contact fault output	Fault alert output. Relay free contact. C-NC contact closed sleep status	Maximum current contact 1A @ 30V DC
23	Normally closed contact fault output		
24	Normally open contact fault output		

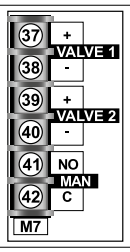
Attention: the status indicated for terminals 23 and 24 is in the condition of control unit not powered. With the control unit powered and in the absence of faults, the state of the terminals is reversed, terminal 23 is in the NO state and terminal 24 is in the NC state



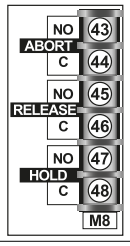
M5 - Description		Funzione	Restrictions
25	Power supply positive for siren	Controlled output for the alarm siren control (polarity reversed in alarm)	Maximum current 750mA @ 24V DC
26	Power supply negative for siren		
27	24V DC Power supply positive	Power output for external devices	Maximum current 750mA @ 24V DC
28	Power supply negative		
29	Programmable output OUT1-	Negative open collector signal outputs	Maximum current 50mA @ 24V DC
30	Programmable output OUT2-		



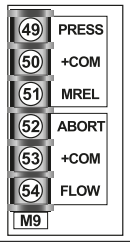
	M6 - Description	Funzione	Restrictions
31	SIREN 1 power supply positive	Controlled output for the activation of the optical-acoustic warning device that notifies "Evacuate the room"	Maximum current 750mA @ 24V DC
32	SIREN 1 power supply negative		
33	SIREN 2 power supply positive	Controlled output for activation of the optical-acoustic warning device that notifies "Extinguishing in progress"	Maximum current 750mA @ 24V DC
34	SIREN 2 power supply negative		
35	Normally open contact DISAB output	Operating status signalling output "EDU Disabled" Closed relay sleep status	Maximum current contact 1A @ 30V DC
36	Common contact DISAB output		



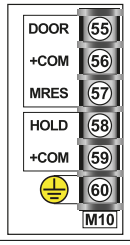
	M7 - Description	Funzione	Restrictions
37	VALVE 1 power supply positive for valve	Controlled output for control of valve 1 Pilot valve	Maximum current 750mA @ 24V DC
38	VALVE 1 power supply negative for valve		
39	VALVE 2 power supply positive for valve	Controlled output for control of valve 2 Reserve valve	Maximum current 750mA @ 24V DC
40	VALVE 2 power supply negative for valve		
41	Normally open contact MAN output	Operating status signalling output Closed relay sleep status	Maximum current contact 1A @ 30V DC
42	Common contact MAN output		



	M8 - Description	Funzione	Restrictions
43	Normally open contact ABORT output	Control relay output "Stop extinguishing" Closed relay sleep status	Maximum current contact 1A @ 30V DC
44	Common contact ABORT output		
45	Normally open contact RELEASE output	Control relay output "Manual Release" Relay closed sleep status	Maximum current contact 1A @ 30V DC
46	Common contact RELEASE output		
47	Normally open contact HOLD output	Control relay output "Extinguishing pause" Closed relay sleep status	Maximum current contact 1A @ 30V DC
48	Common contact HOLD output		



	M9 - Description	Funzione	Restrictions
49	Monitor pressure switch controlled input	Pressure switch operating status monitor input	Do not use the common reference positive for other functions
50	Positive reference for inputs		
51	Controlled input "Manual release"	Input controlled by the "Manual release" button	
52	Controlled input "Extinguishing stop"	Input controlled by the "Extinguishing stop" button	
53	Positive reference for inputs		
54	Flow switch monitor controlled input	Flow switch operating status monitor input	



	M10 - Description	Funzione	Restrictions
55	Door monitor controlled input	Door control contact status monitor input	Do not use the common reference positive for other functions
56	Positive reference for inputs		
57	Controlled input “Reserve Release”	Input controlled by the "Reserve release" button	
58	Control input "Recognition"	Input controlled by the "Extinguishing pause" button	
59	Positive reference for inputs		
60	Ground terminal	Cable shield earthing	-

Connectors	
J1	Power wiring connector
J2 - J3	Connectors for signal wiring

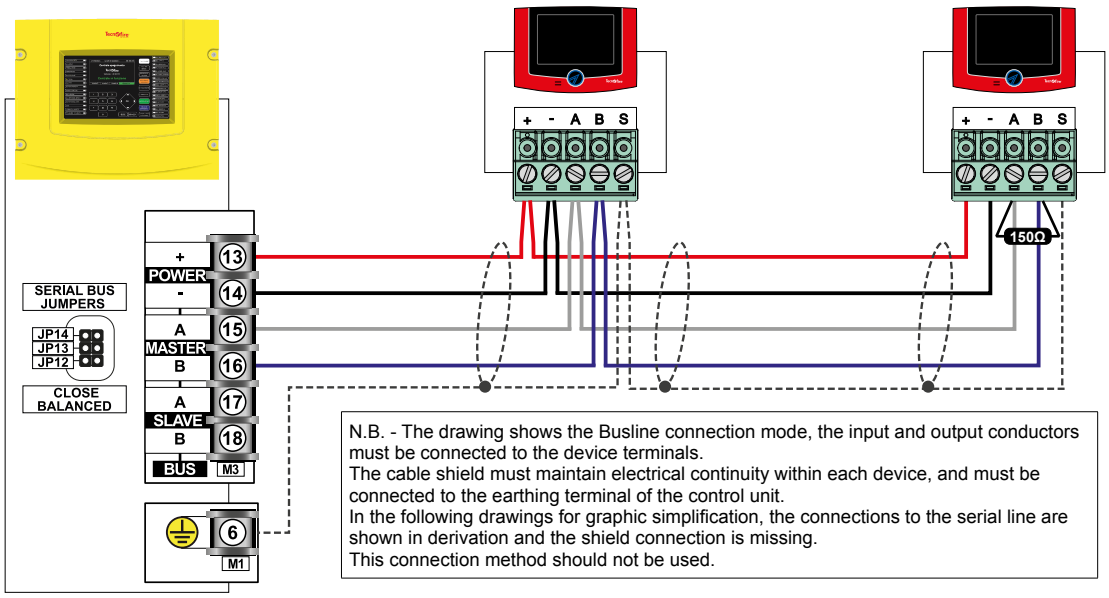
Fuse	
	Battery polarity reversal protection fuse (Type 3.15A - F 5x20)

7 - TSA1 WIRING DIAGRAMS

7-1 - Connecting the Master and Slave Bus Lines

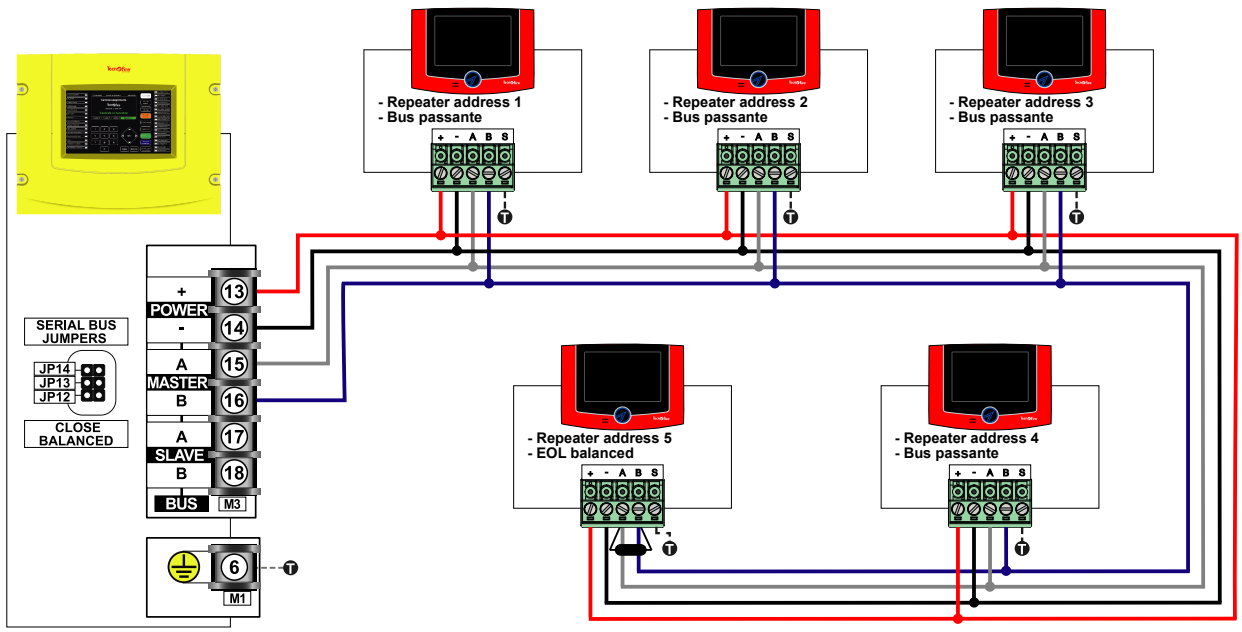
The control unit has two lines RS485 Bus, Bus Master and Bus Slave on which it is possible to connect the expansion devices (up to 5).
The Bus Slave line can be used to connect the TSA1 control unit within a network of control units.
Bus can be connected in open loop or closed loop mode. The Bus must be balanced, the balance is carried out on the first and last device connected on the line.
For the wiring of the Bus lines it is recommended to use a shielded and twisted multipolar cable. The cross-section of the conductors must be proportional to the length of the line and the sum of the consumption of the connected devices.
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.
The maximum length allowed for the Bus line is 1000 metres, to achieve greater line extensions, it is possible to use optical fibre.

HOW TO CONNECT DEVICES ON BUSLINES

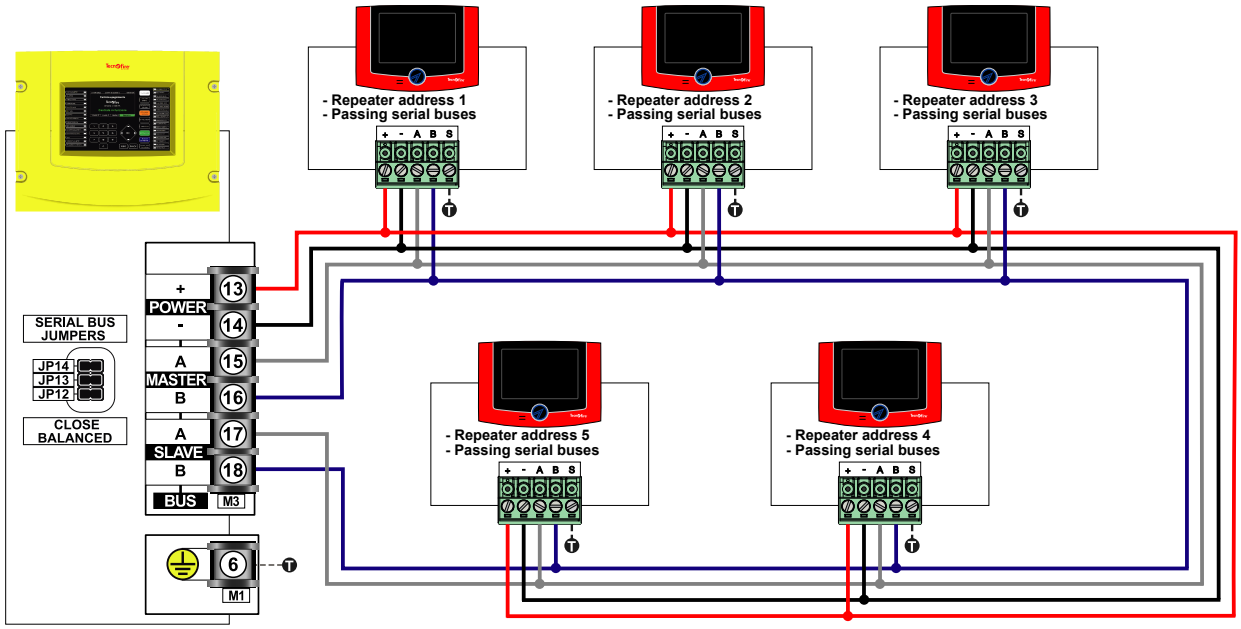


N.B. - The drawing shows the Busline connection mode, the input and output conductors must be connected to the device terminals.
The cable shield must maintain electrical continuity within each device, and must be connected to the earthing terminal of the control unit.
In the following drawings for graphic simplification, the connections to the serial line are shown in derivation and the shield connection is missing.
This connection method should not be used.

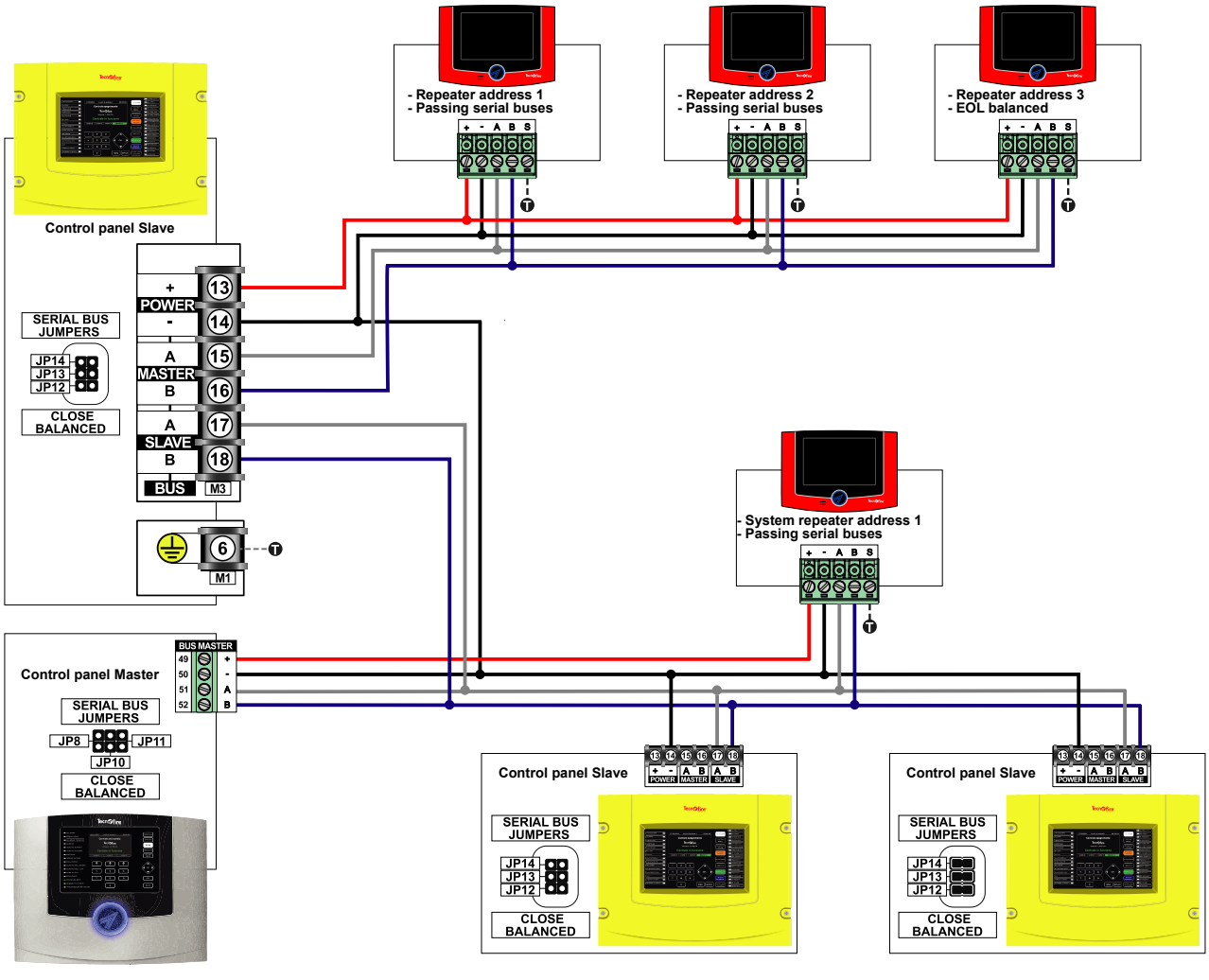
OPEN LOOP BUS MASTER CONNECTION



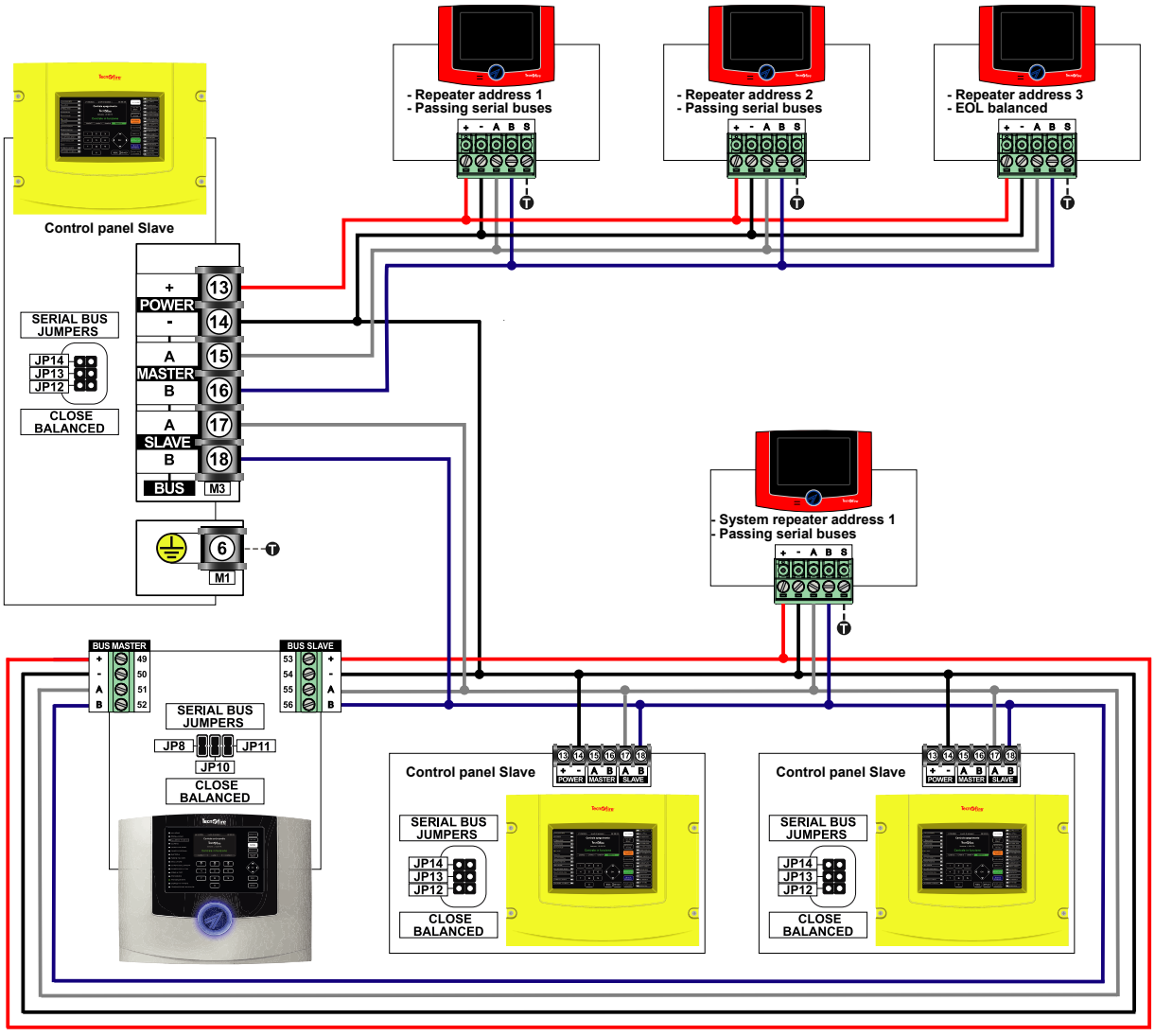
CLOSED LOOP BUS MASTER CONNECTION



CONNECTION IN A CONTROL UNIT NETWORK IN OPEN LOOP MODE



CONNECTION IN A CLOSED LOOP MODE CONTROL UNIT NETWORK

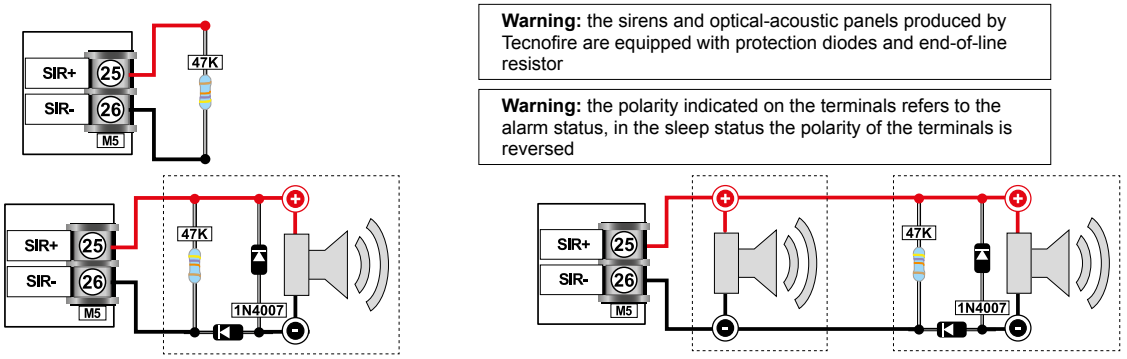


7-2 - Connecting the siren controlled output

The siren connection line is a controlled line, which must be terminated with a 47K resistor
The warning siren must be connected to the control unit terminals 25 (SIR+) and 26(SIR-), the connection provisions are:

- If no siren is connected, a 47K termination resistor must be connected between terminals 25 and 26
- One siren, the 47K resistor must be connected in parallel near the siren.
- More than one siren, the 47K resistor must be connected in parallel near the last siren.

CONNECTION OF THE SIREN CONTROLLED OUTPUT



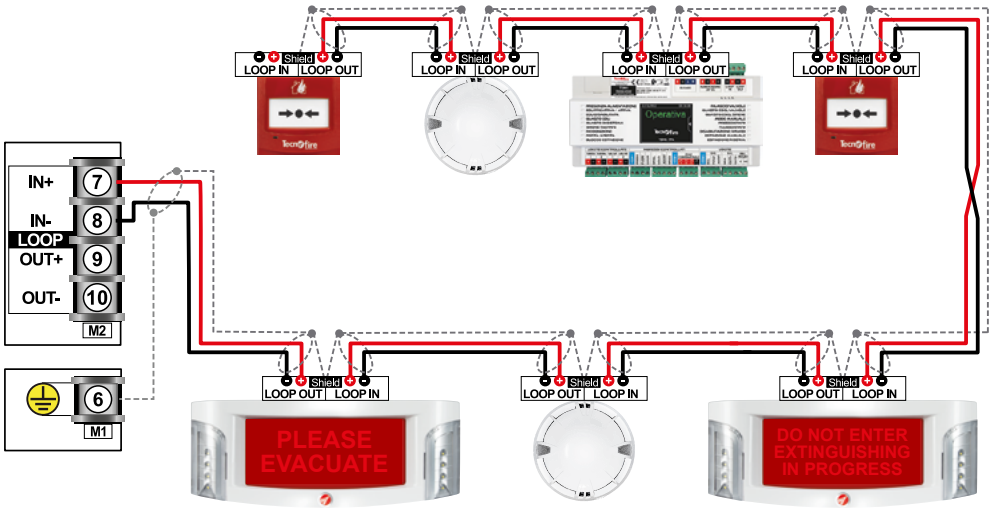
Warning: the sirens and optical-acoustic panels produced by Tecnofire are equipped with protection diodes and end-of-line resistor

Warning: the polarity indicated on the terminals refers to the alarm status, in the sleep status the polarity of the terminals is reversed

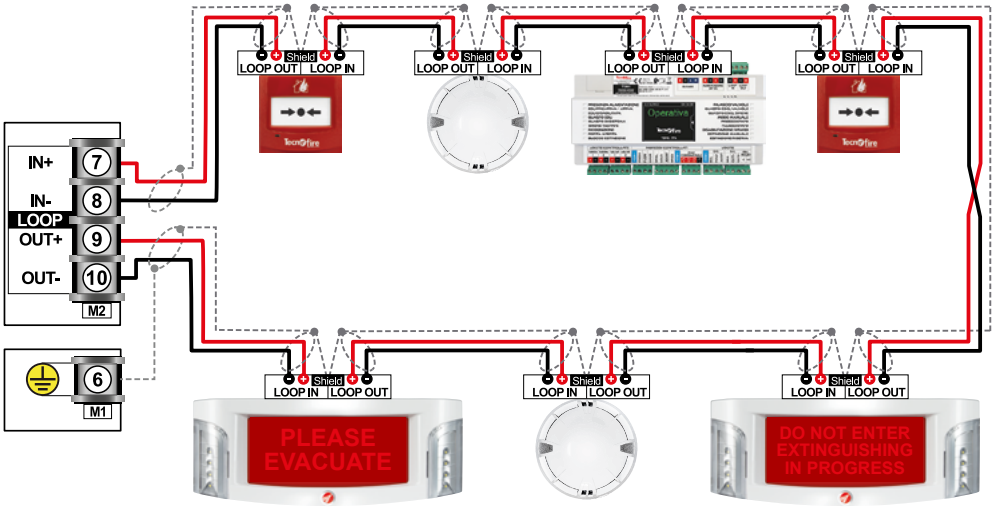
7-3 - Connecting the Detection Line

The Control unit detection line can be connected, either in Closed Line mode or in Open Line mode.
In the open line mode, the EN 54 standard sets the maximum limit of devices that can be connected on each branch of the detection line to 32 (sensors or modules).
For the wiring of the Detection Line it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.
The maximum length allowed for the laying of the detection line, with cable of appropriate cross-section, can never exceed 3000 metres.

LOOP CONNECTION IN OPEN LINE MODE



LOOP CONNECTION IN CLOSED LINE MODE



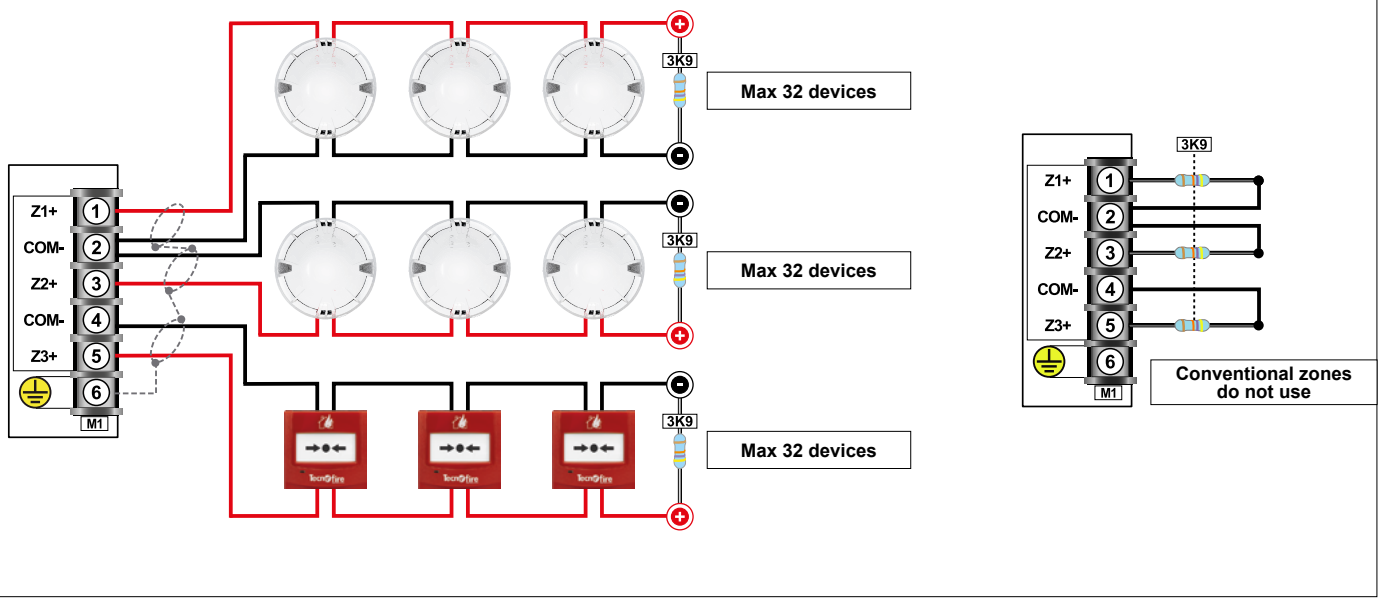
7-4 - EDU Connecting the Conventional Detection Zones

The control unit is equipped with three conventional detection zones. The detection of the conventional zones is subject to the extinguishing section EDU1 of the control unit. A maximum of 32 devices can be connected to each conventional zone.
Conventional detection zones can be replaced with detection zones consisting of detectors and addressable manual alarm button modules.
Conventional zone detection lines can only be connected in Open Line mode terminated with a resistor. The detection logic of conventional zones is subject to a formula chosen from those available.
The logic of the formulas obliges the intended use of the three conventional zones: zones 1 and 2 must be used for the wiring of the detectors, zone 3 must be used for the wiring of the manual alarm buttons.
For the wiring of conventional detection zones, it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.
The maximum length allowed for the laying of the detection line, with cable of appropriate cross-section, can never exceed 1500 metres.

THE RULES OF USE OF CONVENTIONAL ZONES	
1	Only conventional detectors must be connected to conventional zones 1 and 2
2	Only manual alarm buttons must be connected to conventional zone 3
3	The zone must be composed of a maximum number of 32 devices (Standard EN 54)
4	The zone must be equipped with at least one device
5	Conventional zones can be replaced, with addressable system detection zones
6	The three conventional zones are only serviced by EDU1 of the control unit. While detection zones shared with the TSA1 control unit can be used
7	If conventional zones are not used, the relative inputs must be closed with a 3K9 resistor

DETECTION LOGIC DICTATED BY THE FORMULAS	
Formula	**Detection Logic**
Z1 & Z2 | Z3	The extinguishing cycle is activated if: zones 1 and 2 are in alarm or only zone 3 is in alarm. If only zone 1 or zone 2 is in alarm, the EDU is in the PRE-ACTIVATION status.
Z1 & Z2 & Z3	The extinguishing cycle is activated if: zones 1, 2 and 3 are in alarm.
Z1 | Z2 | Z3	The extinguishing cycle is activated if: one zone, does not matter which one, is in alarm.

CONNECTION AND INTENDED USE OF CONVENTIONAL ZONES

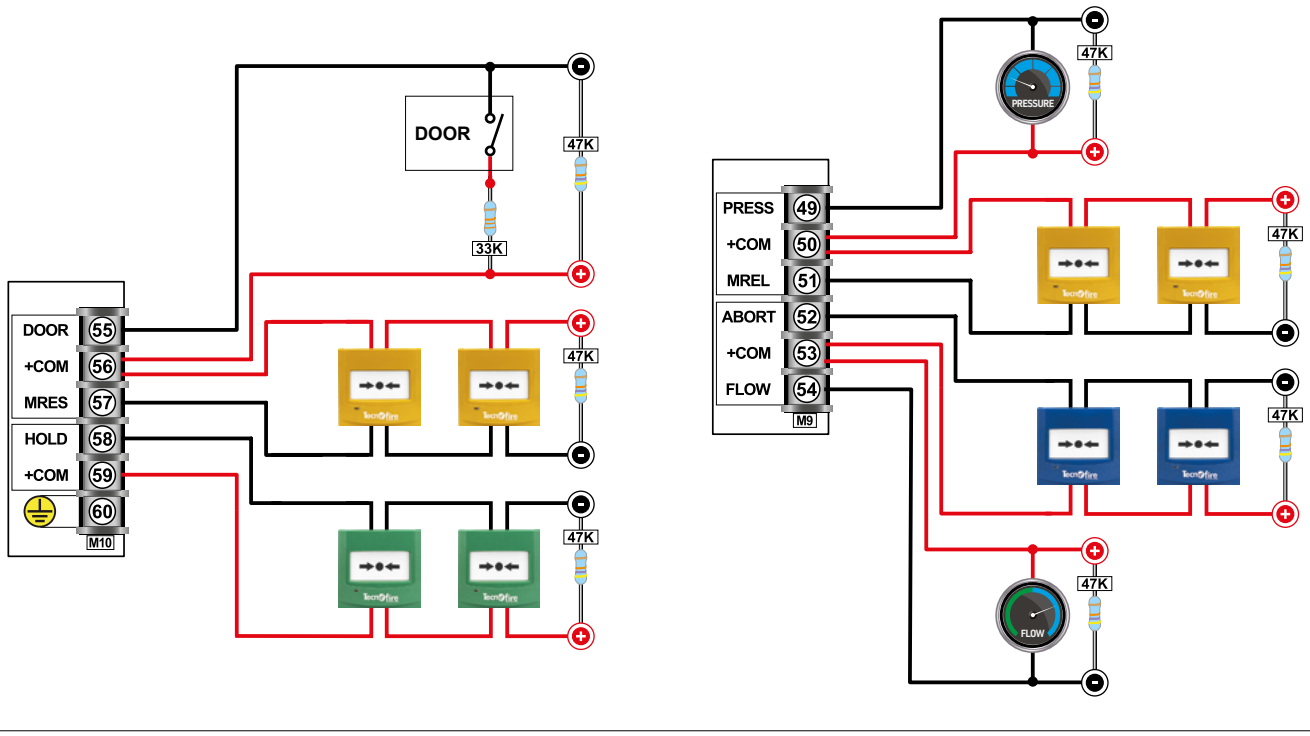


7-5 - EDU Connecting controlled inputs

The seven controlled inputs of the EDU unit can be enabled individually, the connection mode can be programmed as: NC, NO, NC balanced, NO balanced.
On the inputs: MRES, HOLD, MREL, ABORT, up to 32 devices can be connected.
For the wiring of the inputs it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.

CONTROLLED INPUTS		
Input		**Function**
PRESS	**Pressure switch**	Cylinder pressure control input
FLOW	**Flow switch**	Flow switch control input - Programming: the input alarm may or may not generate the discharge
DOOR	**Door**	Door control input - Programming: Door Status Monitor or Block Extinguishing Sequence
MREL	**Manual activation**	Input for manual activation button of the extinguishing cycle
HOLD	**Recognition**	Temporary countdown interruption input delaying extinguishing agent release
ABORT	**Extinguishing block**	Input that stops the extinguishing cycle
MRES	**Manual reserve activation**	Input commanding the release of the reserve cylinder

CONTROLLED INPUTS CONNECTION

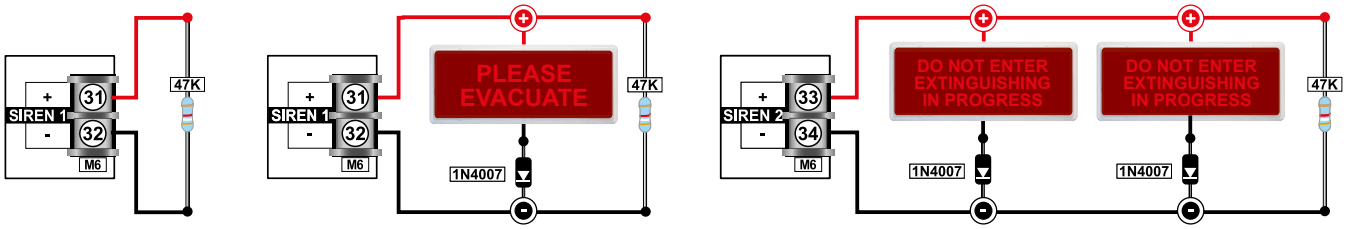


7-6 - EDU Connecting controlled outputs

The four controlled outputs of the EDU unit are used to control the acoustic warning and the extinguishing agent release valves.
The controlled outputs of SIREN 1 and 2 control the acoustic warnings that notify the Pre-discharge and Discharge progress statuses.
The notification times of the panels depend on the programming parameters of EDU.
The controlled outputs Valves 1 and 2 control the activation of the extinguishing agent release valves.
The activation modes and the delay and activation times of the valves depend on the programming parameters of the EDU.
For the wiring of the outputs, it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.

CONTROLLED INPUTS		
Input		**Function**
SIREN 1	**Siren 1 - Pre-discharge Warning**	Control output for acoustic optical warning panel of imminent discharge warning "EVACUATE the ROOM"
SIREN 2	**Siren - Discharge Warning**	Control output for acoustic optical warning panel of discharge warning in progress "EXTINGUISHING IN PROGRESS"
VALVE 1	**Release valve 1**	Extinguishing agent release valve 1 control output
VALVE 2	**Release valve 2**	Extinguishing agent release valve 2 control output

ACOUSTIC OPTICAL WARNING DEVICE CONNECTION



CONNECTING THE SOLENOID VALVES

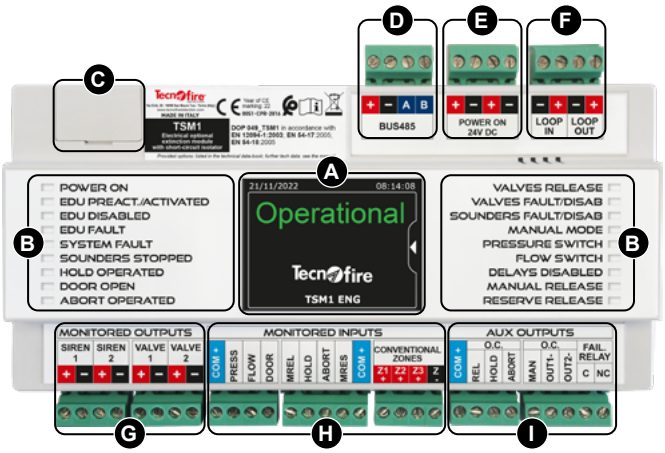



Tecnofire
DETECTION
TSA
SYSTEMS

8 - TSM1 MODULE INSTALLATION INSTRUCTIONS

8-1 - Overall view

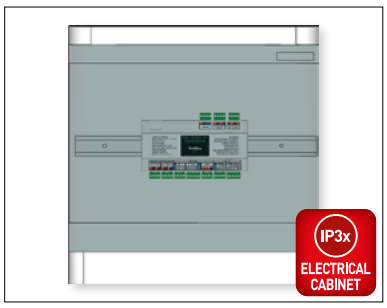
The TSM1 module consists of an ABS container and a controller board, which integrates the user interface consisting of the touch screen display and the LED function indicators. The connection terminal blocks for the connection cables are arranged on the controller board.



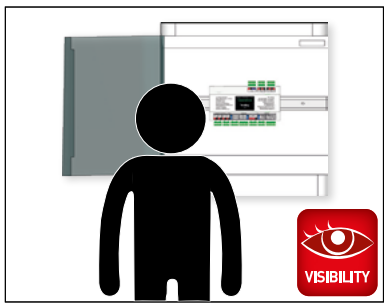
A	4.3" touch screen display	D	BUS485 connection	G	Controlled outputs connection
B	EDU LED function indicators	E	Module power supply connection	H	Controlled inputs connection
C	Management interface compartment cap	F	Detection Loop connection	I	Outputs connection

8-2 - Installation Mode

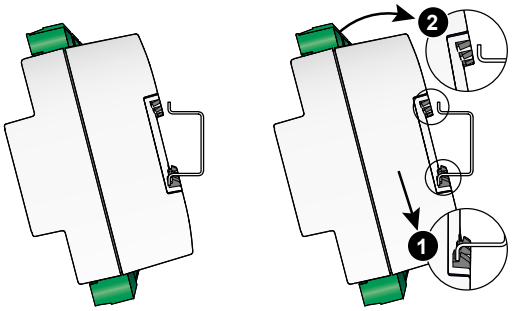
The TSM1 extinguishing module must be installed inside an electrical panel with at least IP3x protection rating, the module must be fixed on a DIN bar.
The module inside the electrical panel must be installed at a height that ensures people can fully see the front panel display and LEDs. In addition, the position of the module must allow authorised personnel to operate easily on the management and control keys, shown on the touch screen display.



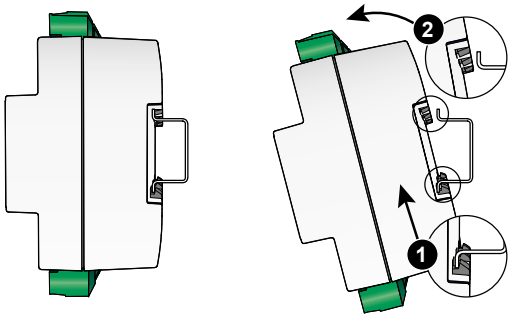




Fix the module to the DIN bar
1 - Fix the module from the bottom 2 - Rotate the module towards the guide



Remove the module from the DIN bar
1 - Push the module upwards 2 - Rotate the module outward



8-3 - Connecting cables

The cables used to connect the devices must comply with European CPR regulation EU 305/2011.
When laying cables, it is necessary to comply with the installation rules established by the standards.
The European reference directive is the LVD Low Voltage Directive LVD 2014/35/EU.
The installer is responsible for inquiring about the standards and obligations that must be met.
To ensure electrical safety, the connection of the cable shield must maintain electrical continuity in its path, without ever been interrupted. One of the two ends must be connected to the electrical system earth, the connection must be made inside the fire detection unit cabinet.

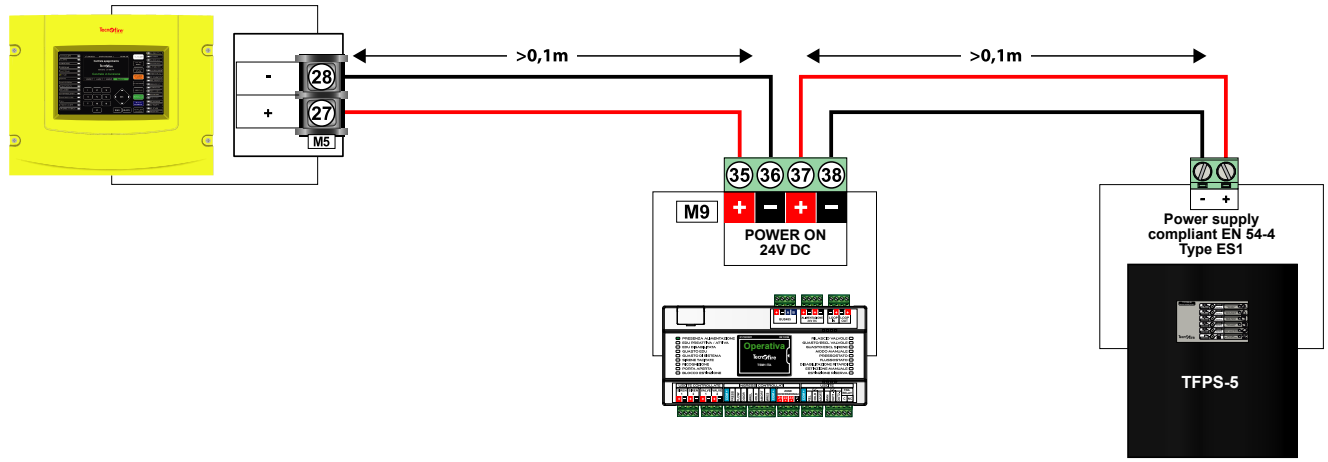
For the Loop line it is recommended to use a multipolar twisted duplex with flexible and shielded conductors.
For the sizing of the cable cross section to be used for the Loop line, refer to the table that indicates the minimum cross section of the conductors according to the length of the Loop line.
For the sizing of the cross section of the 24V power lines, calculate the electrical load and the voltage drop according to the line length.

The maximum length of the detection loop must not exceed 3000 metres.
The maximum length of the RS485 bus line is 1000 metres. It is possible to reach greater distances with a fibre optic connection, made with an RS485 fibre optic converter model TFSFC01.

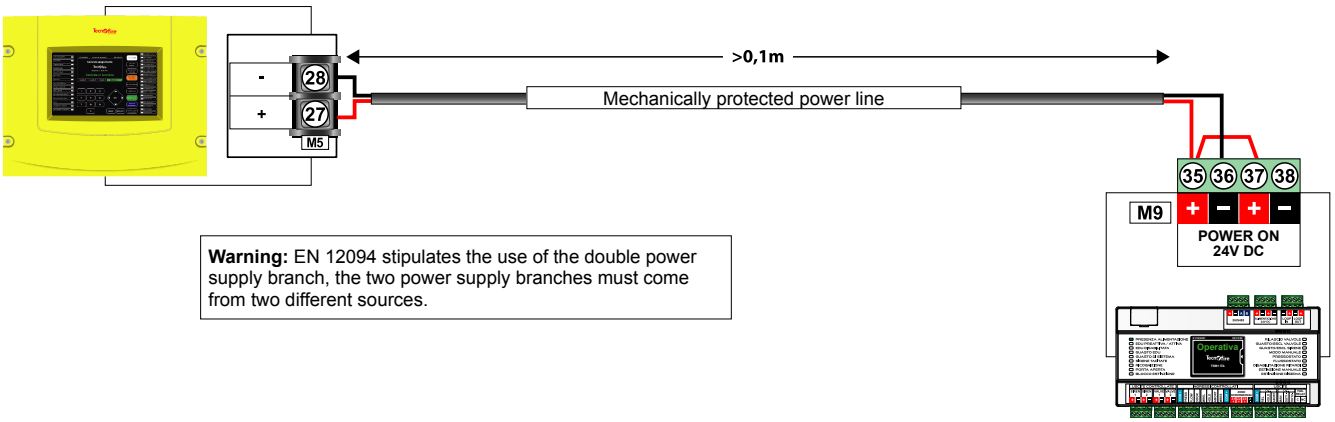
8-4 - Powering the Module

The TFM1 module is powered by an external power source, the power can be taken from the TSA1 control unit or from an additional power supply compliant with EN 54-4.
The module is equipped with two power inputs on which two separate power lines can be connected.
The two power lines are decoupled within the TSM1 module.
The purpose of redundant power supply is to guarantee module operation continuity even in the event that, due to a fault, one of the two power lines is interrupted or is short-circuited.
If the length of the supply line between the supply device and the module is greater than 0.1m, two separate supply lines shall be used, or, if only one supply line is used, it shall be mechanically protected, for example with a steel tube.

MODULE POWER SUPPLY - WITH TWO POWER LINES



MODULE POWER SUPPLY - WITH ONE POWER LINE

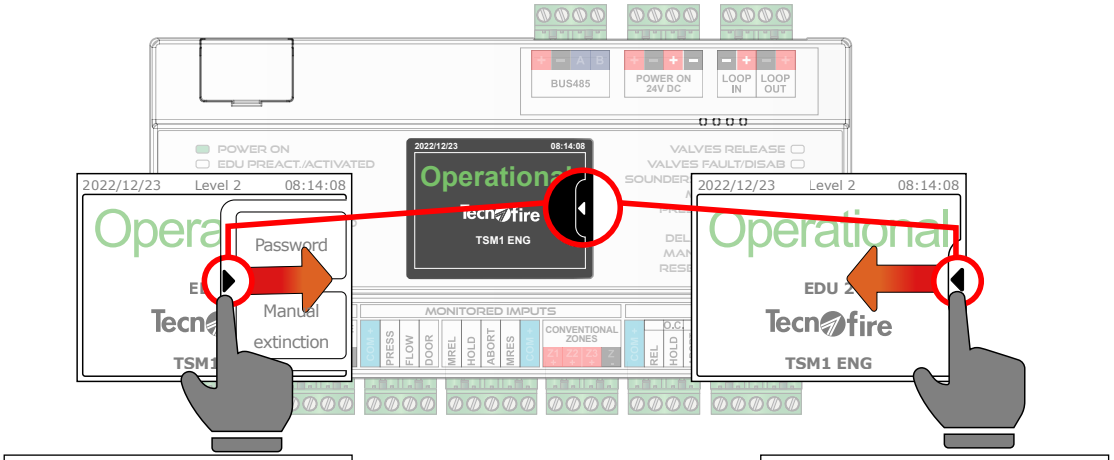


Warning: EN 12094 stipulates the use of the double power supply branch, the two power supply branches must come from two different sources.

9 - TSM1 MODULE MANAGEMENT INTERFACE

9-1 - Module Display Touch screen

The front panel of the TSM1 module is equipped with a Touch screen display and 18 LEDs that indicate the operating status of the peripheral extinguishing unit. The management interface is completed by the Buzzer.
Depending on the access level and via the touch screen display, users can locally manage the functions of the module.
The display dynamically displays information and commands based on the operating context. In case of activation of the extinguishing cycle, the display notifies the actuation sequence, displaying the countdown of the delays that control the different phases of the cycle. The display shows the System commands: Silencing and Restoring the Module, Silencing and Restoring Sirens, Evacuation, Extinguishing Events, Exclusion and Inclusion of devices.



9-2 - TSM1 Module - Access Levels

The TSM1 module has 4 access levels: Level 1 Level 2 Level 3 Level 4.
Level 1 is always available, access to higher levels is subject to the recognition of a code.
Access Level 2 is reserved for users, eight User codes can be programmed.
Access level 3 is reserved for the installer / maintenance technicians, only one code can be programmed.
Access level 4 is reserved for the manufacturer, only one code can be programmed.

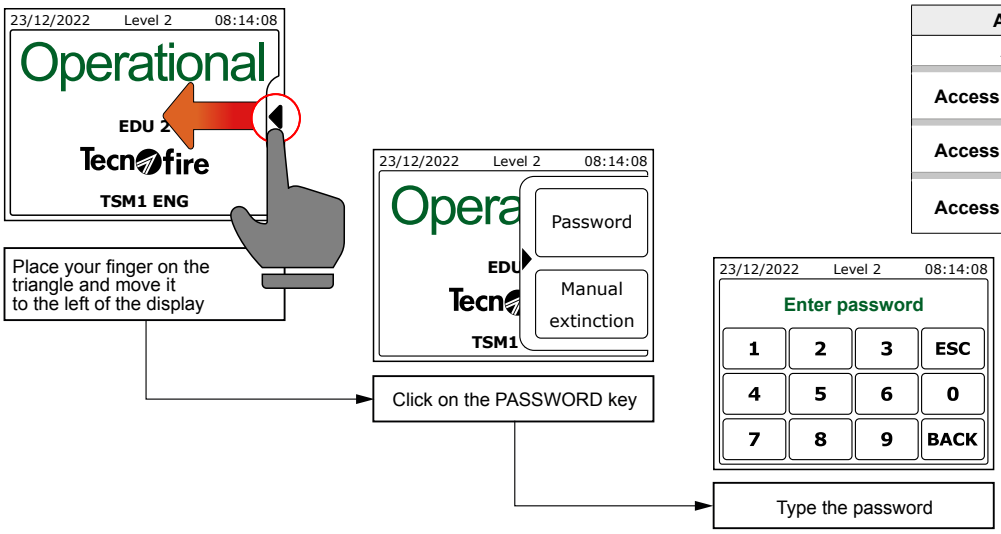
Level 1
The module in sleep conditions makes functions reserved for Level 1 available.
At Level 1 you can do the following:
A - Access levels: 2, 3, 4. Open the display management window, tap the Password button and enter the Levels access code.
B - Acquire the alarm or the fault by pressing the SILENCE key
C - View the alarms in progress, previously acquired, stored in the event category folders.

Level 2
To access the Level, open the display management window, tap the Password button and enter the relevant code.
At Level 2 you can perform all the operations of the previous level and also perform the following operations:
A - Silence and reset the sirens.
B - Perform a reset
C - Manually activate an extinguishing cycle.
D - Access the menu to implement the Automatic or Manual operation mode and to carry out the Exclusions.

Level 3
To access Level 3, open the display management window, tap the Password button and enter the relevant code.
Level 3 is reserved for the installer / maintenance technicians.

Level 4
To access Level 4, open the display management window, tap the Password button and enter the relevant code.
Level 4 is reserved for technical personnel authorised by the manufacturer to carry out relevant technical operations.

9-3 - Access to Operational Levels



Access Methods and Factory Codes					
Access Level 1 is always available					
Access to level 2	1	1	1	1	1
Access to level 3	1	2	3	4	5
Access to level 4	5	4	3	2	1

9-4 - Keys shown on the display

The table describes the function of the keys shown on the display, how to implement the commands and the related signals.
The display shows the management keys dynamically, depending on the operating context.

Key	Function	Implementation procedures
◀ ..... ▶	Triangles allow you to open or close the drop-down menu. Place your finger on the triangle and move it to the left or right.	◀ Move the cursor to the left - Opens the menu ▶ Move the cursor to the right - Closes the menu
0 9	Numeric keys	Numeric keys allow you to type passwords
	Selection pane. Select the item within the menu. Place your finger on the pane and move it up or down. The Selection Pane moves only one position at a time.	Release 1.1.12 ▲ Language ENG EDU Address 2 ▼
Password	Keypad access key	Typing the key displays the numeric keypad with which to type the password to access the levels
NO	Deny key	Pressing the key denies the implementation of the displayed operation and causes the exit from the proposed operation
YES	Enter button	Pressing the key confirms the implementation of the displayed operation
ESC	Exit key	You exit the menu or function displayed
BACK	Key to go back	When entering the Password, move the cursor to the previous position (delete the wrong digit). In the selection criteria - cancels the operation indicated by the display.
OK	Increase or Confirm key	Within the menu, pressing the OK key displays the next option of the menu item selected from the green box.
Stop/Start Sounders	Pressing the key followed by entering the password causes the implementation outputs to be silenced or reset: SIREN 1 and SIREN 2.	1 - Press **STOP/START SOUNDERS** 2 - Type the Level 2 Password The **SOUNDERS STOPPED** Led turns on
Manual release	Pressing the key followed by entering the password causes the extinguishing cycle to be activated. The extinguishing cycle runs normally, respecting the scheduled timings.	1 - Press **MANUAL RELEASE** 2 - Type the Level 2 Password 3 - Confirm operation The Led turns on **MANUAL RELEASE** and **EDU ACTIVATED** The Display shows the **Counting** if activation is delayed at the end of the countdown shows **Release in Progress**
Reset	Pressing the key followed by entering the password causes the reset of all the signals of: Alarm, Pre-alarm, Extinguishing, Fault and restores the control unit to normal operating condition.	1 - Press **RESET** 2 - Type the Level 2 Password Clears All Alarm Signals reported by the LEDs and the display

9-5 - TSM1 extinguishing module LED indicators

The table describes the LED functions and indicator modes on the front panel of the TSM1 extinguishing module. As required by EN 54/2 regulations on light signals, the frequency of LEDs ON/OFF flashing is:

- 0.5sec. ON / 0.5sec. Off (fast flashing) for fault signals.
- 2.5sec. ON / 2.5sec. Off (slow flashing) for pre-activation signalling.

Signal	Colour	Type of Signal	Signal mode	
POWER ON	Green	Indicates that the module is regularly powered	Off	Module not powered
			On	Module regularly powered
EDU PREACT./ACTIVATED	Red	Monitor of the Activation Status of EDU Displays the statuses of: sleep, pre-activation, activation	Off	EDU in sleep status
			Flashing	Pre-active EDU (slow flashing)
			On	Discharge cycle of the EDU activated
EDU DISABLED	Yellow	Monitor of the operating status of EDU Displays the statuses of: enabling or disabling	Off	EDU Enabled
			On	EDU disabled (extinguishing out of service)
EDU FAULT	Yellow	Indicates the fault status of the EDU module	Off	No fault alerts
			Flashing	Fault in progress not silenced
			On	Fault in progress silenced
SYSTEM FAULT	Yellow	Indicates the system fault status	Off	No fault alerts
			Flashing	System Fault in progress not silenced
			On	System Fault in progress silenced
SOUNDERS STOPPED	Yellow	Indicates the silenced status of the optical-acoustic warning devices	Off	No siren silencing event
			On	Siren silenced
HOLD OPERATED	Yellow	Monitor of the controlled input status Recognition command. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
DOOR OPEN	Yellow	Monitor of the controlled input status Door open. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
ABORT OPERATED	Yellow	Monitor of the controlled input status for the connection of the extinguishing block button. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
VALVES RELEASE	Red	Valve status monitor. Displays the statuses of: sleep or release	Off	Valves in sleep status
			On	Valve / Valves in release status
VALVES FAULT/DISAB	Yellow	Valve status monitor. Displays the statuses of: enabling, fault, exclusion	Off	Discharge valves enabled
			Flashing	Faulty discharge valves (no termination)
			On	Excluded discharge valves (out of service)
SOUNDERS FAULT/DISAB	Yellow	Monitor of the operating status of the optical-acoustic detectors. Displays the statuses of: enabling, fault, exclusion. See note 1.	Off	Warning devices enabled
			Flashing	Warning devices in fault status (no termination)
			On	Warning devices excluded (out of service)
MANUAL MODE	Yellow	Monitor of the programmed, manual or automatic operating mode. See note 2	Off	Automatic operating mode
			On	Manual operation mode
PRESSURE SWITCH	Yellow	Monitor of the controlled input status Pressure switch. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
FLOW SWITCH	Yellow	Monitor of the controlled input status Flow switch. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
DELAYS DISABLED	Yellow	Indicates the activation of the command to disable delays.	Off	Delays enabled
			On	Delays disabled
MANUAL RELEASE	Yellow	Monitor of the controlled input status for the connection of the manual extinguishing button. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status
RESERVE RELEASE	Yellow	Monitor of the controlled input status for the connection of the backup or secondary extinguishing button. Displays the statuses of: sleep, activation, fault	Off	Input in sleep status
			Flashing	Input in fault status (no termination)
			On	Input in activation status

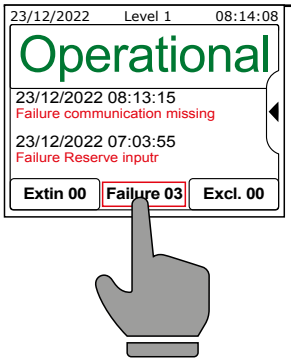
Note 1 - The exclusion and/or inclusion of optical-acoustic warning devices follows the inclusion/exclusion status of the control unit's sirens, (standard EN54-2).
Note 2 - The EDU programmed to operate in manual mode, the detectors cannot activate the extinguishing cycle.
N.B. The switching on of each specific fault LED is always accompanied by the switching on of the Led **" EDU FAULT"**
When the control unit is in the reset status or is not operating, an acoustic signal is emitted and the Leds **"EDUFAULT"** and **"SYSTEM FAULT"** light up simultaneously

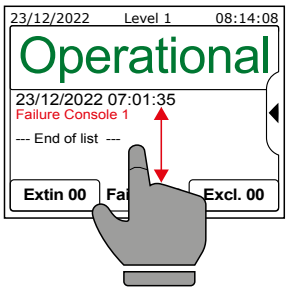
9-6 - TSM1 - Event storage folders

The module display shows the three event archive folders automatically, after silencing the events: Extinguishing and Fault. The folders also appear after the execution of the device exclusion operations.
Each folder records and totals in its counter the events of its category. Resetting the control unit only deletes the silenced events from the archive folders. The events recorded in the Exclusion folder are only deleted by restoring normal system operating conditions, that is, no excluded device.

Event storage folders					
Folder	**Icon**	**Function**	**Folder**	**Icon**	**Function**
Extin. 00		The folder records and counts all events of Extinguishing	Failure 00		The folder records and counts all events of Zone and/or System Fault
Excl. 00		The folder records the status of all excluded devices (i.e. out of service)			

Notes:
1) Each folder can contain up to 99 events.
2) Resetting the control unit or the module cancels the silenced events and adjusts the number displayed by the event counter.
3) The cancelled events are still stored in the "Event history" archive of the control unit.
4) The contents of the Exclusion folder can only be deleted by restoring normal system operation no device Excluded.





Viewing Event Archive Folders
To view the contents of the folders, tap the corresponding key.
To scroll through the list, place your finger on the display and move it up or down.
The first event displayed in the list is the most recent.

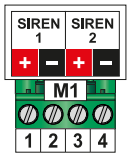
If you select a folder with the counter indicating a number other than 00, as in the example, the "Fault" folder displays the list that contains the number of events indicated by the counter.

Each event in the list is accompanied by: date, time and description.
The end of the list of events is indicated by the word "End of list".

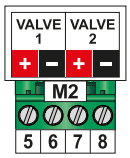
Only the conventional or control unit zones associated with the module are displayed.

9-7 - TSM1 module terminal block description

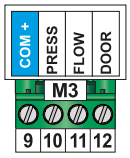




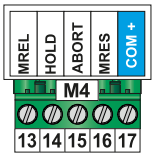
M1 - Description		Function	Restrictions
1	SIREN 1 power supply positive	Controlled output for activating the optical-acoustic warning device that notifies "Evacuate the room"	Max. current 750mA @ 24V DC
2	SIREN 1 power supply negative		
3	SIREN 2 power supply positive	Controlled output for activating the optical-acoustic warning device that notifies "Extinguishing in progress"	Max. current 750mA @ 24V DC
4	SIREN 2 power supply negative		



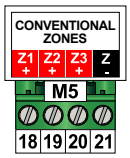
M2 - Description		Function	Restrictions
5	VALVE 1 power supply positive for valve	Controlled output for control of valve 1 Pilot Valve	Max. current 750mA @ 24V DC
6	VALVE 1 power supply negative for valve		
7	VALVE 2 power supply positive for valve	Controlled output for control of valve 2 Spare Valve	Max. current 750mA @ 24V DC
8	VALVE 2 power supply negative for valve		



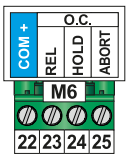
M3 - Description		Function	Restrictions
9	Common positive reference for input	Do not use the reference positive for other functions	Do not use the common positive reference for other functions
10	Monitor pressure switch controlled input	Pressure switch operating status monitor input	
11	Flow switch monitor controlled input	Flow switch operating status monitor input	
12	Door monitor controlled input	Door control contact status monitor input	



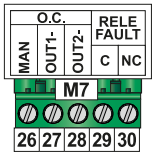
M4 - Description		Function	Restrictions
13	Controlled input "Manual release"	Input controlled by the "Manual release" button	Do not use the common reference positive for other functions
14	Control input "Recognition"	Input controlled by the "Recognition" button	
15	Controlled input "Extinguishing stop"	Input controlled by the "Extinguishing stop" button	
16	Controlled input “Reserve Release”	Input controlled by the "Reserve release" button	
17	Positive reference for inputs	Do not use the reference positive for other functions	



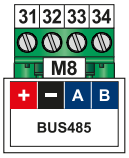
M5 - Description		Function	Restrictions
18	Conventional Zone 1 Input	Inputs usually used for the connection of conventional detectors	Max 32 devices for zone. Only sensors or only buttons.
19	Conventional Zone 2 Input		
20	Conventional Zone 3 Input	Input for connecting conventional buttons	
21	Negative reference for zone inputs	Do not use the reference negative for other functions	



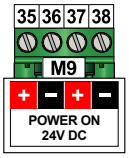
	M6 - Description	Function	Restrictions
22	Common positive reference for outputs	Do not use the reference positive for other functions	
23	RELEASE Output - Manual Release	Open collector signal outputs (negative output status signalling)	Open collector Maximum current 50mA @ 24V DC
24	HOLD Output - Recognition in progress		
25	ABORT Output - Extinguishing stop		



	M7 - Description	Function	Restrictions
26	MAN Output - Manual Operating Status	Signal output (negative signalling)	Open collector Maximum current 50mA @ 24V DC
27	Programmable output OUT1-	Negative open collector signal outputs	
28	Programmable output OUT2-		
29	Common contact fault output	Relay Output Signal Fault Sleep Status Relay Open	Maximum current contact 1A @ 30V DC
30	Normally closed contact fault output		

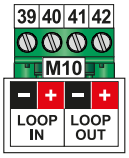


	M8 - Description	Function	Restrictions
31	Positive RS485 Bus line power supply	Power output for the expansion devices Do not use this power supply for other devices	Max. current 500mA @ 24V DC
32	Negative RS485 Bus line power supply		
33	RS485 BUS communication channel A	Bus reserved for connecting expansion devices The TSM1 module only manages TFT-4.3C repeater panels	The module handles up to 3 repeaters
34	RS485 BUS communication channel B		

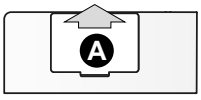
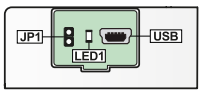


	M9 - Description	Function	Restrictions
35	Positive power input	Power input of the TSM1 module. The power supply must comply with EN 54-4 and be Type ES1	Rated voltage 24V DC Operating voltage 20V...27.6V DC
36	Negative power input		
37	Additional positive power input	Additional power input to provide a redundant power supply to the module. The module uncouples the two power sources.	
38	Additional negative power input		

Warning: EN 12094 stipulates the use of the double power supply branch, in the case of a single power supply it is necessary to jumper terminals 35 and 37.



	M10 - Description	Function	Restrictions
39	Input Loop -	Loop End Return	
40	Input Loop +		
41	Output Loop -	Loop Start Departure	
42	Output Loop +		

MANAGEMENT INTERFACE	
 	The management interface is protected by the removable closure cap, indicated by the letter A. The interface allows you to connect a personal computer to the module, with which to perform the firmware update of the TSM1 module. The interface consists of the Mini USB port, the JP1 reset jumper and a red LED that has the function of monitoring the module's firmware update activity.

9-8 - Instructions for connection and use of the system outputs

Instructions for connection and use of the system outputs

The relays and electrical outputs available on the control unit and on the addressed modules, are part of an "ES1" (EN 62368-1) type power supply network. Therefore, these relays and outputs can only be interfaced with other circuits that fall within the safety voltages defined as "ES1".

TSM1 Module Output Usage Restrictions

Outputs OUT1 (terminal 27) and OUT2 (terminal 28) are uncontrolled outputs.

The FAULT output (terminals 29, 30) is an uncontrolled output.

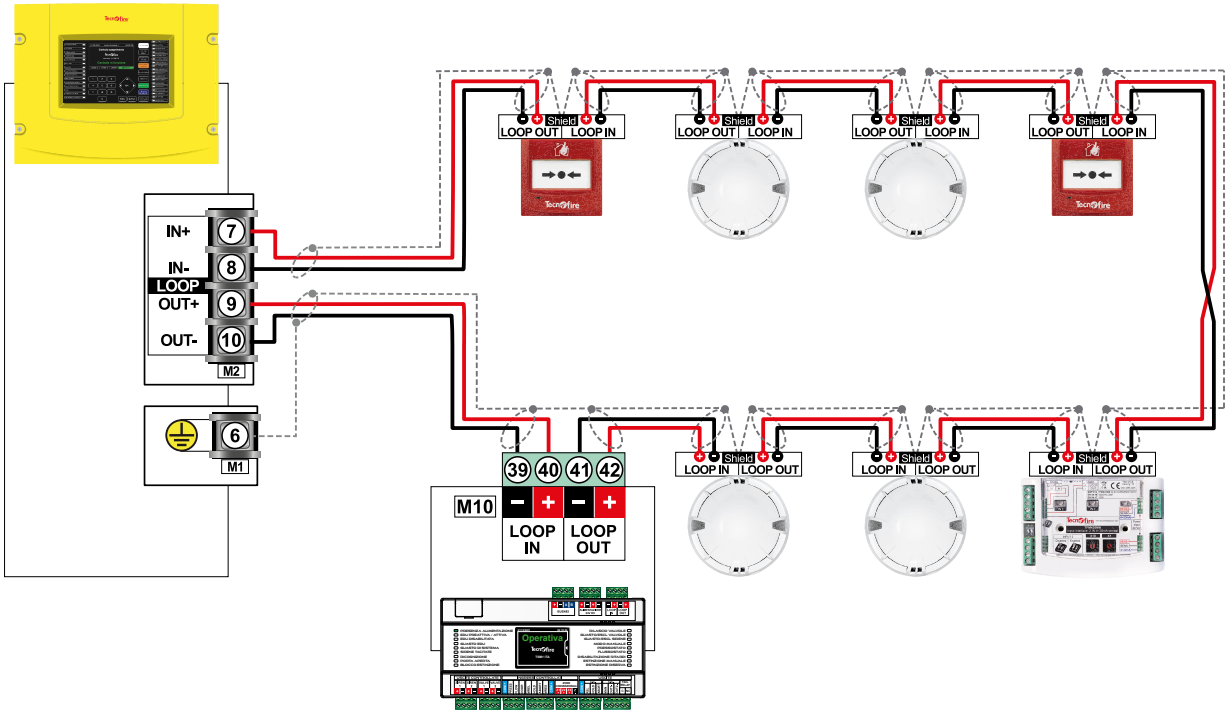
In accordance with EN 54-2, the outputs: OUT1, OUT2 and FAULT must not be used to control fire alarm devices and/or transmission devices of fire alarm and fault warning notifications.

10 - TSM1 WIRING DIAGRAMS

10-1 - Connection to the Detection Line

The TSM1 module connects to the control unit detection loop. The address of the module is digitally programmed from its local programming menu, it is possible to assign addresses from 2 to 9.
The TSA1 BASE control unit does not manage TSM1 modules, the TS1 LIMITED manages up to 5 TSM1 modules, the TS1 EXTENDED manages up to 9 TSM1 modules.

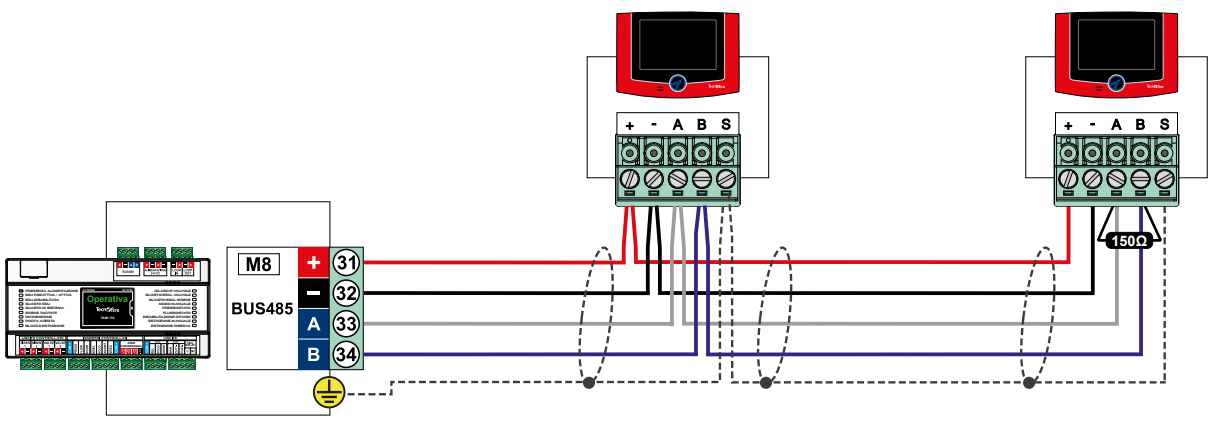
TSM1 CONNECTION TO THE DETECTION LINE



10-2 - Connecting local repeaters

Up to three TFT-4.3C management devices can be connected to the module's Bus485.
The devices are connected in open loop mode the Bus must be balanced on the last connected device.
For the wiring of the Bus lines it is recommended to use a shielded and twisted multipolar cable. The cross-section of the conductors must be proportional to the length of the line and the sum of the consumption of the connected devices.
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.
The maximum length allowed for the Bus line is 1000 metres.

TSM1 MODULE CONNECTING LOCAL REPEATERS



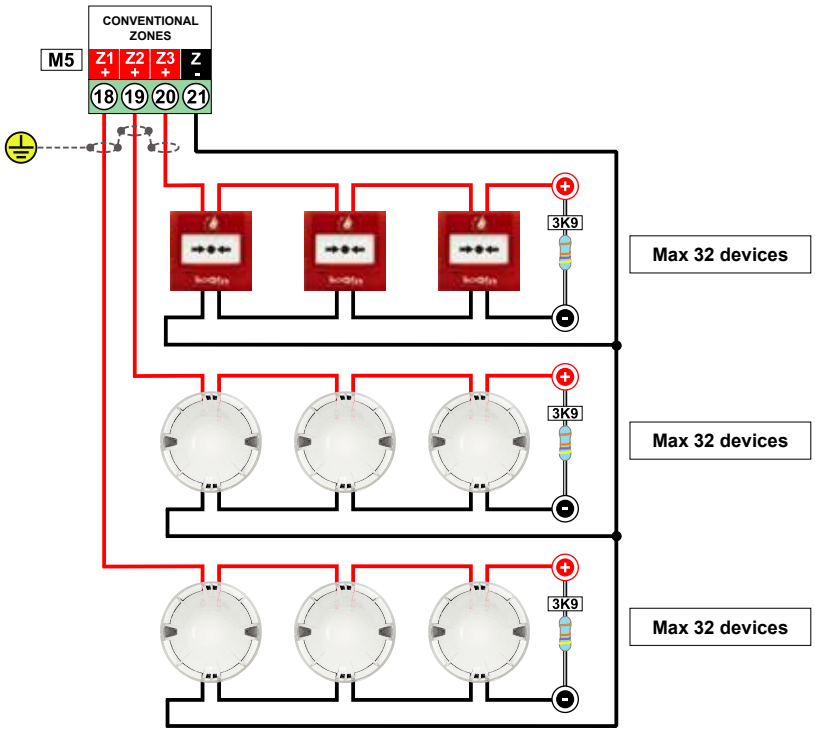
10-3 - Connecting Conventional Detection Zones

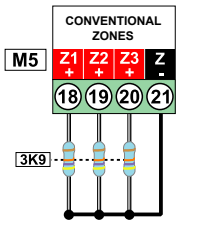
The module is equipped with three conventional detection zones. A maximum of 32 devices can be connected to each conventional zone.
Conventional detection zones can be replaced with detection zones consisting of detectors and addressable manual alarm button modules of the TSA1 control unit.
Conventional zone detection lines can only be connected in Open Line mode terminated with a resistor. The detection logic of conventional zones is subject to a formula chosen from those available.
The formula logic obliges the intended use of the three conventional zones: zones 1 and 2 must be used for the wiring of the detectors, zone 3 must be used for the wiring of the manual alarm detection buttons.
For the wiring of conventional detection zones, it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board. The maximum length allowed for the laying of the detection line, with cable of appropriate cross-section, can never exceed 1500 metres.

THE RULES OF USE OF CONVENTIONAL ZONES	
1	Only conventional detectors must be connected to conventional zones 1 and 2
2	Only manual alarm buttons must be connected to conventional zone 3
3	The zone must be composed of a maximum number of 32 devices (Standard EN 54)
4	The zone must be equipped with at least one device
5	Conventional zones can be replaced, with addressable system detection zones
6	The three conventional zones are subject only to the EDU. While detection zones shared with the TSA1 control unit can be used
7	If conventional zones of the module are not used, the relative inputs must be closed with a 3K9 resistor
WARNING - If using system zones instead of conventional zones, it is important to note that, in the event of failure or interruption of the detection loop, the module may not receive alerts from the associated zones and consequently cannot manage the extinguishing cycle automatically	

DETECTION LOGIC DICTATED BY THE FORMULAS	
Formula	**Detection Logic**
Z1 & Z2 | Z3	The extinguishing cycle is activated if: zones 1 and 2 are in alarm or only zone 3 is in alarm. If only zone 1 or zone 2 is in alarm, the EDU is in the PRE-ACTIVATION status.
Z1 & Z2 & Z3	The extinguishing cycle is activated if: zones 1, 2 and 3 are in alarm.
Z1 | Z2 | Z3	The extinguishing cycle is activated if: one zone, does not matter which one, is in alarm.

TSM1 CONNECTION AND INTENDED USE OF CONVENTIONAL ZONES





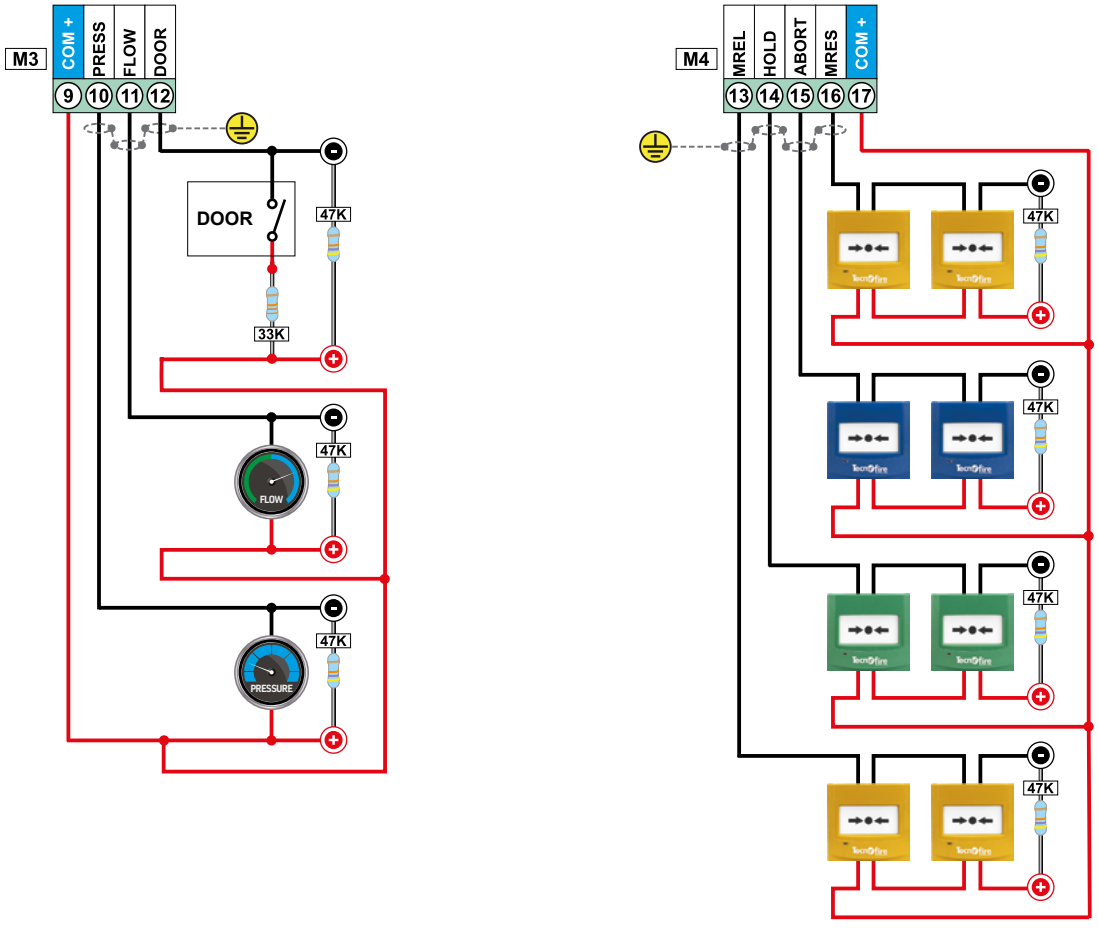
Conventional zones do not use

10-4 - Connecting controlled inputs

The seven controlled inputs of the TSM1 module can be enabled individually, the connection mode can be programmed as: NC, NO, NC balanced, NO balanced.
On the inputs: MRES, HOLD, MREL, ABORT, up to 32 devices can be connected.
For the wiring of the inputs it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.

CONTROLLED INPUTS		
Input		Function
PRESS	**Pressure switch**	Cylinder pressure control input
FLOW	**Flow switch**	Flow switch control input - Programming: the input alarm may or may not generate the discharge
DOOR	**Door**	Door control input - Programming: Door Status Monitor or Block Extinguishing Sequence
MREL	**Manual activation**	Input for manual activation button of the extinguishing cycle
HOLD	**Recognition**	Temporary countdown interruption input delaying extinguishing agent release
ABORT	**Extinguishing block**	Input that stops the extinguishing cycle
MRES	**Manual reserve activation**	Input commanding the release of the reserve cylinder

CONTROLLED INPUTS CONNECTION

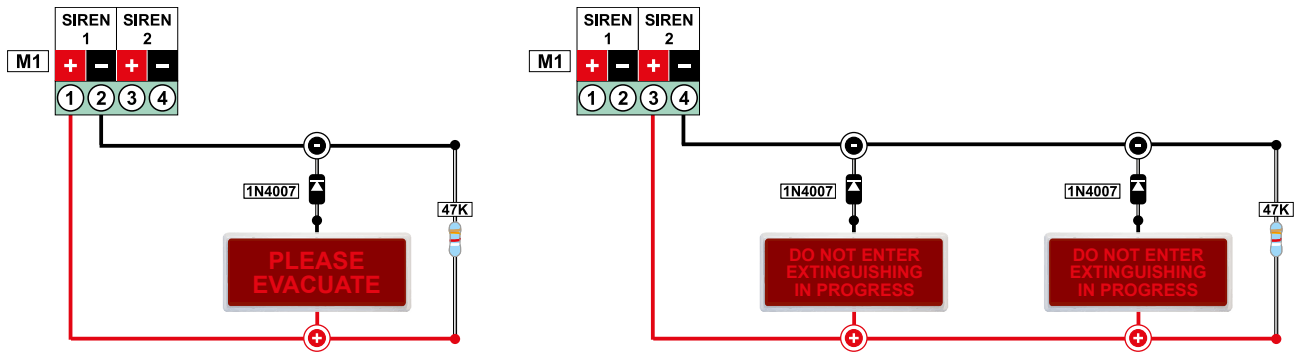


10-5 - Connecting controlled outputs

The four controlled outputs of the TSM1 module are used to control the acoustic warning devices and the extinguishing agent release valves.
The controlled outputs of SIREN 1 and 2 control the acoustic warnings that notify the Pre-discharge and Discharge progress statuses.
The notification times of the panels depend on the programming parameters of EDU.
The controlled outputs Valves 1 and 2 control the activation of the extinguishing agent release valves.
The activation modes and the delay and activation times of the valves depend on the programming parameters of the EDU.
For the wiring of the outputs, it is recommended to use a shielded and twisted bipolar cable.
The cross-section of the conductors must be proportional to the length of the line, and in any case must never be less than 0.5mm².
To ensure electrical safety and avoid induced disturbances, the cable shield must be connected so that it is never interrupted, always connecting on each device the cable shield of the line input with the cable shield of the line output. The screen must only be connected to the ground inside the control unit, on the terminals indicated with the Earth symbol, of the cable connection board.

CONTROLLED OUTPUTS		
Output		**Function**
SIREN 1	**Siren 1 - Pre-discharge Warning**	Control output for acoustic optical warning panel of imminent discharge warning "EVACUATE the ROOM"
SIREN 2	**Siren - Discharge Warning**	Control output for acoustic optical warning panel of discharge warning in progress "EXTINGUISHING IN PROGRESS"
VALVE 1	**Release valve 1**	Extinguishing agent release valve 1 control output
VALVE 2	**Release valve 2**	Extinguishing agent release valve 2 control output

ACOUSTIC OPTICAL WARNING DEVICE CONNECTION



CONNECTING THE SOLENOID VALVES



11 - DETECTION ZONES

11-1 - Logical Zone organisation

The TSA1 detection and extinguishing control unit manages 3 conventional detection zones and 1 detection LOOP, on which it is possible to connect up to 199 sensors, 99 modules and 9 TSM1 extinguishing modules depending on the model used. The sensors and modules must be assigned to the zones of the control unit. The devices not assigned to the zones are automatically associated with the default zone.

THE PROGRAMMING RULES OF THE ZONE	
1	The Zone may be composed of detection devices and/or modules
2	For the button modules (manual activation points) there must be dedicated zones, composed exclusively of such devices
3	The Zone **cannot** share its devices with other Zones
4	The Zone must consist of at least one device
5	The zone must be composed of a maximum number of 32 devices (Standard EN 54)

Types of Zone
Each sensor or module detection device must be part of a Detection Zone. Devices not associated with Zones are automatically part of the Default Zone. The Zones can operate with the logic of single or double consent.

Default zone
All sensor devices and modules that have not been associated with the detection zones are automatically associated with the Default Zone. The default zone is a single consent non-programmable zone.
The default zone allows all the sensor devices and modules not associated with the zones to perform their function.
However, it is advisable not to leave any sensors or devices in the default zone. The default zone can be excluded.

ABOUT THE DEFAULT ZONE	
1	The Default Zone is not programmable
2	The Default Zone groups all programmed devices not associated with the Zones
3	The composition of the Default Zone is not directly editable

Fire Zone
The Fire Zone consists of one or more detection and implementation devices; it has the task of monitoring and detecting the physical phenomena generated by the onset of fire.
The Zone alarm activates the Fire Alarm alert and activates the programmed functions associated with the zone alarm.
The Alarm output of the control unit is associated with the fire zones, the Pre-Alarm output and any additional outputs, available on the output modules, must be programmed and associated with the Alarm and/or Pre-Alarm functions.

UNI 9795:2013 - REGULATORY REFERENCE
5.4.6.1 Manual Call Points Fixed automatic fire detection systems shall be supplemented by a signalling system consisting of manual call points. Faults and/or exclusion of automatic detectors must not place manual signalling detectors out of service and vice versa.
Warning: with this paragraph the standard implicitly indicates that automatic detection devices and manual call points must not be in the same zone.

Symbols key							
	Zone in sleep mode		Fire detector in sleep mode		Fire detector in Pre-alarm		Fire Detector in Alarm
	Zone in signal mode		Button in sleep mode		Button in Alarm		

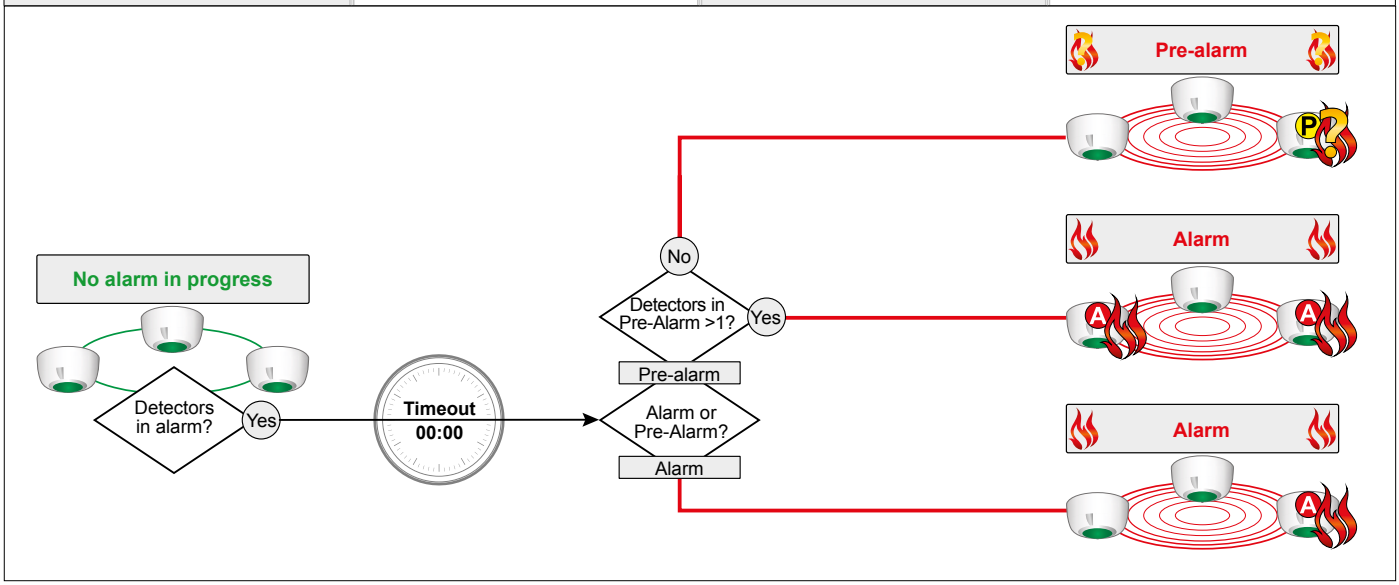
11-2 - Zone planning and operation

The operating logic of the zones of TSA1 control units can be programmed to operate in Single Consent mode or in Double Consent mode.
The addressable Tecnofire detectors and modules can be connected directly to the Detection Line, other conventional devices, not compatible, can be connected to the Detection Line, through the interfacing of Tecnofire modules.
The TECNO - COMBO 2T detector can manage two levels of Pre-Alarm and Alarm signals if programmed.
The TECNO-BUTTON modules associated with the Fire Zones, programmed with the alarm operating criterion, are never subject to the logic of double consent. Pressing a button always generates the immediate Alarm signal and the activation of the Evacuation output.

Fire Zone - Single Consent

Signalling logic - The detection of Pre-Alarm or Alarm of a device implements the related Pre-Alarm or Alarm signal.
The Pre-Alarm signal of two devices activates the Alarm signal
The signalling status ends when the Silencing procedure is performed.

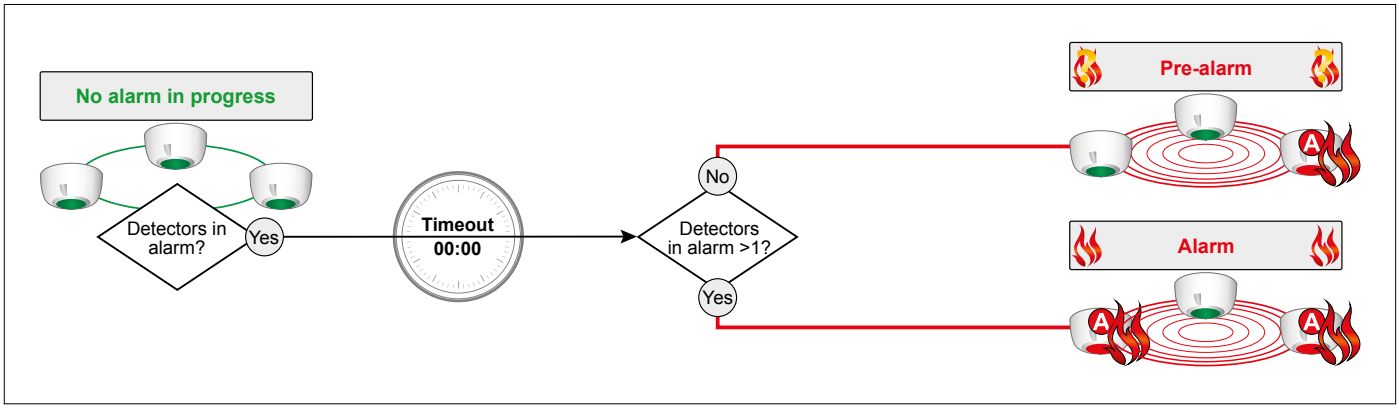
Programming - Zone Configuration Menu		Programming - Edit Delays Menu	
Zone Type	Fire	**Dual Consent Zone Pre-Alarm Timeout**	Irrelevant Programming
Consent	Single		
Behaviour with Timeout	Irrelevant Programming		



Fire Zone - Double Consent

Signalling logic - The detection of Alarm or Pre-alarm of a device (First consent) activates the Pre-alarm signal.
The detection of Pre-alarm or Alarm of another device (Second consent) activates the Alarm signal.
The signalling status ends when the Silencing procedure is performed.

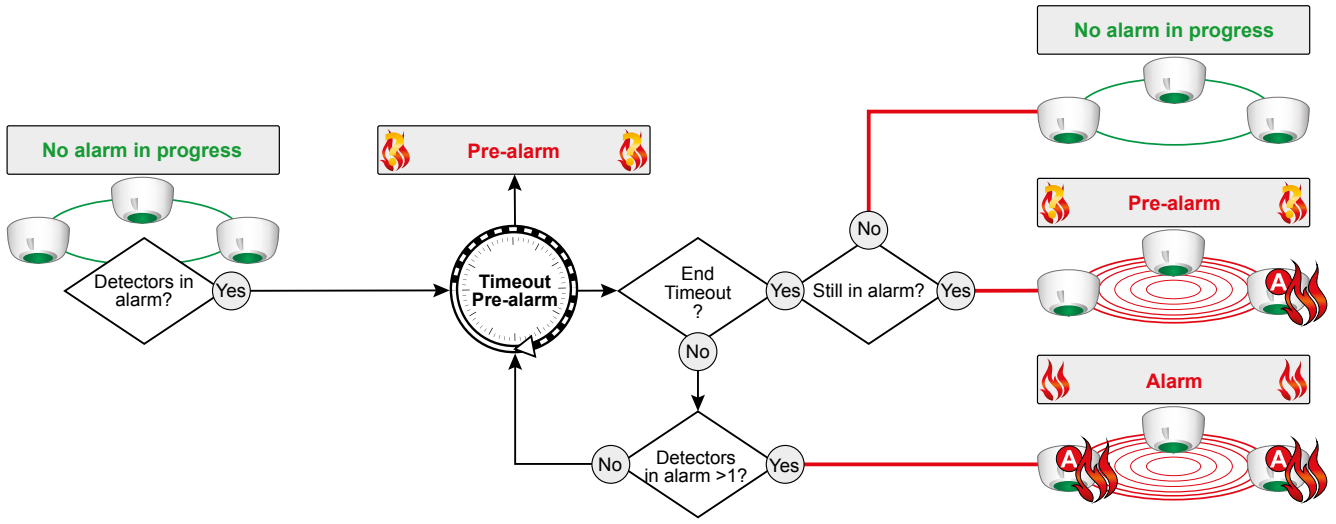
Programming - Zone Configuration Menu		Programming - Edit Delays Menu	
Zone Type	Fire	**Dual Consent Zone Pre-Alarm Timeout**	A time equal to 0 (zero) must be programmed
Consent	Double		
Behaviour with Timeout	Irrelevant Programming		



Fire Zone - Dual Consent - Behaviour with Timeout None

Signalling logic - The Alarm detection of a device (First consent) activates the Pre-Alarm signal and starts the "Pre-Alarm Timeout" timer if during the time interval defined by the timer another device detects an Alarm (Second consent) the Alarm signal is activated immediately. If the second consent does not occur, the status of the detector that caused the first consent is tested within the Timeout: if the detector is in the alarm status, the Pre-Alarm signal is maintained, if the detector is in the sleep status, the control unit signals the status "No Alarm in Progress". The signalling status ends when the detectors return to their sleep status, or, at the time when the Silencing procedure is performed.

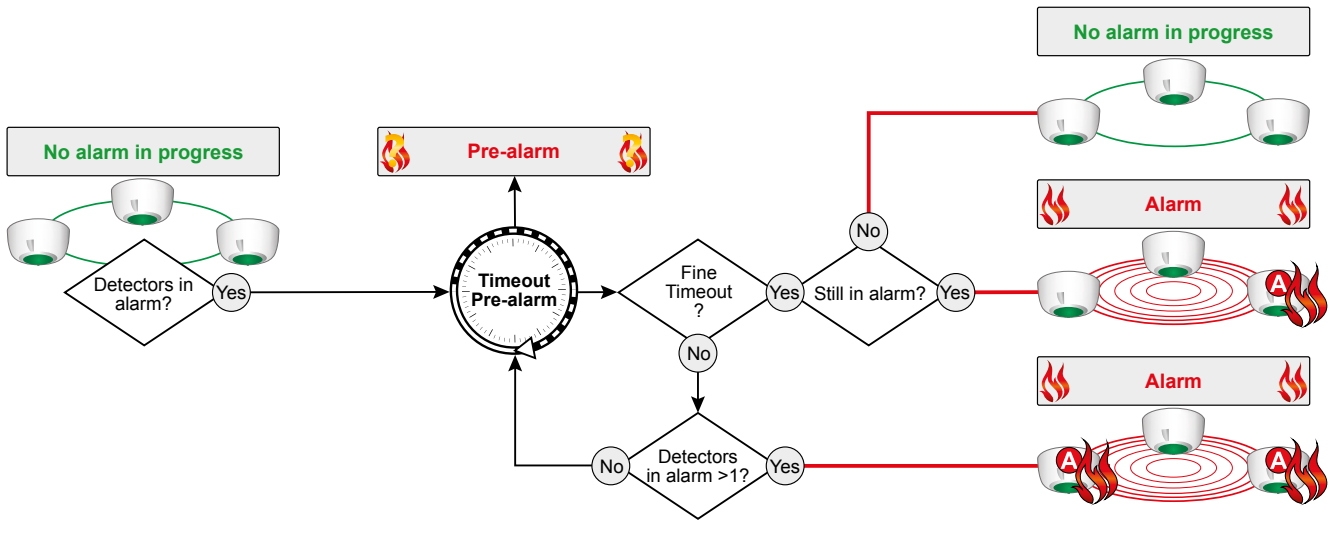
Programming - Zone Configuration Menu		Programming - Edit Delays Menu	
Zone Type	Fire	**Dual Consent Zone Pre-Alarm Timeout**	Programme a time greater than zero Range from 5 to 60 minutes.
Consent	Double		
Behaviour with Timeout	None		



Fire Zone - Double Consent - Behaviour with Timeout Alarm

Signalling logic - The Alarm detection of a device (First consent) activates the Pre-Alarm signal and starts the "Pre-Alarm Timeout" timer if during the time interval defined by the timer another device detects an Alarm (Second consent) the Alarm signal is activated immediately. If the second consent does not occur, the status of the detector that caused the first consent is tested within the Timeout: if the detector is in the alarm status, the Alarm signal is maintained, if the detector is in the sleep status, the control unit signals the status "No Alarm in Progress". The signalling status ends when the detector that generated the first consent restores its sleep status, or, at the time when the Silencing procedure is performed

Programming - Zone Configuration Menu		Programming - Edit Delays Menu	
Zone Type	Fire	**Dual Consent Zone Pre-Alarm Timeout**	Programme a time greater than zero Range from 5 to 60 minutes.
Consent	Double		
Behaviour with Timeout	Alarm		



Fire Zone - Composed of manual alarm devices			
Signalling logic - The TECNO-BUTTON modules associated with the Fire Zones, programmed with the alarm operating criterion, have signalling priority; the implementation of a button always generates the immediate alarm signal and the activation of the Evacuation output.			
Programming - Zone Configuration Menu		**Programming - Edit Delays Menu**	
Zone Type	Fire	**Dual Consent Zone Pre-Alarm Timeout**	Irrelevant Programming
Consent	Single		
Behaviour with Timeout	Irrelevant Programming		



NOTE

NOTE


Tecnofire
DETECTION
TSA
SYSTEMS

21ISTR13166

Via Ciriè, 38 - 10099 - San Mauro T. se - Torino (Italy)

Unità produttiva:
Strada del Cascinotto, 139/54 - 10156 Torino (Italy) - Tel. +39 011 22 35 410

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