Control Panels

TELEFIRE
FIRE & GAS DETECTORS

TSA-1000

Conventional Multi-Zone Fire Alarm and Extinguishing Control Panel

Technical Manual

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LEGAL NOTICE

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Note

Fire alarm systems are composed and assembled of different devices and subsystems, such as control panels, annunciators, smoke detectors, heat detectors, manual call points, extinguishing activation devices, and annunciating devices intended to alert to fire / smoke.

Using this system does not ensure protection from or prevention of fire and/or smoke damages, but proper use of the system may reduce fire and smoke damages.

Proper system configuration design, including all of its components and infrastructure, as well as proper installation according to the manufacturers' instructions and the applicable standards – are a conditioned precedent for the proper and efficient function of the system.

The designer and installer should have the appropriate skills and qualifications for performing said installation and all damages or losses resulting from improper design and/or installation lie with the designer and/or installer alone.

All loss or damage caused by improper action shall lie with the originator of said improper action.

The manufacturer shall not be liable for any fire and/or fire damages caused by fire in location where fire systems are installed and or results of direct or indirect fire damage that may be caused to any persons and/or property and/or third parties as a result of using the TSA-1000 and/or resulting from its inaction.

Record of Changes

No.	Date	Revision	Details	Author
1	25.01.2012	1.12	Update Introduction, Para 2.2 (UL), UPDATE SYMBOLIC DIAGRAM, Update note about reading and UNDERSTANDING this document Move Number of adapters and extinguishant quantities to appear after "Extinguishing Adapters" Replace Fig. 1 with original dwg. from Ylan UPDATE INSTRUCTIONS FOR IMMEDIATE ACTION	I. Reshef

Note

The terms Control Panel" as used in NFPA 72 guideline and UL 864 standard and Control and Indicating Equipment (CIE) as used in EN 54 standards are used interchangeably throughout this manual.

Note

The terms “Trouble” as used in NFPA 72 guideline and UL 864 standard and “Fault” as used in EN 54 standards are used interchangeably throughout this manual

Note

All maintenance and repair work performed on the TSA-200 shall be performed by qualified and authorized personnel ONLY

Note

Do not install, operate, or maintain this product before fully reading and thoroughly understanding this manual.

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1 Introduction

Telefire's TSA-1000 Conventional (i.e. Non Addressable) Multi-Zone Fire Alarm Control Panel complies with numerous standards. It is certified to EN 54-2 and EN 54-4. It is also CE marked and is certified to GOST 53325-2009 and to IS 1220. It also complies with UL 864 edition 9.

The control panel is modular and can be extended up to 16 input zones, with options for other expansions.

The base control panel contains four programmable zones, four programmable outputs, a horn output, a Fire Alarm dialer output, and three programmable relays.

The control panel is modular and is expandable via various modules that include inputs, outputs, and relays to implement complex logic functions.

Up to four remote panels can be connected via an RS-485 interface (part of the TSA-1000C, a communication expansion card). Computer communication and remote panels are also supported through the TSA-1000C

The TSA-1000 supervises two-wire IDC lines ("zones") and outputs that can be used to activate sounders, automatic extinguishing devices, evacuation sounders, or other notification equipment. Additionally, the control panel has separate outputs for activating a main sounder, automatic dialer, and "dry" contacts (of relays) to indicate alarm, fault, and supervisory events of the system.

All input and output lines are fully supervised. The output lines are constantly monitored and are automatically disconnected when current draw exceeds the allowed values.

Input and output line protection is done without the use of fuses, using Telefire's unique ACM (Advanced Current Management) that provides high resilience even during fault events and automatic return to normal operation with problem resolution.

Any event in the system is clearly displayed in detail and allows quick and easy troubleshooting for the user, operator, and service technician.

All programming and configuration can be done easily through the panel's keyboard or via dedicated software.

As the system is computerized, it allows working in various modes that can be easily reconfigured in the field without special tools, yet allowing access only to authorized personnel.

The TSA-1000 can be programmed as a fire alarm panel, fire alarm and extinguishing panel that includes cross-zoning, extinguishing activation delay, or a combination of the two. Additionally, it is possible to delay alarm from specific zones and cross zones to neutralize false alarms from difficult locations such as areas with forklift activities, etc.

The system's inputs, outputs, and relays are fully configurable including complex logic operations involving multiple outputs and multiple inputs.

The TSA-1000 allows output activation in four ways: general, specific zone, cross-zones of several zones, and one of several zones, through unique matrix logic (AAM – Advance Activation Matrix).

The system includes a maintenance alert for detectors (dependant on using Telefire detectors), a function that required, until now, analog addressable panels.

Battery charging is fully supervised – including charging voltage, charging current, and monitoring of the battery's ability to supply the required current.

A special work mode (Field Test) allows detector testing using only one technician, whilst differentiating between activations that are done for testing purposes and real alarms.

The system supports an automatic alarm verification feature, to decrease the occurrence of false alarms, and a time and date clock for logging system events. System log can be viewed via a PC or printed for system investigation purposes.

The TSA-1000 can be connected to form a network of control panels.

2 Functions and Options

2.1 EN 54-2 Options with Requirements

The TSA-1000 conforms fully to European standards BS EN 54-2:1998 and BS EN 54-4:1998 and the following optional features:

- *Output to fire alarm devices* – EN 54-2 Section 7.8 option with requirements
- *Output to fire alarm routing equipment* – EN 54-2 Section 7.9 option with requirements
- *Output to fire protection equipment* – EN 54-2 Section 7.10 option with requirements
- *Coincidence detection*– EN 54-2 Section 7.12 option with requirements (Provided as a two zones coincidence and as a single/Dual zone AVF- Alarm Verification Function)
- *Alarm Counter* – EN 54-2 Section 7.13 option with requirements
- *Total loss of power supply* – EN 54-2 Section 8.4 option with requirements
- *Output to fault warning routing equipment* – EN 54-2 Section 8.9 option with requirements
- *Test condition* – EN 54-2 Section 10 option with requirements

2.2 UL 864

The TSA-1000 complies with UL 864 edition 9

3 Important Notes

3.1 Manual Triggering

Any of the inputs can be configured as a manual (extinguishing) release input, or as a Manual Call Point (i.e. Manual Alarm Input). Asserting the Manual release (i.e. pressing the PB) causes immediate extinguishing.

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Note

If a remote (non panel mounted) extinguishing manual triggering device is used, then USE ONLY an approved and certified Extinguishing Triggering Device of the correct color as per EN 12094-3.

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Note

If a remote (non panel mounted) Manual Call Point is used, then USE ONLY an approved and certified Device of the correct color as per EN 12094-3 and EN 54-2.

If two zones coincidence is not required by your national regulations, you may change the configuration so the ECD activates on any single zone which is configured as a member of the Extinguishing Decision Group.

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Note

Trigger on coincidence of more than two independent sources does not comply with the 12094-1 standard.

3.2 Manual Triggering Devices

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Note

When an extinguishing manual triggering device is used, then USE ONLY an approved and certified Extinguishing Triggering Device of the correct color as per EN 12094-3.

3.3 Dependency on More Than One Alarm Signal

The TSA-1000 supports Coincidence detection– per EN 54-2 Section 7.12 option with requirements
(Provided as a two zones coincidence and as a single/Dual zone AVF- Alarm Verification Function)

The "Dependency on more than one alarm signal" function, also termed (By UL) "Alarm Verification Function" (AVF), as detailed in EN-54-2, paragraph 7.12.

The alarm Delay and Confirmation (verification) feature allows the control panel to ignore false, short and transient alarm events, which may cause a nuisance and unnecessary extinguishing.

This feature is based on an Alarm Delay Period, and an Alarm Confirmation Period.

The alarm delay can be programmed, PER ZONE, to OFF (No Delay, No Alarm Verification) or to ON. Each detection zone can be programmed independently.

If the zone Alarm Delay is programmed ON, there is a 30 seconds alarm Delay. During the delay period alarms are ignored. This is followed by a 180 seconds confirmation period.

When a zone programmed for alarm verification is first triggered, the control panel resets the zone in alarm, waits for 30 seconds (if Delay is ON) and enters a 180 seconds (3 minutes) confirmation period. During the 30 seconds delay period, alarms are ignored. During the 180 seconds confirmation period, the control panel enters the alarm state immediately if a trigger from the same zone or from another zone is received, even if the other zone is programmed for alarm delay and confirmation).

If, during the alarm confirmation period, no alarm is received, the ECD reestablishes the quiescent condition.

Each detectors zone can be independently programmed for Alarm Delay and Confirmation, (Alarm Verification).

The dependencies supported, as per EN 54-2, paragraph 7.12 are type A or type B, depending on the configuration of the TSA-1000.

3.4 Two Zones Coincidence

The detailed explanation of the operation of the ECD is provided in Work States, page 33, and in Operation and Maintenance, page 65.

Coincidence detection– EN 54-2 Section 7.12 option with requirements is implemented in the TSA-1000 as a two zones coincidence and as a single/Dual zone AVF- Alarm Verification Function).

AVF was explained above. "Two Zones Coincidence" is explained below

When the ECD is configured for two zones coincidence, then a trigger from one of the zones which are members of the extinguishing decision group will change the state of the ECD to "Fire Alarm", and to the "Preactivated State". Trigger from a second zone, which is a member of the extinguishing decision group, will cause the CIE to enter the "Activated" state. If a Non-Zero Delay is programmed, the CIE will enter the "Pre Discharge Warning Time", (extinguishing delay). If Delay is zero, or the warning time (delay) expires, the extinguisher is triggered.

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Note

If zones, which are not members of the extinguishing decision group, are triggered, the ECD changes state to "Fire Alarm", BUT DOES NOT start the extinguishing process, and the extinguisher is NOT ACTIVATED even if two such zones are triggered.

3.5 Note Regarding Default Configuration

Note

By default, the TSA-1000 is programmed for all input zones are detectors zones and all outputs are general outputs.

To modify these and additional settings, the TSA-1000 must be programmed accordingly.

3.6 Maximum Number of Detectors

EN 54-2 specifies a limit of 32 detectors per zone, which is the limit of each zone of the TSA-1000; hence the TSA-1000 max number of detectors is dependant on the configuration, and the number of zones.

3.7 Suitability of use in various environments

See Mounting, page 37

3.7.1 Environmental Limits and Protection Level

The TSA-1000 environmental limits are specified in EN-54-02:1998 para. 12.

The TSA-1000 is specified for -5℃ to +40℃, RH max 95% temperature range, and IP30 protection level.

Note

See **Routing cables into the ECD and maintaining the protection level, page 38,** for information about maintaining the protection level.

Note

Do not operate the ECD outside the specified limits.

3.7.2 Suitable Environment

The TSA-1000 environmental limits are stated above. It is to be installed in an indoors location, well ventilated location, protected from the elements.

Avoid locating the CP in direct sunlight or near sources of heat.

It is recommended to install the CP in an electrically quiet location (i.e. away from high power cables, motors, etc).

3.8 Limiting the Consequences of Faults

See POWER SUPPLY, CHARGER AND BATTERIES, page 22, for explanation of PS/Charger limiting/protection devices.

The Main Board, which contains the charging circuitry and the battery protective resettable PTC, also has a common electronic limiter for most output ports (It does not protect the contacts of relays!), which are monitored by the CPU

If there is an overload on an output (or outputs), the common limiter shuts off, the buzzer sounds and the visual fault indication and the Fault relay are switches ON. The CPU switches OFF all the controlled outputs. It then switches ON the separate outputs in

sequence, until the faulty output is isolated. All appropriate "good" outputs are then switched back ON, except for the faulty outputs.

The controlled outputs (i.e. not relays' contacts or OC outputs) are continuously monitored.

Recovery from faults is detected by the CPU and all relevant recovered outputs are reactivated, if necessary.

Open Collector outputs are current limited by design, by series connected high value resistors.

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Note

Relays' contacts are not monitored, supervised or protected.

Connect external protective circuitry to the relays' contacts circuitry.

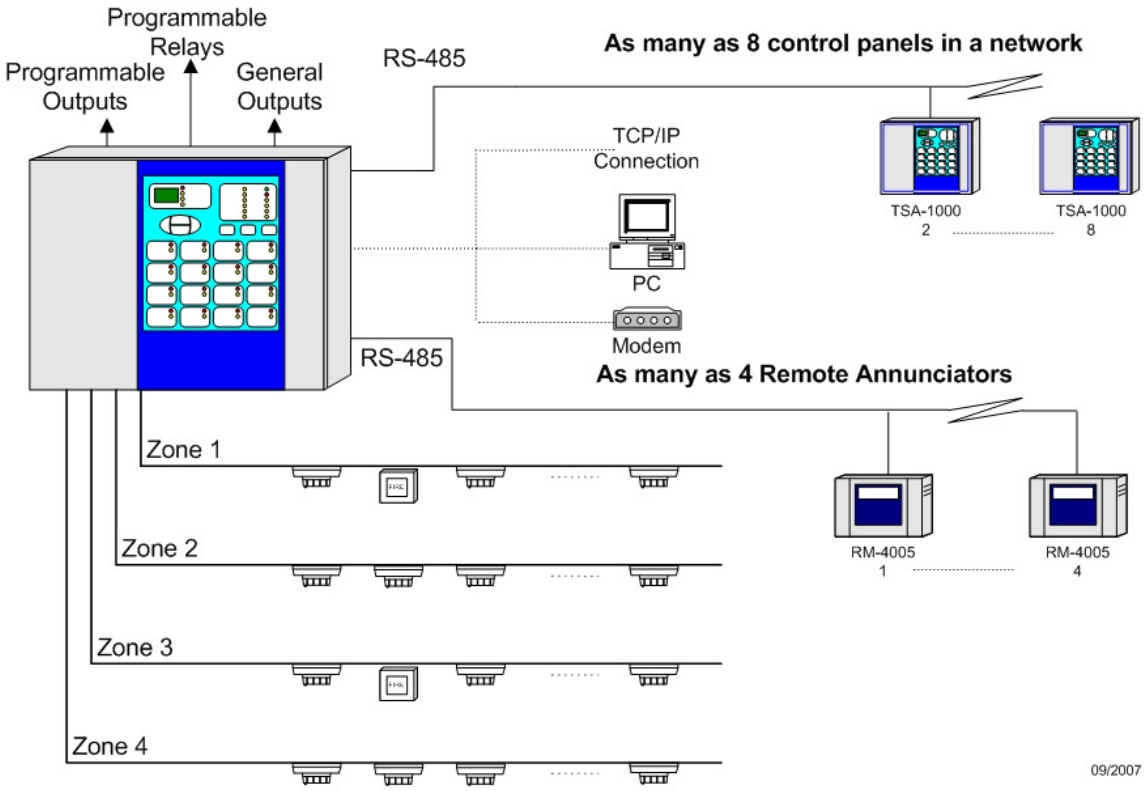

Figure 1 TSA-1000 typical system

4 Terms, Definitions and Abbreviations

4.1 Abbreviations:

Abbreviation	Meaning	Remarks
CP	Control Panel	
ECD	Electrical Automatic Control and Delay Device	
TB	Terminal Block	
MCP	Manual Call Point	
PB	Push Button	
PC	Personal Computer	
PS	Power Supply	
PW	Password	
M	Minute	
#	(Number)	
FWRE	Fault Warning Routing Equipment	Fault Dialer
FARE	Fire alarm Routing Equipment	Alarm Dialer
AC	Alternating Current	
AH	Ampere Hours	
RH	Relative Humidity	
PTC	Positive Temperature Coefficient	(FUSE)

4.2 Terms and Definitions

TERM	MEANING
Event	A change which is detectable by the ECD and causes a response

5 Safety

Note

Do not install commission, operate, or maintain this product before fully reading and thoroughly understanding this manual.

Note

Whenever possible, disconnect all power sources (Line AND Battery) from the product before performing any work on the ECD.

5.1 Grounding and Mains Supply Connection

Note

All installation, maintenance work and connecting/Disconnecting of the ECD to power sources shall be performed according to applicable international, national, regional and local codes and regulations, and the specific instructions by the manufacturer.

Note

All maintenance work should only be performed by trained, qualified and certified personnel only.

Personnel that work on this equipment must fully read and comprehend this manual.

Note

Connection/Disconnection of the control panel to the mains should be performed by QUALIFIED AND AUTHORIZED personnel ONLY

Note

Disconnect all mains power wires (Line AND Neutral) to the circuit to which you intent to connect the control panel, before actually connecting the mains input power cable to the ECD.

Verify that the ECD enclosure is properly grounded before applying power

5.2 Batteries Handling and Safety

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Note

Batteries require special care and safety precautions.

Refer to the batteries' manufacturer literature for full information.

The following information supplements and highlights manufacturer's information.

WHEN HANDLING BATTERIES, OBSERVE THE MANUFACTURER'S RECOMMENDATIONS REGARDING CLOTHING AND PROTECTIVE GEAR

Use two 12V 5 AH sealed Lead Acid batteries, such as Yuasa NP5-12 or equivalent, connected in series.

Use the supplied wires to connect to the batteries, and to connect two batteries in series.

Since the batteries used are maintenance free, and the ECD automatically controls the battery charging, discharge and test, no SPECIAL maintenance is required.

OBSERVE THE FOLLOWING:

Connect the battery to the ECD main board battery terminal block using the supplied wires. Observe polarity.

Keep the batteries clean and dry

Keep the area well ventilated

Smoking, fire or sparks ARE NOT ALLOWED near batteries.

When working on batteries, DISCONNECT THE BATTERIES AND ALL OTHER POWER SOURCES

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Note

If batteries show any signs of swelling, rupture, fluid leakage, emission of gases or fluids, heating or discoloration, or accumulation of corrosion products near the terminals, OR YOU HEAR A HISSING SOUND, disconnect the batteries and replace with a new pair of the appropriate type.

Follow the manufacturer's instructions for cleaning the batteries and the enclosure, if necessary

Dispose of batteries properly

Do not short-circuit, puncture, crush, or dispose of batteries in fire.

Do not connect batteries to makeshift chargers or power supply.

Do not expose the batteries or its terminals to mechanical stress

Handling of materials that leak from the batteries should be done by qualified personnel using the appropriate protective gear, materials, and procedures.

If the ECD indicates a battery fault, check the wiring.

If necessary, replace the batteries

6 Access Levels

The control panel provides protection from unauthorized access of certain functions by various access levels.

The TSA-1000 includes electronic and mechanical mechanisms that enact 4 access levels, as per EN 54-02 Annex A:

- Access level 1 – not limited, immediate access by operator
- Access level 2 (operator) – protected by an operator password. Provides all of access level 1 functions and allows access to additional functions that are performed on a regular basis by the system's operator.

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Note

To avoid multiple PW key punching, there is a 3 minutes period after the operator's PW has been entered, when the PW remains valid and effective, which enables the operator to perform several tasks continuously without entering the PW separately for each action.

(Since. In the password delay, the reentering of level 2 PW is not required, level 2 access appears to be level 1 access, and level 3 appears to be level 2 access)

Access level 3 (programmer & installer) – protected by a programmer password (different from the operator's password!)or a mechanical key. Provides all of access to level 1 and 2 functions and allows access to additional functions such as programming, and access for functions performed during installation.

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Note

Access levels 2 and 3 have different passwords. This is not correlated to the number of times the password has to be keyed in to access a certain menu.

Some sub-menus which are accessible at level 3, require that the level 3 (programmer) password be entered in a single menu, while others (for additional safety) require the level 3 password to be entered in to different menus

- Access level 4 (manufacturer) – Only accessible using a dedicated PC SW tool or a mechanical key.

The mechanically controlled access elements are detailed below.

The ECD enclosure has a door/front-panel with a mechanical lock. A detachable key is required to open the lock, which requires a positive and deliberate action and prevents accidental and non authorized access. Hence the access level to the batteries and AC power lines and the field wiring connections is 3/4.

Two switches are located on the front panel. A Manual &Automatic/Manual Only key-switch and a Manual Activation Push Button switch.

7 Technical Specifications

7.1 Main Elements, Basic Unit

The TSA-1000 comprises the following major elements:

- A metal enclosure with a hinged and mechanically lockable door. The door also serves as the front panel
- PS40W Power Supply / Charger
- TSA-1000 Main Board (1 change polarity output, 5 level activation outputs, 4 inputs, 3 relays)
- TSA-1000D Display board
- Flat Cable for connecting the Main Board to the Display board
- Two 12V 5AH batteries (Connected in series).
- Link wire for connecting the two batteries in series
- Two (single) wires for connecting the batteries to the PS "BATTERY" TBs.
- Flat Cable for connecting the PS to the main Board
- Two 4 wire cables, for connecting the MB to the TSA-1000E8 card.
- Clamp On ferrite on AC input cable
- Clamp On ferrite on flat cable from MB to the display board.

7.2 Expansion Modules

The TSA-1000 basic unit functionality can be extended using the following expansion boards/modules;

- **TSA-1000E4** expansion board (4 inputs)
- **TSA-1000E8** expansion board (8 inputs)
- **TSA-1000EM083** expansion board (8 Open Collector outputs, 3 relays)

Prerequisite: TSA-1000E4 or TSA-1000E8

- **TSA-1000EM422** expansion board (4 inputs, 2 programmable outputs, 3 programmable relays)

Prerequisite: TSA-1000E4 or TSA-1000E8

- **TSA-1000C** Communication module

7.3 I/O Functions of the Different Expansion Boards/Modules

The MB inputs and the expansion modules inputs are of the same design and have identical electrical characteristics. So are the Relays, Level Activation outputs, Open Collector outputs, etc.

The alarm dialer output is a level activation output with educed current capability (0.6A instead of 0.8A).

7.4 Relays

Relays' contacts are not monitored, supervised or protected.

Connect external protective circuitry to the relays' contacts.

Relays are intended for same room connection only.

7.5 TSA-1000C Communication Expansion module

The **TSA-1000C** communication expansion provides the following communication and networking capabilities;

RS-232 ..... 1 – for PC connection

RS-485 ..... 2 – remote panels and networking

FWRE (Fault Warning Routing Equipment) output ..... 1 – (Fault Dialer)

Remote Panel Annunciators ..... Up to 4 RM-1000 panels through the RS-485 connector

Note! The TSA-1000C communication module contains the FWRE, or Fault Dialer, of the TSA-1000.

7.6 Table of Technical Specifications, TSA-1000

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
MECHANICAL			
Dimensions (W / H / D)	370 / 290 / 90 mm		
Weight (excluding batteries)			
TSA-1000E4 or TSA-1000E8	3,470 gr.		
TSA-1000Ex and TSA-1000EM083	3,600 gr		
TSA-1000Ex and TSA-1000EM422	3,600 gr.		
ENVIRONMENTAL			
Operating Temperature range	-5℃ ÷ +40℃, Max RH 95%	Non condensing	
IP rating	30		
Environmental class	A		
POWER RATINGS			
Mains Supply	230VAC+10% -15%, 50Hz , 0.6A		TB line connection
Mains Supply Fuse	3.15A 250VAC 5x20mm glass Fast Blow	Bussman S500-3.15-R or equiv.	
Power Supply output rating,	27.5V±0.3V,		8 pin header
Total output current	1.5A electronic current limit	(including charge current),	
5V output rating	5V, ±0.2V 0.5A electronic current limit		
Max Ripple Voltage	28V & Charger out: 320mV, 5V out: 80 mV		

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
Battery Type	Two 12V 5AH connected in series	Yuasa NP 12-5 or equivalent	
Battery Charge Voltage	27.3V±0.2V		Modulated DC
Battery Charge Current	0.3A max.	Electronically limited	
Battery Fuse	3A	PTC	
Current consumption from battery	Quiescent condition, buzzer ON	Panel Only	
Basic configuration	70 mA		
with TSA-1000E4	110 mA		
with TSA-1000E8	120 mA		
with TSA-1000E4 and TSA-1000-EM083	115 mA		
with TSA-1000E8 and TSA-1000-EM083	125 mA		
with TSA-1000E8 and TSA-1000-EM422	145 mA		
Maximum Current Consumption	two zones in alarm, panel only		
Basic configuration	150 m A		
with TSA-1000E4	180 mA		
with TSA-1000E8	190 m A		

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
with TSA-1000E4 and TSA-1000-EM083	200 mA		
with TSA-1000E8 and TSA-1000-EM083	210 mA		
with TSA-1000E8 and TSA-1000-EM422	250 mA		
Max Current from Batteries	3A	Protected by a PTC	
Battery voltage range	20.4V DC min to 27.5V DC max		
Max (single) battery size	to 9.5 (W) by 7 (D) by 12.5 (H) cm each		
MB INTERFACES			
MB Relays			
Relay 1, Programmable	48V DC, 1.5A, not monitored	Dry contact SPDT	
Relay 2, Programmable	48V DC, 1.5A, not monitored	Dry contact SPDT	
Relay 3, Programmable	48V DC, 1.5A, not monitored	Dry contact SPDT	NC when unpowered
MB OUTPUTS		MB outputs are monitored	
Outputs EOL	3.9 K ±5%	Only required for MB outputs	
MB out 1	Change Polarity, 1.4A Current limited	OFF-6V. ON +24V, Programmable, Silenceable	Change Polarity DC
MB out 2	Level Act. 24V DC, 0.8A, Current limited,	Programmable, Silenceable	Modulated DC

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
MB out 3	Level Act. 24V DC, 0.8A, Current limited,	Programmable, Silenceable	Modulated DC
MB out 4	Level Act. 24V DC, 0.8A, Current limited,	Programmable, Silenceable	Modulated DC
Outputs 1-4 programmable Delay	0 – 55 seconds	configured separately for each output	
MB output Fire Alarm Dialer	Level Act. 24V DC, 0.6A, Current limited		Modulated DC
MB output Alarm Sounder (Horn)	Level Act. 24V DC, 0.8A, Current limited	Silenceable	Modulated DC
+24V output	24 Nominal 1.4A electronic current limit	Not affected by reset	
Resettable +24V output	24 Nominal 1.4A electronic current limit	Not powered during Reset	Switched DC
MB INPUTS		MB inputs are monitored	
Input alarm resistance range	70-630Ω ±5%, Nominal alarm resistor 200 Ω		
Input Normal Range	700Ω – 6.5kΩ ±5%Nominal EOL 3.9KΩ ±5%		
Input Short Threshold	0-40 Ω±5%,		
Input Open threshold	7.5kΩ to ∞		
Inputs 1-4	See above for inputs characteristics	Detectors	
E4 (inputs) Expansion card			
Input 1	See MB above for inputs characteristics	E4 card Inputs are monitored	
Input 2			
Input 3			
Input 4			

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
E8 (inputs) Expansion card			
Input 1	See MB inputs for inputs characteristics	E8 card Inputs are monitored	
Input 2			
Input 3			
Input 4			
Input 5			
Input 6			
Input 7			
Input 8	.		
EM083 (outputs) expansion card		**Prerequisite: E4 or E8 module**	
EM083 OPEN COLLECTOR OUTPUTS			
OC 1	24V Nominal, 50mA	OC outputs are not monitored	
OC 2	24V Nominal, 50mA		
OC 3	24V Nominal, 50mA		
OC 4	24V Nominal, 50mA		
OC 5	24V Nominal, 50mA		
OC 6	24V Nominal, 50mA		
OC 7	24V Nominal, 50mA		

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
OC 8	24V Nominal, 50mA		
EM083 RELAYS			
Relay 1	See MB relays for relays characteristics		
Relay 2			
Relay 3			
EM422 Expansion Card		**Prerequisite: E4 or E8 module**	
EM422 Inputs			
Input 1	See MB inputs for inputs characteristics		
Input 2			
Input 3			
Input 4			
EM422 Outputs			
Out 1	Level Act. 24V DC, 0.8A, Current Limited	Programmable, Silenceable	Modulated DC
Out 2	Level Act. 24V DC, 0.8A , Current Limited	Programmable, Silenceable	Modulated DC
EM422 Relays			
Relay 1	See MB relays for Relays characteristics		
Relay 2			

ITEM	RATING	REMARKS	COMMUNICATION PARAMETERS
TSA-1000C – Communication Module			
	RS-232 1 RS-485 2 FWRE 1	For PC connection Remote panels and networking Fault dialer	RS-232 RS485 Modulated DC
GENERAL			
Input nominal quiescent voltage, current	18.5v, 5.0mA	Current Limit	
Terminal block wire capacity	12-18 AWG		
Max number of detectors per zone	32		
Number of detection zones		Dependant on HW configuration	
Total number of detectors		Dependant on HW configuration	
CABLING		SEE "INSTALLATION"	

Table 1 Technical Specifications

i **Note**

Specifications are subject to change without prior notice.

7.7 Default Ports Allocation and Configuration

By default, all the TSA-1000 inputs are detector zones inputs, and all outputs (except horn and alarm dialer) are general outputs.

To modify these settings the TSA-1000 must be programmed.

8 TSA-1000 Control Panel Assembly

The TSA-1000 contains the power supply, the main board, optional expansion modules, and an optional communication module.

The wiring openings were designed to allow a bottom or top mains input and a bottom, top, or back low-voltage connection, to the installer's convenience.

An optional BC-1000 battery compartment can be attached below the TSA-1000.

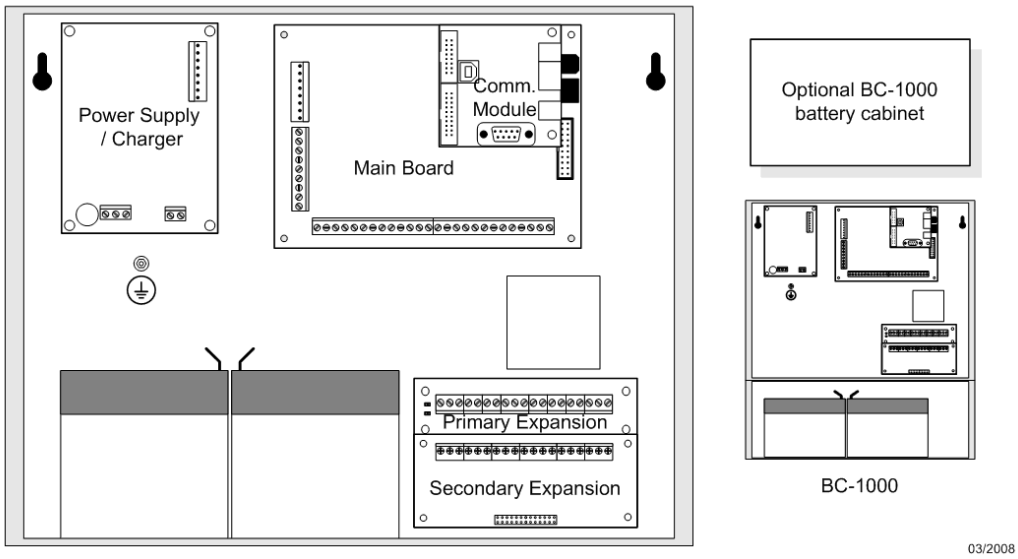

Figure 2 Module location

8.1 Power Supply, Charger and Batteries

The TSA-1000 is powered by the PS40_W Power Supply/Charger, which is located at the top left corner of the enclosure/.

The PS40_W requires 230VAC, +10%, -15%, 50/60Hz.

It is protected by a 5x20 mm, 3.15A glass Fast-Blow fuse, located at the bottom left corner of the PS_40W (F2).

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Note

Replace ONLY with a fuse of the same type, size and rating.

The PS40_W provides 27.5±0.3 V (referred to as the 24V supply rail) for powering the ECD and for charging the battery, and has a +5V 0.5A output for powering the ECD MB logic.

Max "24V" supply load current is 1.5A (including the 0.3A charging current)

The maximum battery charging current is 0.3A, electronically limited. The max allowed load on the battery (when the mains power is disconnected or OFF) is 3A, limited by a PTC.

Type and rating of batteries;

The ECD requires two 12V, 5AH sealed Lead Acid batteries, connected in series. (Yuasa NP 5-12 or equivalent)

8.2 Main Board

The main board is designed to be easy to install and maintain. The connectors are grouped per type: three programmable relays, four programmable outputs, dialer output, horn, 24V DC out (both resettable and permanent), and four inputs; connections to the display / keyboard card and expansion connectors.

8.2.1 Low-Voltage Connections

Zone Connectors Four programmable inputs

Relays; Three programmable dry-contact relays.

Programmable Outputs; Four supervised and programmable 24V outputs. Output 1 is an enhanced "reversed polarity" output; outputs 2 to 4 are "level activation" outputs.

General Outputs; A supervised horn output, a supervised fire alarm dialer output, and a 24VDC output to supply power to external devices.

Expansion Connectors; Two connectors for expansion modules, and a connector for the optional communication module.

8.3 Expansion Modules

The expansion modules make it possible to add input, output and relays through the control panel, up to a configuration of 16 zones.

The expansion modules series includes:

- TSA-1000-E4 – an expansion module for 4 inputs
- TSA-1000-E8 – an expansion module for 8 inputs
  - TSA-1000-EM422 – an expansion module to the TSA-1000-E8 that includes 4 inputs, 2 supervised programmable outputs and 2 programmable relays (prerequisite: TSA-1000E8)
  - TSA-1000-EM083 – an expansion module to the TSA-1000-E8 that includes 8 unsupervised "open collector" outputs (supply of Minus upon activation) and 3 programmable relays (prerequisite: TSA-1000E8 or TSA-1000E4).
  - TSA-100C communication module.

  See Table 2 below for a detailed explanation of the various combinations.

Configuration	Prog. Inputs	Programmable Outputs				System Configuration
		Reverse Polarity	Level Activation	Relays	Open Collector	
TSA-1000/4	4	1	3	3	—	**C10**
TSA-1000/8 Base + TSA-1000-E4	8	1	3	3	—	**C14**
TSA-1000/8+ Base + TSA-1000-E4 + TSA-1000E083	8	1	3	6	8	**C15**
TSA-1000/12 Base + TSA-1000-E8	12	1	3	3	—	**C11**

Configuration	Prog. Inputs	Programmable Outputs				System Configuration
		Reverse Polarity	Level Activation	Relays	Open Collector	
TSA-1000/12+ Base + TSA-1000-E8 + TSA-1000E083	12	1	3	6	8	**C12**
TSA-1000/16 Base + TSA-1000-E8 + TSA-1000E422	16	1	5	5	—	**C13**

Table 2 TSA-1000 – number of inputs and outputs of the various configurations

8.4 Front Door

A front door completes and closes the CP box and enacts access level 4 for some operations, since it needs a tool (screwdriver) for opening. It also serves as a front panel, as it has a display and a keyboard, which includes separate indicating LEDs, programming keys, and a 3-digit 7 segments display.

The display and keyboard comprise four main areas:

- General display zone
- Digital display and clarification area
- Keyboard
- Zone Indicators

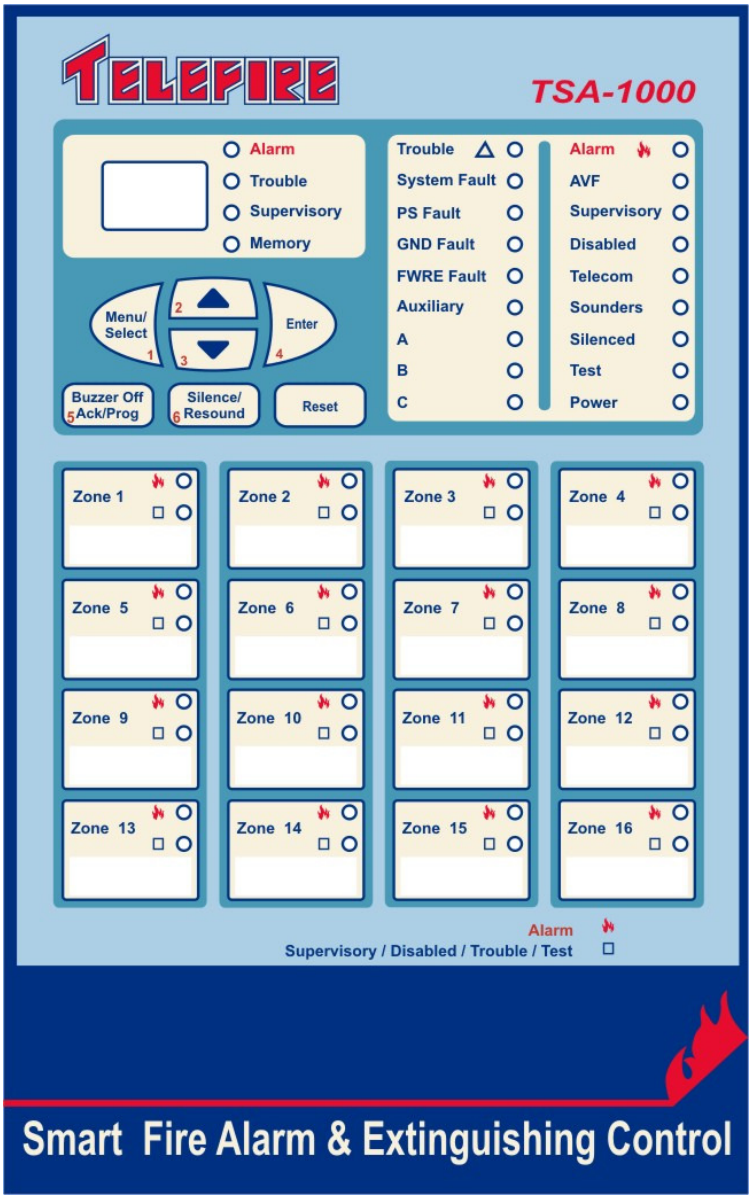

Figure 3 Display and Keyboard

9 User Interface-Display and Keyboard

The front door of the TSA-1000 also serves as the user interface, and contains a display and a keyboard.

The display has three distinct areas:

A General Display area (distinct, separate LEDs)

Zones indications area (distinct, separate LEDs)

Digital Display area (3 7 segments numeric digits display)

Digital Display indications area (distinct, separate LEDs)

9.1 General Display Area

The general display area is the main display of the TSA-1000.

It is made up of two rows, where each row has 9 LEDs.

The right column provides status information such as Alarm, Power On, Test State, etc.

The left column displays faults of the control panel, A, B, C indicators are reserved for future use. The General Display Area is shown below, and the function of each LED is explained.

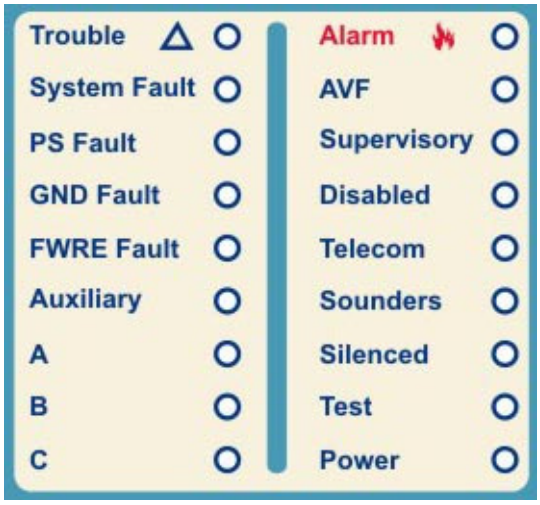

Figure 4 General Display Area

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Note

The term "outputs" in the following table refers to any or all outputs, including Horn output, Fire Dialer output, FWRE output, programmable outputs, or relays.

LED	Its Color and meaning (EN 54 / CP 10 version)	Its Color and meaning (UL 864 / IS 1220 version)
Alarm	Red LED. Indicates fire alarm. The zone in alarm is displayed on the digital display and is indicated by the zone's private indication LED. • Off in normal state • Flashes during alarm until the control panel is reset	Red LED. Indicates fire alarm. The zone in alarm is displayed on the digital display and is indicated by the zone's private indication LED. • Off in normal state • Flashes during alarm. Pressing the **Acknowledge** key will turn the LED on until the control panel is reset
AVF	Yellow LED. Indicates alarm verification. AVF is also displayed (**V##**) on the digital display. • Off in normal operation • Flashes during alarm verification	Yellow LED. Indicates alarm verification. AVF is also displayed on the digital display. • Off in normal operation • Flashes during alarm verification
Supervisory	Yellow LED. Indicates a supervisory event. • Off during normal operation • The LED flashes as long as the supervisory event is in force. Additionally the zones supervisory LED also flashes	Yellow LED. Indicates a supervisory event. • Off during normal operation • The LED flashes as long as the supervisory event is in force. Additionally the zones supervisory LED also flashes
Disabled	Yellow LED. Indicates a disabled input or output. Additional detail is shown on the digital display. • Off during normal operation • On when one of the inputs or outputs is disabled. Additional detail is shown on the digital display. The LED will stay on until all inputs and outputs are enabled.	Yellow LED. Indicates a disabled input, or output. Additional detail is shown on the digital display. • Off during normal operation • On when one of the inputs or outputs is disabled. Additional detail is shown on the digital display. The LED will stay on until all inputs, and outputs are enabled.

LED	Its Color and meaning (EN 54 / CP 10 version)	Its Color and meaning (UL 864 / IS 1220 version)
Telecom	Red/Yellow LED. Indicates a fault event in the dialer line. Additionally a fault alert marks this event. • Off in normal operation • ON in red during dialing • Flashes in yellow when there is a fault event in the dialer • Solid yellow when the dialer is disabled	Red/Yellow LED. Indicates a fault event in the dialer line. Additionally a fault alert marks this event. • Off in normal operation • ON in red during dialing • Flashes in yellow when there is a fault event in the dialer. Pressing the **Acknowledge** key will turn the LED on until the fault is resolved • Solid yellow when the dialer is disabled
Sounders	Red/Yellow LED. Indicates a situation where the horns are disabled due to a fault in the horn line or disablement of the horn output. • Off during normal operation • ON in red during horn activation • Flashes in Yellow when there is a fault in the horn line	Red/Yellow LED. Indicates a situation where the horns are disabled due to a fault in the horn line or disablement of the horn output. • Off during normal operation • ON in red during horn activation • Flashes in Yellow when there is a fault in the horn line. Pressing **Acknowledge** will turn the LED ON until resolution of the problem • Solid yellow when horn output is disabled
Silenced	Yellow LED. Indicates silenced condition. • Off during normal operation and during alarm • Flashes during alarm after silencing.	Yellow LED. Indicates silenced condition. • Off during normal operation and during alarm • Flashes during alarm after silencing.
Test	Yellow LED. Indicates test mode. • Off during normal operation, • On during Field Test.	Yellow LED. Indicates test mode. • Off during normal operation, • On during Field Test.

LED	Its Color and meaning (EN 54 / CP 10 version)	Its Color and meaning (UL 864 / IS 1220 version)
Power	Green LED. Indicates the presence of AC input or battery. • Always on in normal operation • Flashes when there is no main power.	Green LED. Indicates the presence of input power (AC or battery). • Always ON in normal operation • Flashes when there is no main power until **Acknowledge** key is depressed. Additionally there will be additional warning in the digital display. Pressing the **Acknowledge** key will turn the LED off
Trouble	Yellow LED. Indicates a fault in the system or one of the devices that are connected to it. • Off during normal operation • Indicates a fault event or one of the connected devices – see additional yellow LEDs and the digital display for addition display.	Yellow LED. Indicates a fault event or one of the connected devices – see additional yellow LEDs and the digital display for addition display. • Off during normal operation • Flashes to indicate a fault event or one of the connected devices – see additional yellow LEDs and the digital display for addition display. Pressing **Acknowledge** will turn the LED ON until resolution of the problem
System Fault	Yellow LED. Indicates a hung processor. • Off during normal operation • ON when the processor hangs	Yellow LED. Indicates a hung processor. • Off during normal operation • ON when the processor hangs
PS Fault	Yellow LED. Indicates a power fault (loss of AC power; Disconnected battery; Weak battery) • Off during normal operation • ON when there is a power supply fault	Yellow LED. Indicates a power fault (loss of AC power; Disconnected battery; Weak battery) • Off during normal operation • Flashes to indicate a ground fault. Pressing **Acknowledge** will turn the LED ON until resolution of the problem

LED	Its Color and meaning (EN 54 / CP 10 version)	Its Color and meaning (UL 864 / IS 1220 version)
Ground Fault	Yellow LED. Indicates a ground leak. • Off during normal operation • ON indicate a ground fault. Pressing **Acknowledge** will turn the LED ON until resolution of the problem	Yellow LED. Indicates a ground leak. • Off during normal operation • Flashes to indicate a ground fault. Pressing **Acknowledge** will turn the LED ON until resolution of the problem
FWRE Fault	Yellow LED. Indicates a Fault Warning Device Fault. • Off during normal operation • ON during a fault in the FWRE equipment.	Yellow LED. Indicates a Fault Warning Routing Equipment Fault. • Off during normal operation • ON during a fault in the FWRE equipment.
Auxiliary	Yellow LED. Indicates a fault in an auxiliary device. Additional detail is shown on the digital display. • Off during normal operation • Flashes upon a fault event in any output device (other than Horn and outputs configured as "General, Silenced")	Yellow LED. Indicates a fault in an auxiliary device. Additional detail is shown on the digital display. • Off during normal operation • Flashes on upon a fault event in any output device (other than Horn and outputs configured as "General, Silenced"). Pressing **Acknowledge** will turn the LED ON until resolution of the problem
A	Reserved for future use	Reserved for future use
B	Reserved for future use	Reserved for future use
C	Reserved for future use	Reserved for future use

9.2 Digital Display and Digital Display Indicators

The digital display includes three 7-segments digits and a group of 4 discreet separate LEDs to its right. These LEDs detail and clarify the information provided by the digital display.

A **More Events** LED indicates that there are additional events other than the one shown on the display currently, which can be accessed using the keyboard.

The display module allows a detailed display of work states, faults, programming, etc in a clear and detailed way to the operator and the technician.

In normal condition, the digital display scrolls the figure **8** from left to right.

Figure 5 Digital Display and Digital Display Indicators

9.3 Zone Indicators

Each zone has 2 LEDs in the zone indication area that indicates the alarm and fault in that zone.

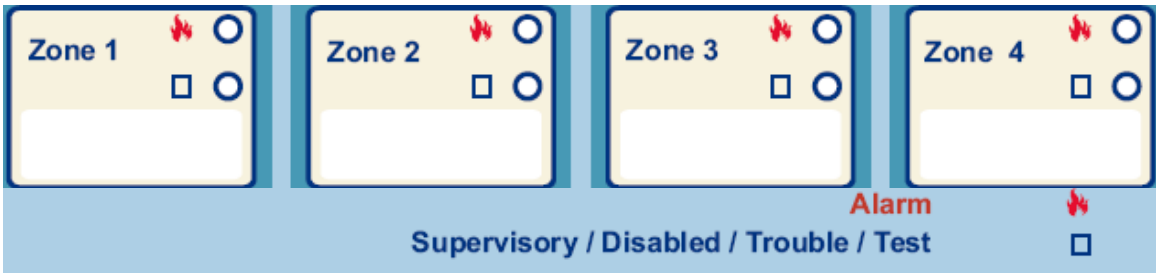

Figure 6 Zone Indicators

LED	Its Color and meaning
Alarm	Red LED. Indicates that the zone is in alarm. • Off during normal operation • Flashes when the zone is in alarm until pressing the **Acknowledge** key. Pressing the **Acknowledge** key will stop the LED flashing, and turn it on until the control panel is reset.
Fault / **Supervisory** / **Disabled** / **Test**	Yellow LED. Indicates that the zone is in alarm. • Off during normal operation • Flashes when the zone is in fault until pressing the **Acknowledge** key. Pressing the **Acknowledge** key will stop the LED flashing, and turn it on until fault resolution.

9.4 Keyboard

The keyboard includes 7 keys. The table below shows the function during daily operation.

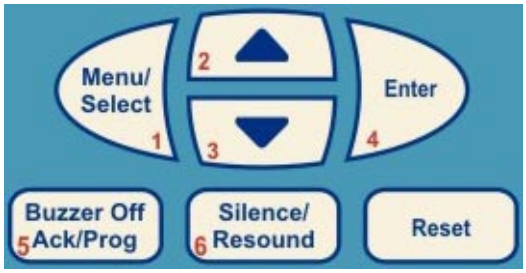

Figure 7 Keyboard

Key	Function
Menu	Enter Menu
Arrows	Paging through memory
Buzzer Off / **Ack** / **Prog**	• Is used for silencing the internal alarm buzzer and fault buzzer in the control panel • Acknowledges new event. Pressing this key will stop the LED flashing (indicating new events) and turn the LED ON • Used for computer printing
Silence / **Resound**	• Used for silencing the alarm horns. Devices connected to the Horn output will be silenced. Devices connected to a programmed alarm output will be silenced if the output is defined as silenceable. • An additional long press will re-activate the output
Reset	• Is used to reset alarms and return the system to normal operations after an alarm. All outputs in the control panel and inputs to the system are returned to normal operation. The digital display will show the figure "**8**" moving from left to right. The system will return to alarm or fault state during additional events • Is used for exiting the menu.

10 Work States

During an alarm, fault or supervisory event on the system, the event is clearly shown by dedicated LEDs that are labeled **Fire Alarm, Fault**, and **Supervisory**, respectively. A detailed explanation in the digital display will include all the details necessary for troubleshooting the event and proper resolution.

Fire alarms, fault conditions, and supervisory conditions are defined as events. When two events occur at the same time, the first event will be shown (preference to an alarm) and at the same time the Memory LED will be turned on to indicated additional events in the system.

Fire alarms have a higher priority than fault events and are shown first.

To see the events in the order they occur, use the up and down arrow keys.

10.1 Normal State

Normal state is a state where no alarm or fault event and all of the inputs and outputs are enabled. In this state, the green power LED is turned on and the digital display moves the figure **8** from left to right.

10.2 Alarm State

10.2.1 Alarm Verification

The alarm verification feature allows the control alarm to ignore momentarily false alarms that may cause a nuisance.

When a zone is programmed for alarm verification, the control panel resets the zone in alarm, waits for 0 to 55 seconds (depends on individual zone programming) and rechecks whether the same zone is still in alarm. During that time, the control panel will enter alarm state when receiving an alarm from the same or another zone.

During alarm verification time, the control panel will enter alarm state immediately in case that there is another alarm indication even if that zone is programmed as alarm verification.

In case only one alarm triggered the alarm verification clock, during and up to 120 seconds, no additional alarm is received, the clock will be reset and the control panel will be back in normal mode.

10.2.2 Alarm Operations

During an alarm in one of the detection zones, the control panel performs the following operations

- Indicating the alarm zone in the digital display
- Turning on the general alarm LED in the digital display and clarification area and the private alarm zone in the zoning alarm
- Displaying the alarm in the remote panel RM-1000 if connected
- Logging an event in alarm history
- Activating the horn output
- Activating dialer output
- Activating internal buzzer
- Activating relays that were defined as alarm relays (default RL1 and RL2)

10.2.3 Acknowledge / Buzzer-Off Operation

- Silences the internal buzzer

UL 864

UL Models

For UL models, pressing the **Acknowledge** key will stop the flashing of the LEDs in the general alarm area, in the digital display and clarification area and the private LEDs in the zones and turn them ON.

10.2.4 Silence Operation

Pressing the **Silence** key performs the following actions

- Stops the action of the horn output
- Stops the action of the internal buzzer
- Stops the alarm relay if it was programmed as silenceable
- Stops outputs that were programmed as silenceable

10.2.5 Action during a Second Alarm (Two Zones in Alarm at the Same Time)

When receiving a second alarm, (i.e., two zones alarms at the same time), the control panel perform the following operations

- Reactivation of all silenced output
- Turning on the memory LED
- Activating outputs that were programmed to activate upon an alarm from these zones

10.2.6 Resetting an Alarm

Resetting an alarm can be done by pressing the **Reset** key.

10.3 Fault State

A fault in the system will be shown indicated in the system by a flashing yellow LED in addition to the fault code in the digital display.

10.3.1 Actions Performed During Fault

When receiving a fault event at the control panel, the control panel will perform the following operations

- Indicating the fault code in the display
- Turning on the general fault LED
- The fault LED in the digital clarification area and the private fault LED in the zoning fault
- Activating the internal buzzer in the control panel
- Logging an event in fault history
- Activating relays that were defined fault relays (default RL3)

10.3.2 Acknowledge / Buzzer off Operation

- Silencing the internal buzzer
- Stopping the flashing of the LEDs in the general alarm area, in the digital display and clarification area and the private LEDs in the zones and turning them ON (UL version only)

10.4 Supervisory State

The TSA-1000 has a supervisory function that conforms to UL and EN standards.

In certain cases, there is a need to activate an output following a fault such as indication of low pressure in an extinguishing cylinder, closed sprinkler valve, etc.

The supervisory function answers these need and allows monitoring switch conditions and reaction according to the state were using the fire alarm infrastructure.

Supervisory fault does not latch – at the end of the event, the system goes back to normal state without intervention.

10.4.1 Actions Performed During Supervisory Events

A supervisory event will cause the following events in the control panel

- Turning on the supervisory LED, the supervisory LED in the digital display and clarification area and the private fault LEDs in the supervisory state
- Indicating the fault event in the RM-1000 remote panel if connected
- Activating fault buzzer
- A logging of the event in the fault history
- Activating supervisory outputs that were belong to the activated fault supervisory zone, if defined
- Activating supervisory relays, if defined

10.4.2 Acknowledge / Buzzer off Operation

- Silencing the internal buzzer
- Stopping the flashing of the LEDs in the general alarm area, in the digital display and clarification area and the private LEDs in the zones and turning switching them on continuously

UL 864

UL Models

For UL models, pressing the **Acknowledge** key stops the flashing of the LEDs in the general alarm area, in the digital display and clarification area and the private LEDs in the zones and switching them on continuously.

10.5 Disablement State

Sometimes there is temporarily a need to disable a particular input, output, or relay.

The control panel will ignore alarms from disabled zones and will not activate disabled outputs or relays.

When one of the zones or output is disable, the disabled LED is turned on to indicate this status.

10.6 Test State

Test states allow testing the control panel without activating outputs. This state is indicated by **– – –** in the digital display and in the LEDs test clarification area

See page 65 for additional information about Field Test.

11 Installation

11.1 Pre-Installation Planning

Planning of quantity and location of detectors, push buttons, notification appliances and extinguishing devices shall be done according to the local codes and regulations and in accordance to the planning consultant's requirements.

11.1.1 Capacity Planning

Ensure that the total number of input initiating devices does not exceed local regulations of the number of initiating devices per zone, area or other limitations. Ensure that the number of zones satisfy the requirements of the consulting planner, use expansion modules as necessary.

You can connect up to 5 sounders, beacons, or sounders-beacons to any programmable output and the horn output.

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Note

Do not connect devices that should be supervised to the TSA-1000-EM083.

EN 54

EN 54 Requirement

- EN 54 allows up to 32 devices per zone. This limitation may differ for different countries and local regulation– check your specific limitation based on your local standards and regulations.
- According to EN 54-2 limitation, do not connect more than 512 initiating devices to a single TSA-1000 control panel.

CP 10

CP 10 Requirement

CP-10 allows up to 20 smoke detectors or up to 40 heat detectors per zone. The TSA-1000 was tested and certified to CP-10 based on these limitations.

11.1.2 Calculating Current Requirement and Battery Capacity

For every control panel calculate the total current consumption of all devices such as sounder, beacons, extinguishing cylinders, automatic dialer etc. Ensure that the total current consumption does not exceed 1.4A.

The batteries are chargeable, sealed lead acid batteries, in total voltage of 24 volts (two 12 volt batteries in series) and capacity of up to 7.2AH.

Battery capacity shall be calculated according to the loads and applicable regulations.

11.1.3 Cabling Planning – Initiating Device Circuit (IDC – Zones)

Use a 2-wire cable, 12 – 18 AWG (0.8 to 3.3 mm^2) for IDC (zone) connections.

Wire Type	Cross-Section (mm^2)	Maximum IDC Length	
18 AWG	0.82 mm	1,200 m	3,940 ft
16 AWG	1.31 mm	1,900 m	6,230 ft
14 AWG	2.08 mm	3,000 m	9,840 ft
12 AWG	3.31 mm	4,800 m	15,750 ft

Table 3 IDC cable selection

11.1.4 Cabling Planning – Activation Lines and 24Vdc Out

Use a 2-wire cable, 12 – 18 AWG (0.8 to 3.3 mm^2) for Activation Lines and 24Vdc Out connections.

The length of activation lines and 24Vdc out cabling depends on the required current and cable size. Ensure that the maximum voltage drop to the end of the line at full load does not exceed 3V and will leave the last device the minimal operating voltage as per the manufacturer's specification.

11.1.5 Cabling Planning – Shielded Cables

It is highly recommended to avoid outdoor wiring due to the increased susceptibility to lightning strikes. Overhead cables running between buildings or on roofs should be shielded. The shield should be connected to the ground by using the Master Ground Terminal in the control panel. Grounding should not be connected to any other points. Ensure continuous grounding by soldering.

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Note

When installing a system at a site adjacent to high power cables, heavy industrial machinery, or any kind of high electromagnetic fields, shielded cables should be used and an EPI-3000 module should be connected to each TSA-1000.

11.1.6 Cabling Planning – RS-485 to RM-1000 Remote Panels and Control Panel Networks

RM-1000 remote annunciators connected to the control panel to a 4 wire cable. A pair of RS 485 data cable from the control panel and a pair of 24 volts DC from the control panel or an external power supply such as the TPS 34.

Cabling will be done as per the recommendation of RS485 and local fire regulations – the more stringent of the two. Long distance cables or cables between buildings or rooftops shall be shielded.

The cabling from the control panel to the remote panels is in linear (bus) topology. Maximum total cable length is 1,220 m.

11.1.7 Activation Matrices Planning

Plan the activation logic according to the requirements of the consultant.

11.1.8 Extinguishing Device Planning

Size and quantity of extinguishing cylinders shall be calculated by authorized personnel in accordance to the requirements of the consultant and local regulations.

11.2 Mounting

11.2.1 Environmental Limits

The TSA-1000 is a class A (-5℃ to +40℃, RH max 95%) temperature range device.

Its environmental protective level is IP30.

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Note

See "installation instructions" for information about maintaining the protection level

Note

Do not operate the ECD outside the specified limits.

11.2.2 Mounting Recommendations and Instructions

The control panel should be installed in an indoor location, meeting the specified environmental limits, where it is protected from the elements. Select a location which is free of smoke, dust or high humidity, and which is distant from sources of electrical noise, such as high power motors, relays, etc. Avoid locating the control panel in direct sunlight

Mount the TSA-1000 to a solid wall so it will have comfortable access to connecting the cables from the input and output devices and maintenance personnel for ongoing operations and in a location where it is possible to supervise and clearly see the display and indicators.

The back of the chassis has 2 sliding slots on the top half and the bottom has a hole for securing the chassis to the wall.

Drill the hole for mounting using the chassis mounting holes drawing below.

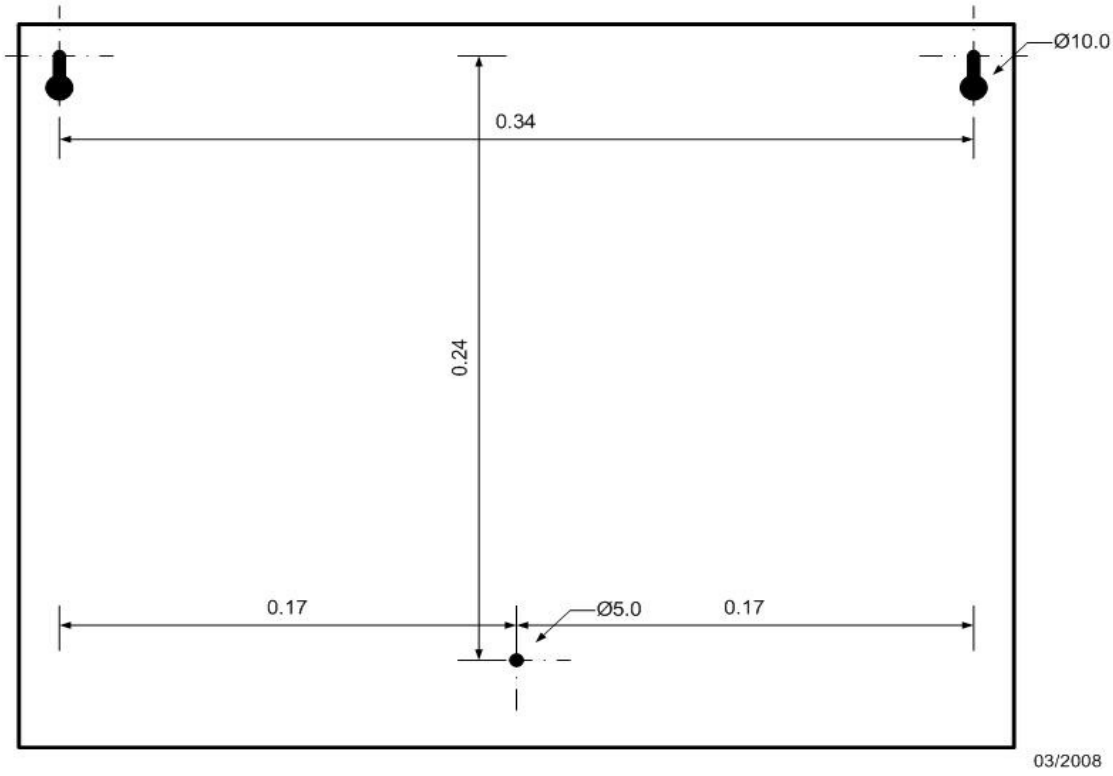

Figure 8 Chassis Mounting Holes

11.3 Wiring

11.3.1 Routing Cables into the ECD and Maintaining the Protection Level

In order to route power and field wiring into the ECD, the appropriate, partially punched knockouts must be removed.

Use a hammer and a chisel to open and remove the knockout.

Do not remove unnecessary knockouts

Remove burrs and sharp edges, if necessary

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Note

To maintain the IP30 protection level, use appropriately sized cable glands such as CABLE GLAND NEMA 4X PG-7 BLACK manufacture by BUD, or equivalent.

Insert the cables through the glands before connecting them to the ECD.

Tighten the cover nut to securely clamp the cable or group of field wires.

This serves as a strain relief and as means to meet the IP30 requirements.

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Note

If unused knockouts opening remain, they must be plugged with an appropriate, secure cover/plug to maintain the required protection level

11.3.2 Wiring Information

The TSA-1000 is supplied in working condition, fully assembled, and with all internal modules pre-wired. Wiring instructions are only for connecting the system to AC input, zones, programmable output and general output.

Cable type selection and wiring shall be done according to local regulations.

System connections shall be done when power sources are disconnected. Changing/installing electric activation modules shall be done after the system is in quiescence state (push buttons and detectors in normal state).

Characteristic	IDC	Outputs
Electric Resistance	Minimal	Very High
Capacitance	No Influence	No Influence
Inductance	Minimal	Minimal
Mechanical Strength	High	High

Table 4 Wiring Characteristics' influence on System Performance

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Warning

Disconnect all power supplies, main and batteries before connecting or disconnecting cables to the control panel.

11.3.3 Mains Power Supply

Connect the control panel's AC input line to a dedicated circuit breaker that is not shared by other appliances or equipment. It is recommended that the circuit breaker shall be labeled "FIRE ALARM".

The power cable should enter the control panel through either the top left or bottom left knockout opening and separated from the field wiring Use a plastic bushing that fits the opening. Connect the Live and Neutral wires to the proper terminal. Connect the Ground wire directly the panel's chassis using the marked ground screw.

11.3.4 Input Wiring

Input wiring for detectors and push buttons shall be with a two-wire cable according to the local regulations.

Special detectors such as beam detectors or gas detectors shall be connected by a 4-wire cable.

In industrial installations which have machines which produce high power electromagnetic fields, use shielded cables.

Detector wiring shall be in a separate conduit from mains conduit.

The wiring cables and input and system output shall be separate from mains AC input – see Figure 9.

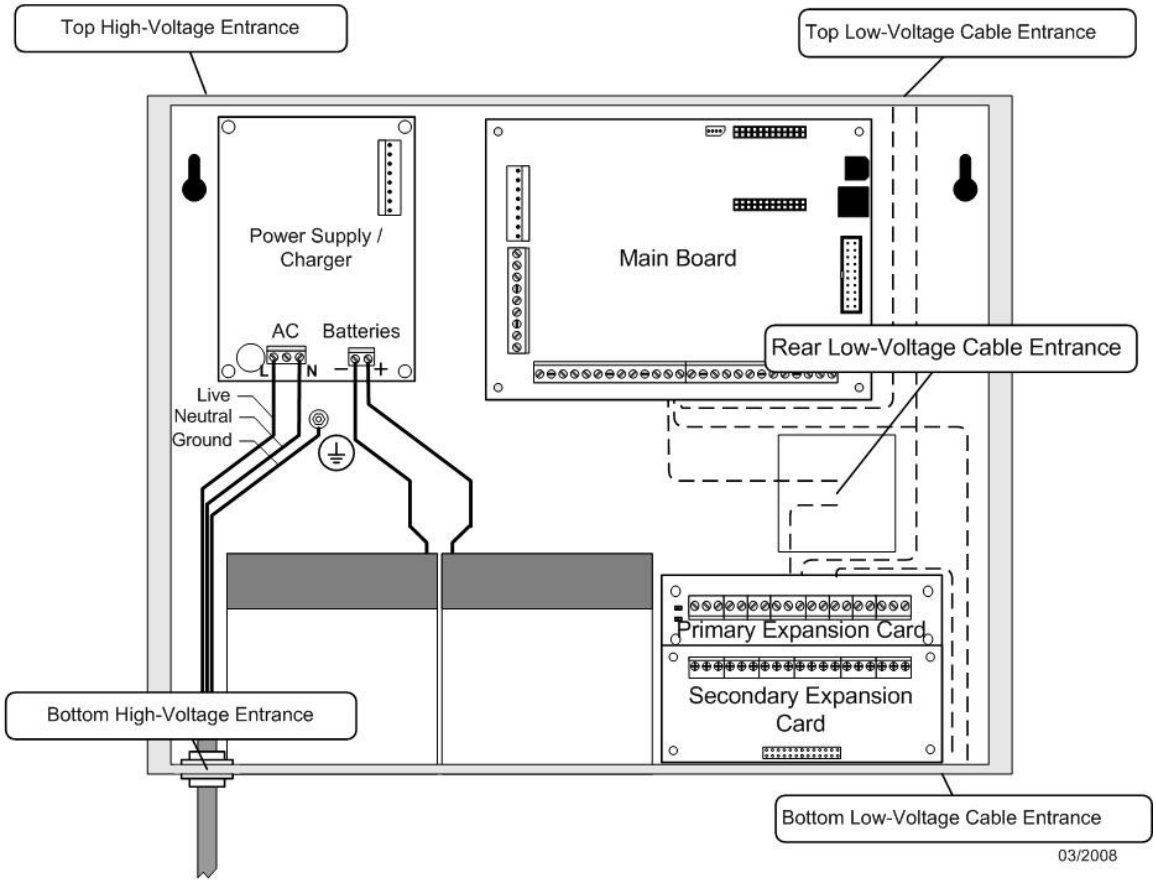

Figure 9 Routing High- and Low Voltage cables in the TSA-1000 Chassis

11.3.5 24Vdc Powered Devices

To ensure operation of alarm or initiating device that requires relatively high current from a 24 Vdc source, use appropriate cables.

Wire specifications should be between 12 and 18 AWG and the cable resistance running between the 24 Vdc source to the I/O module and from the I/O module to the device should be calculated. Ensure that no device receives a voltage below its specified minimum operating value and that the total voltage drop will not exceed 3 volts.

Calculate the total current drawn by the system and system devices at normal operation and alarm modes. Ensure that the total load on the power supply does not exceed its limit of 1.5 Ampere.

11.3.6 Output Wiring

Activation circuit cabling between the 24Vdc source to the output device such as sounders, extinguishing devices, strobes, etc., shall be calculated to a maximum voltage drop of 3V or a voltage drop that will leave the device with the lowest operating voltage specified by the manufacturer – the lowest voltage drop of the two.

11.3.7 Remote Panel Wiring

RM-1000 remote panels are connected to the control panel via 4-wire connection. One pair of RS-485 wires and one pair for 24Vdc supply.

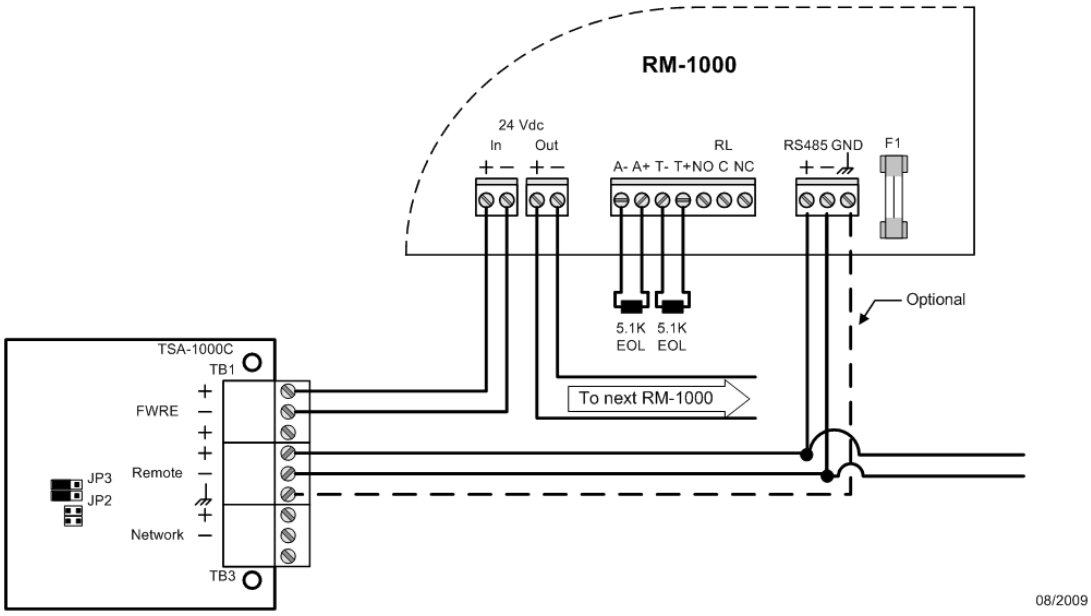

Figure 10 RM-1000 connection

11.3.8 Control Panel Network Wiring

Control panel networking shall be done via a pair of RS-485 wires.

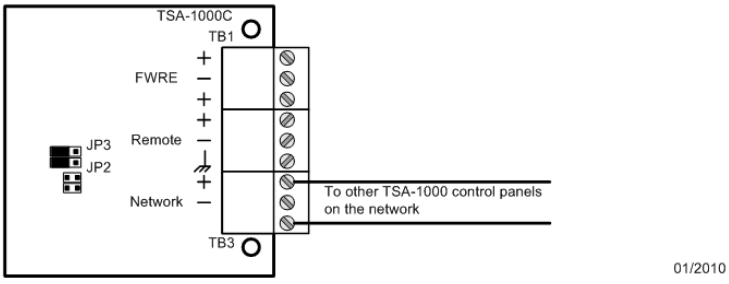

Figure 11 Connecting a network

Warning

Disconnect all power supplies, (main and batteries) before connecting or disconnecting cables to the control panel.

Ensure that the system operates normally and that there are no zones in alarm prior to connecting or replacing extinguishing devices.

11.3.9 End Of Line device (E.O.L.)

Install the End Of Line Device (E.O.L.) to the last device in the zone or output.

11.4 Installing Detectors, Input and Output Devices, and Other Devices

11.4.1 Connecting Zones and Outputs

Note

Measure the wiring to ensure there are no shorts before connecting the wiring to the control panel.

Connecting or adding zone, devices, outputs etc shall be done when all power to the control power is disconnected (AC and batteries disconnected).

Connect the zones, 24 volt output and control panel outputs (dialer, horn, programmable outputs and relays) to the control panel.

Warning

Do not connect the extinguishing activation circuits at this time. Use a dummy load.

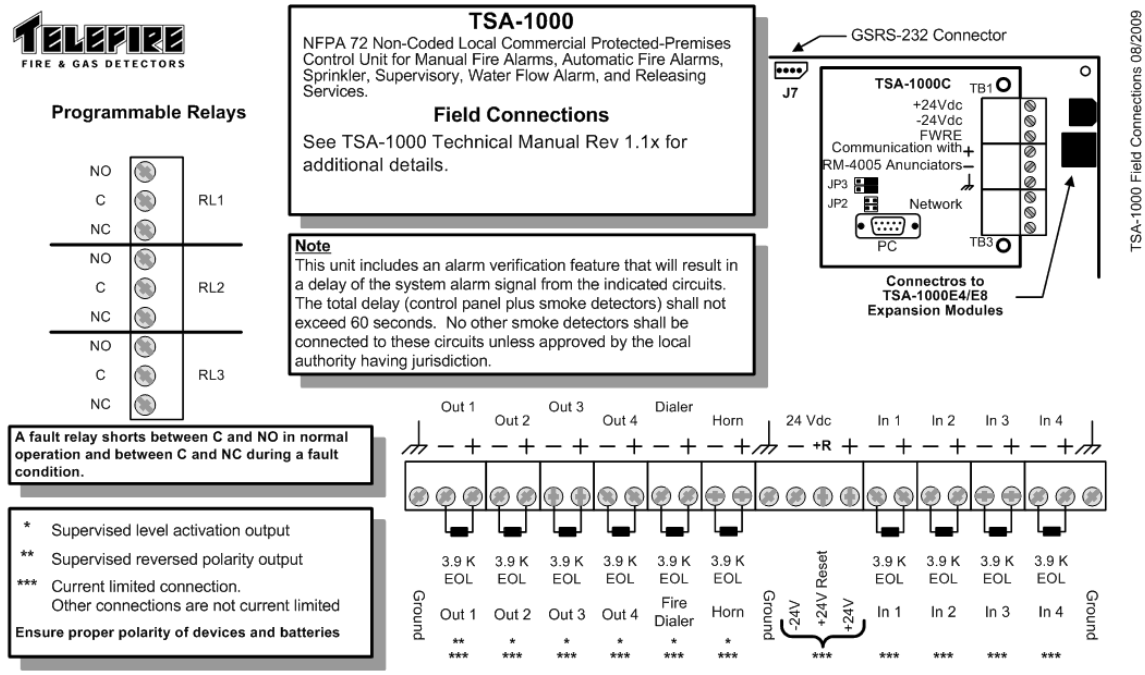

Figure 12 Main Board Connectors

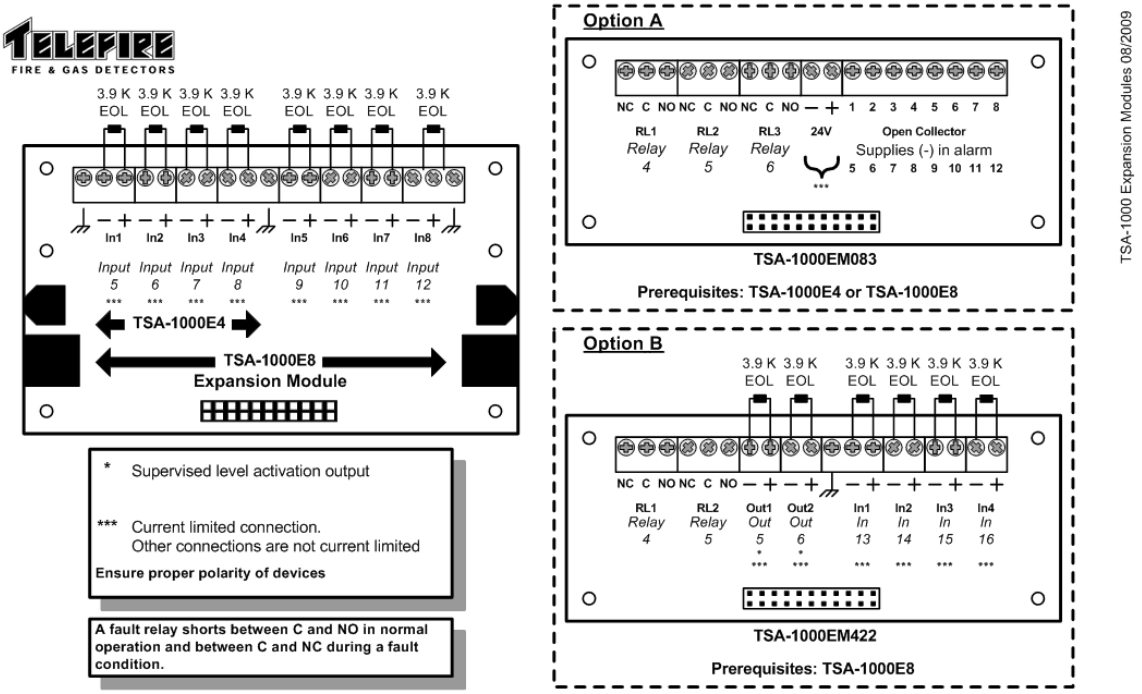

Figure 13 Expansion Module Connectors

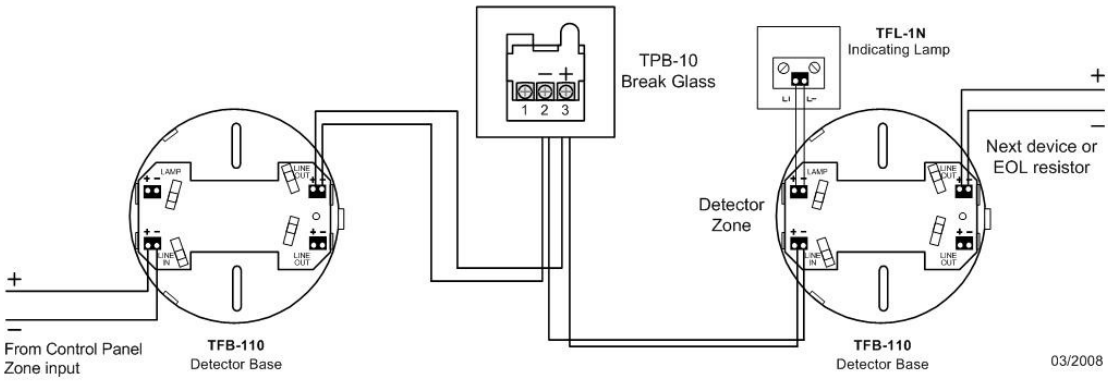

Figure 14 Connecting Two Detectors and a TPB-10R Break-Glass

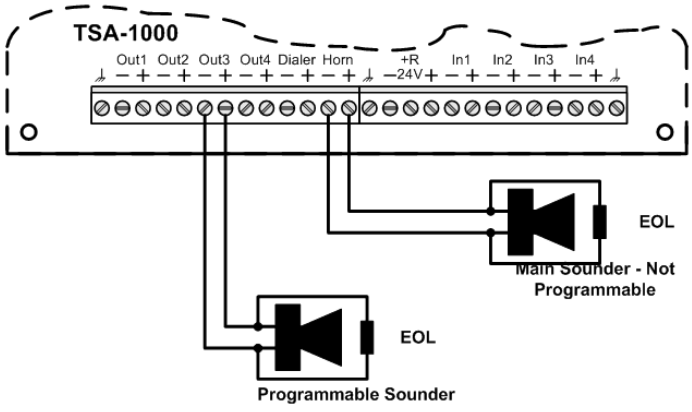

Figure 15 Connecting Programmable and General Sounders

11.5 Connecting the mains, batteries and the ground wire.

SEE SAFETY, page 9
SEE Routing cables into the ECD and maintaining the protection level, page 38

Connect the control panel's AC input line directly to a dedicated circuit breaker that is not shared by other appliances or equipment. It is recommended that the circuit breaker shall be labeled "FIRE ALARM".

Use a three wire cable (Line, Neutral and Ground wires) of the appropriate gauge

Verify that all power sources to the ECD are disconnected.

Disconnect the ECD AC cable from the mains, so that the ECD ends of the wires can be handled safely.

Insert the AC input power cable to the control panel enclosure through either the top left or bottom left knockout opening and keep it separated and distant from the field wiring and the control panel circuits.

Use appropriate bushing/grommet that fits the knockout openings, to ascertain that there are no sharp edges, to prevent damage or abrasion to the cable during assembly and use.

Connect the GND (yellow/green) wire to the dedicated grounding screw located below the PS, using the appropriate hardware as shown in Fig. 7 below, thus connecting the chassis to the grounding wire

CONNECT THE GROUND WIRE OF THE AC INPUT CABLE DIRECTLY THE PANEL'S CHASSIS GROUND SCREW, USING SERRATED WASHERS AS SHOWN.

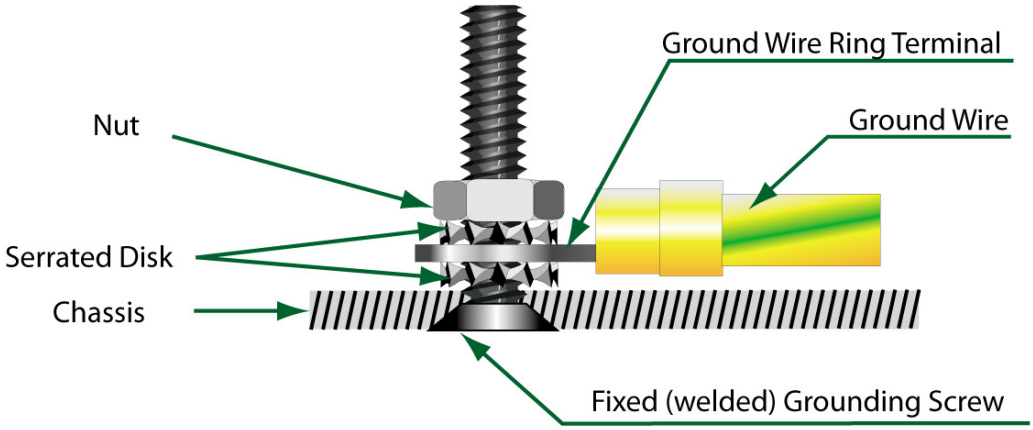

Figure 16 Connecting the grounding wire to the Chassis

Then connect the Line and Neutral wires to the proper terminal. Tighten the terminal block screws.

VERIFY THAT THE ECD IS PROPERLY GROUNDED BEFORE CONNECTING AC POWER TO THE ECD.

Connecting the batteries: Connect the supplied link wire between the batteries, and then connect the long Red wire o the + terminal of one battery and to the +bat terminal block,, and the long black wire to the –terminal of the battery and the –bat terminal block

Observe Batteries polarity. Wrong connection can cause damage to the ECD.

Connect AC input power.

Verify that the ECD is working properly; the alphanumeric display scrolls the character **8** from left to right and only the Power led is ON.

11.6 Post-Installation

11.6.1 Switching the Control Panel On

Activate the control panel and ensure that it is working properly (the digital display moves the figure **8** from left to right and only the power led is on).

11.6.2 Configuring the Control Panel

The ECD is delivered in a default configuration.

Modify only if necessary, by programming the ECD, as explained in Control Panel Programming, page 55

The time and date must be updated' the password has to be modified, etc

11.6.3 Setting the Date and Time

The TSA-1000 includes a real-time clock and calendar that are used for logging system events. Ensure that you set the date and time after powering on (see section 15.7 on page 66). The clock/calendar circuit includes a power backup for about five hours without power sources – verify and set the time and date if the TSA-1000 was powered off more than 5 hours.

11.6.4 Control Panel Programming

Program the control panel configuration and activation matrix. Chapter 0 on page 52 has detailed programming information.

11.6.5 Field Test

Perform a field test – this test allows a single operator to perform a test for all field devices, including detectors, call points, and other inputs (see page 65 for instructions for performing Field Test).

The testing process is automatic except for activation of the device which is done manually by means specified by the device's manufacturer.

Telefire's devices can be tested by putting a magnet to the test point of the detectors or activation of the call points through the testing tool (supplied with the call point).

11.6.6 Activation Test

Test the outputs of the system to ensure that they are activated according to the conditions specified by the consultants.

11.6.7 Arming Extinguishing Devices

Ensure all input devices are in normal state and no devices are in alarm.

11.6.8 Change Password

It is recommended to change the operator password after completing the installation and system testing. See section 15.6 on page 66 for explanation on changing passwords.

Warning

Forgotten passwords require factory reset: if you lose or forget the password, the panel must be sent back to the factory to be initialized. There is no field option for gaining access to the panel without a valid password.

Once you have changed the password, it is important that you write it down somewhere and store it in a safe place.

11.7 Connecting a TDM-500i Dialer

11.7.1 Dialer Configuration

Verify that dialer software version is revision 2.01.08 or higher (see label on TDM-500i).

Press **Prog** – the display shall show "**_.**" enter the password (default **2222**). The display shall show **P**.

Press **1**. The display shall show **d**.

Press	Display	Configuration	Range	Default
6	–	Selection of A and B input polarity" 11 – A positive, B positive (option exists only from software revision 2.05.01)	00 – 11	01

Configure the dialer for positive activation of both input A and input B (11).

11.7.2 Dialer Connection

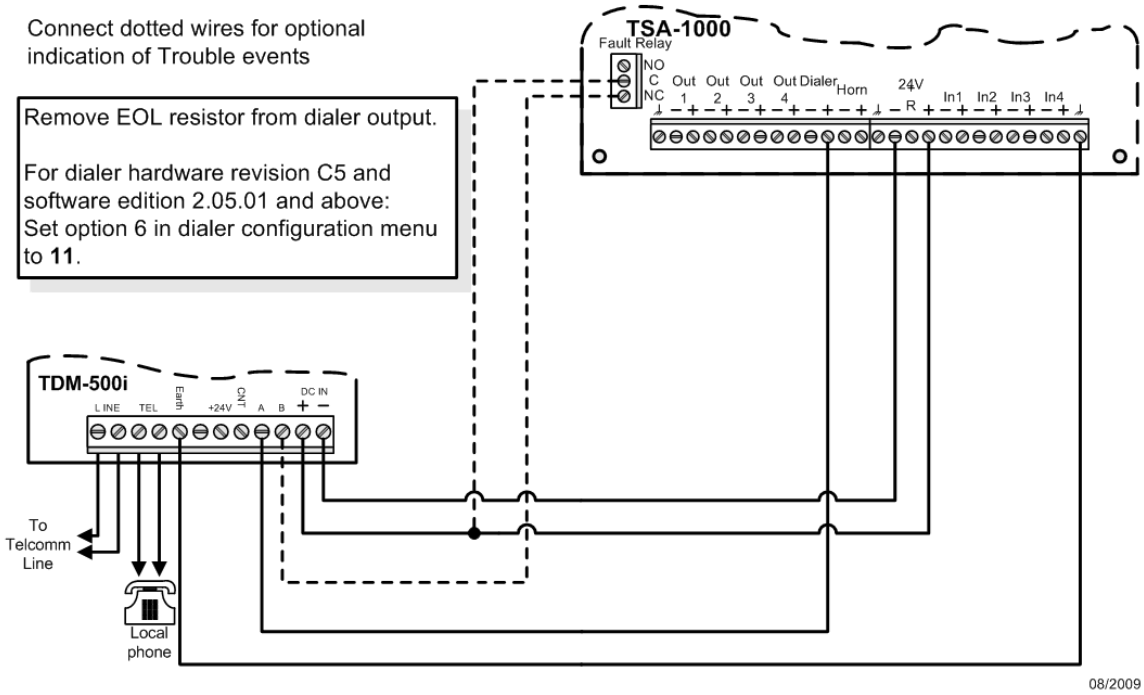

Figure 17 Connecting a TDM-500i Dialer (W/W rev C5, S/W rev 2.05.01)

i

Note

The dotted lines in Figure 17 are required only for error message notifications.

Configure the dialer (option 6) to 11.

12 Extinguishing

Extinguishing can start manually or by automatic operation,.

12.1 Automatic Extinguishing

After receiving an alarm from a zone or across zones that belong to the automatic extinguishing outputs, the extinguishing process starts. In case an extinguishing delay was defined, the delay system starts to operate. At the end of the delay the extinguishing output is activated for (default) 20 seconds.

12.2 Manual Extinguishing

The extinguisher output can be triggered by manual operation, by pressing the Manual Release Push Button.

12.3 Extinguishing Output

A programmable output that is configured as an extinguishing output (E) differs from an output that is configured as an "And" matrix in several ways:

- An extinguishing output supplies an 20 second pulse, as opposed to a regular output that stays on until the panel is reset or silenced
- An extinguishing output supplies a higher current
- An extinguishing output has a higher priority when allocating currents
- An extinguishing output can be configured to be triggered by a single input
- And extinguishing matrix may optionally include inputs (Pressostat, Emergency Abort, Emergency Hold, Gas flow switch, or Manual Only switch)
- Activation of an extinguishing output will result in a notification that extinguishing was activated in the control panel. Pressing the **Reset** key will not cancel this indication in order to ensure extinguishing agent replacement or refill

12.4 Emergency Hold and Emergency Abort

The TSA-1000 supports emergency hold and emergency abort as per EN-12094-1.

Pressing an emergency hold switch will start one of the following sequences:

- The extinguishing signal shall not be activated as long as the emergency hold device is continuously operated. De-activation of the operation of the emergency hold device after the end of the count-down shall activate extinguishing immediately.
- The extinguishing signal shall not be activated as long as the emergency hold device is continuously operated. The pre-discharge warning time shall be re-started from the beginning by each release of the emergency hold device.

Pressing the emergency abort switch during quiescent state or during activation count-down shall inhibit extinguishing release until the emergency abort device is released and the control panel is reset by the operator.

12.5 Post-Activation Indication

After activation of an extinguishing output, the digital display will show **E#.A** with the middle digit indicating the activated extinguishing output. For example, activating extinguishing output 3 will display **E3.A**. Pressing the **Reset** key will not cancel this indication, in order to verify extinguishing agent replacement or refill.

The Fault LED is also switched on.

Programmable output 1 defined as an extinguishing output will provide upon activation 24VDC and a current of 1.4A for 20 seconds. Programmable output 1 operates in "Reversed Polarity" mode.

Other outputs that are defined as extinguishing outputs will provide upon activation 24Vdc and a current of 1.0A for 20 seconds. These outputs operate in "Level Activation" mode.

12.6 Actions to Perform After Extinguishing Activation

After extinguishing activation, the control panel will show **E#.A** (Extinguishing # Activated) with the middle digit indicating the output that was activated.

Pressing the **Reset** key **will not cancel** this indication, in order to remind the user that cylinder replacement or refill is required.

Fill /Replace extinguisher and fix all pending faults.

12.7 Reestablishing the Quiescent Condition after Extinguishing

After ALL the issues are resolved, all faults (if an) are fixed, and the Extinguisher is replenished and brought to working order,

The ECD can be set to the Quiescent (idle) state.

This requires entering and exiting the programming mode.

To do this, using the ECD keyboard, perform the following;

Press **Menu** to enter the main menu. Press the ▲ or ▼ keys until the display shows **PG** (programming mode). Press **Enter** to enter programming mode. The display will flash **PAS** (password) and the TSA-1000 will wait for the password (default **2222**).

Key-in the password

and then perform RESET.

If there no other problems or faults, the ECD shall return to the quiescent state.

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Note

To return the control panel to normal operation, enter programming mode and then return the control panel to normal operation by pressing the **Reset** key.

This action shall be performed by authorized personnel.

Verify that the control panel is back to normal operation, the digital display scrolls the figure **8** from left to right.

13 Connecting Extinguishing Equipment

13.1 Extinguishing Adapters

In order to connect the ECD extinguishing output to different actuators, it is necessary to connect adapters between the ECD output and the extinguishing equipment input,

Telefire offers several adapters.

Shown below are the type of equipment and the relevant adapter:

Fike FIRERASER cylinders-use TLA-130 adapter

Fike GCA cylinder-use TLA-22 adapter

Greenex Aerosol Containers-use TLA-33 adapter

FirePro Aerosol Containers-use TLA-44 adapter

SAFE Solenoid Activated gas containers-use TLA- 110 adapter

i

Note

When extinguishing adapters are installed, addition of EOL resistors is not required!

i

Note

Please consult the manufacturer for solutions regarding activation of additional extinguishing devices.

13.2 Number of Extinguishing Adapters

Extinguishing Device	Maximal number of extinguishing adapters
SAFE solenoid gas cylinders	A single TLA-110 adaptor connected to the extinguishing output
FIKE solenoid gas cylinders (FIRERASER)	A single TLA-130 adaptor connected to the extinguishing output
FIKE GCA gas cylinders	A single TLA-22 adaptor connected to the extinguishing output
FirePro aerosol generators	A single TLA-44/1 or TLA-44/4 adaptor connected to the extinguishing output
GreenEX aerosol generators	A single TLA-33 adaptor connected to the extinguishing output

i

Note

Connect a single extinguishing adaptor to the extinguishing activation output. This adaptor will activate a single extinguishing device, except for the TLA-44/4 that can activate up to 4 FirePro aerosol extinguishers.

Please consult the manufacturer for solutions regarding activations of additional extinguishing devices

13.3 Extinguishant Quantities

- It is possible to connect up to three, simultaneously activated solenoid-operated containers to the TSA-1000. Additional containers may be activated with a delay of at least 20 seconds between activations
- It is possible to connect a single GCA-activated container to the TSA-1000 – this will be connected only to output 1 (see Figure 19)
- It is possible to connect one GreenEX aerosol releasing device to each programmable output on the TSA-1000
- It is possible to connect one TLA-44 to each programmable output, as long as there are no simultaneous activations. Multiple outputs may be activated with a delay of at least 20 seconds between activations. Each TLA-44/1 module can activate a single FirePro aerosol generator, while each TLA-44/4 module can activate up to 4 FirePro aerosol generators.

i

Note

Please consult the manufacturer for solutions regarding activations of additional extinguishing devices

13.4 Fike FIRERASER

Fike's FIRERASER cylinders are suitable with work for all of Telefire control panels. For additional detail, refer to Fike's technical manual.

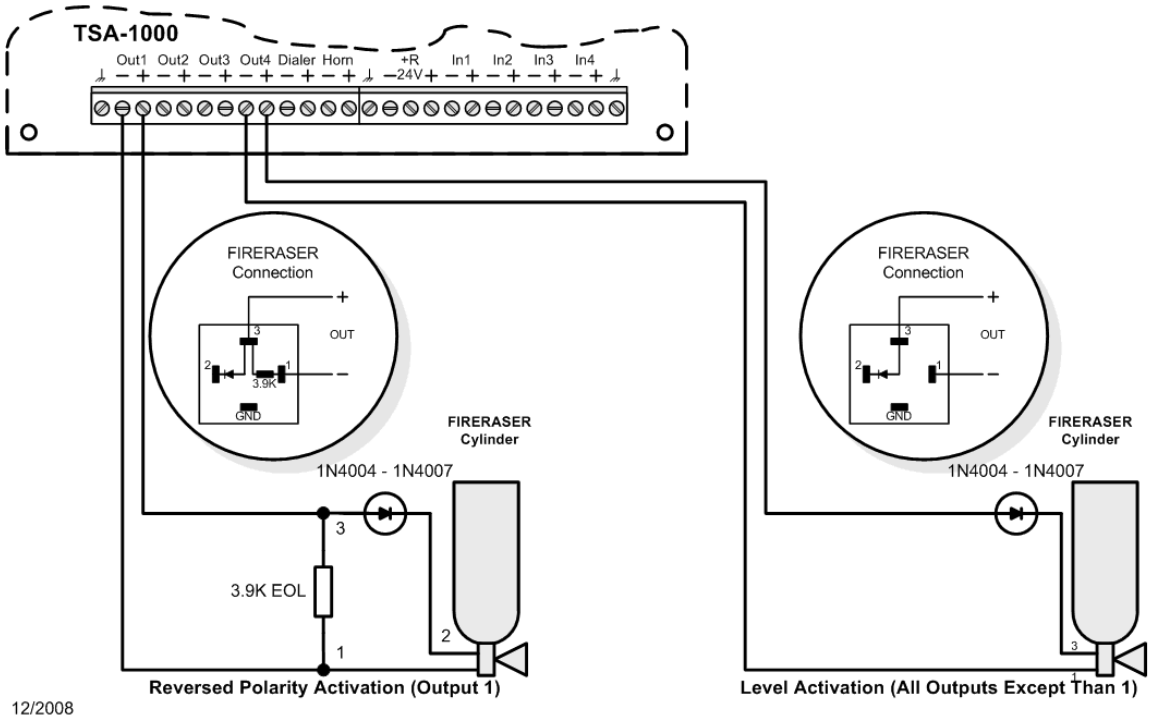

Figure 18 Connecting a FIRERASER Cylinder for Automatic Extinguishing

13.5 Fike GCA

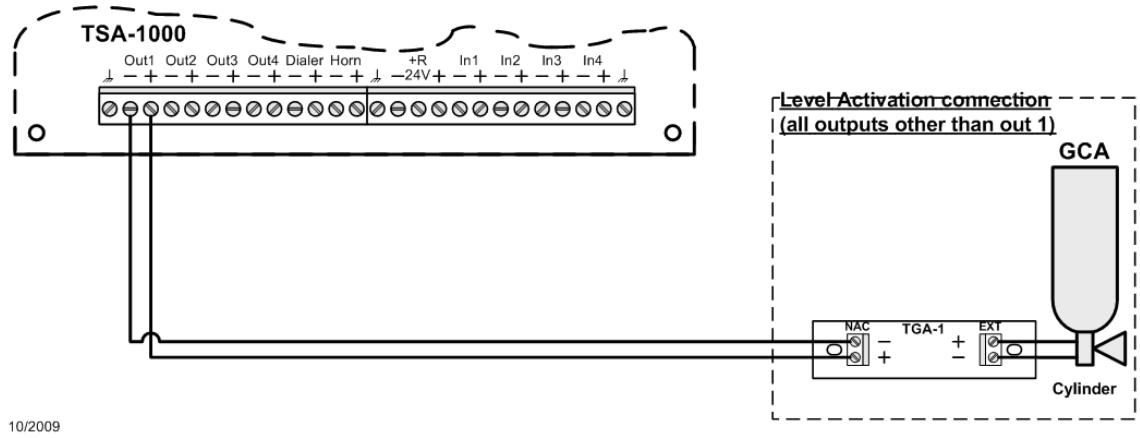

Figure 19 Connecting a GCA-Activated Extinguishing Cylinder

13.6 GreenEX Aerosol Containers

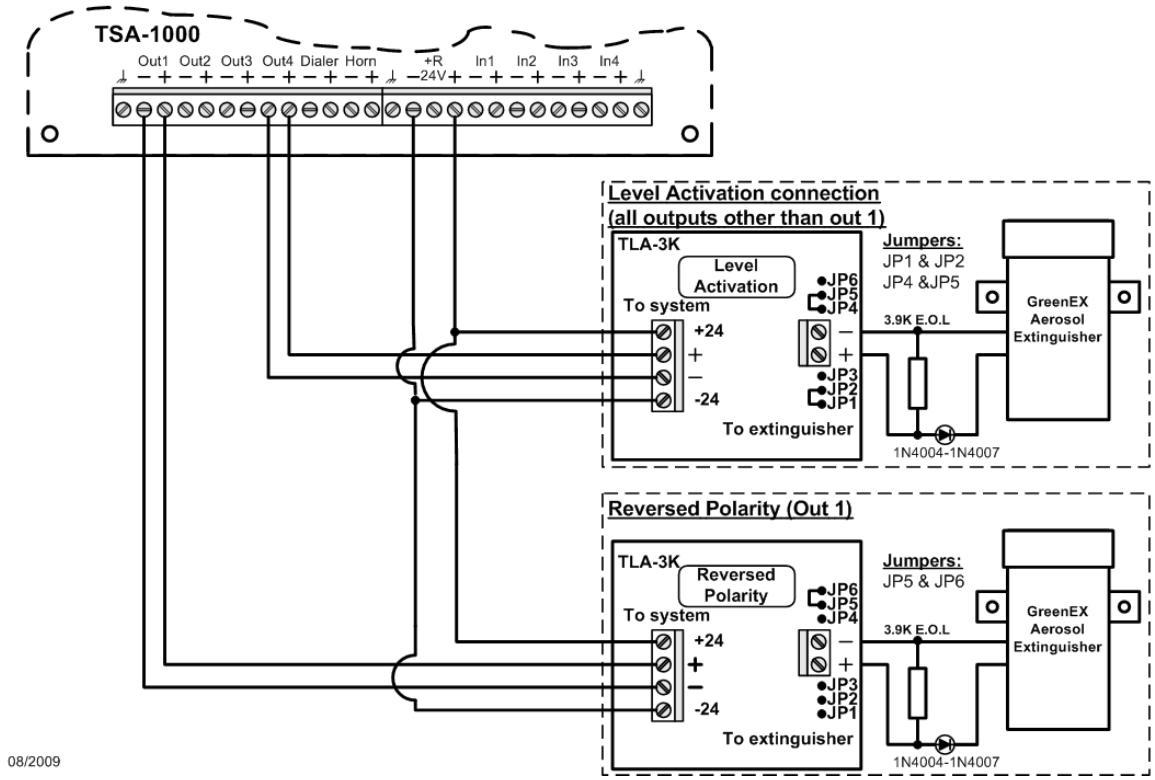

Figure 20 Connecting a GreenEX Aerosol Extinguishing Container

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Note

When connecting a TLA-3K module to programmable output 1 in a TSA-1000 verify that jumpers JP5 and JP6 are shorted.

When connecting a TLA-3K module to programmable all other outputs in a TSA-1000 ensure that jumpers JP1 and JP2 are shorted and jumpers JP4 and JP5 are shorted.

See Figure 20 above.

13.7 FirePro Aerosol Containers

Aerosol releasing devices made by different manufacturers differ from each other in their power requirements and therefore require different interface modules.

The TLA-44 module is intended to work with FirePro aerosol units. It is available in two configurations that allow for connecting either a single module or up to four modules.

- TLA-44/1 – allows activation of a single module
- TLA-44/4 – allows activation of up to four modules

Activation is simultaneous to all aerosol devices connected to the TLA-44. The module's output lines to the aerosol devices are supervised for open circuit.

The TLA-44 is intended to be installed in the same protected space as the aerosol devices.

The TLA-44 may be connected to outputs with level activation or reversed polarity activation.

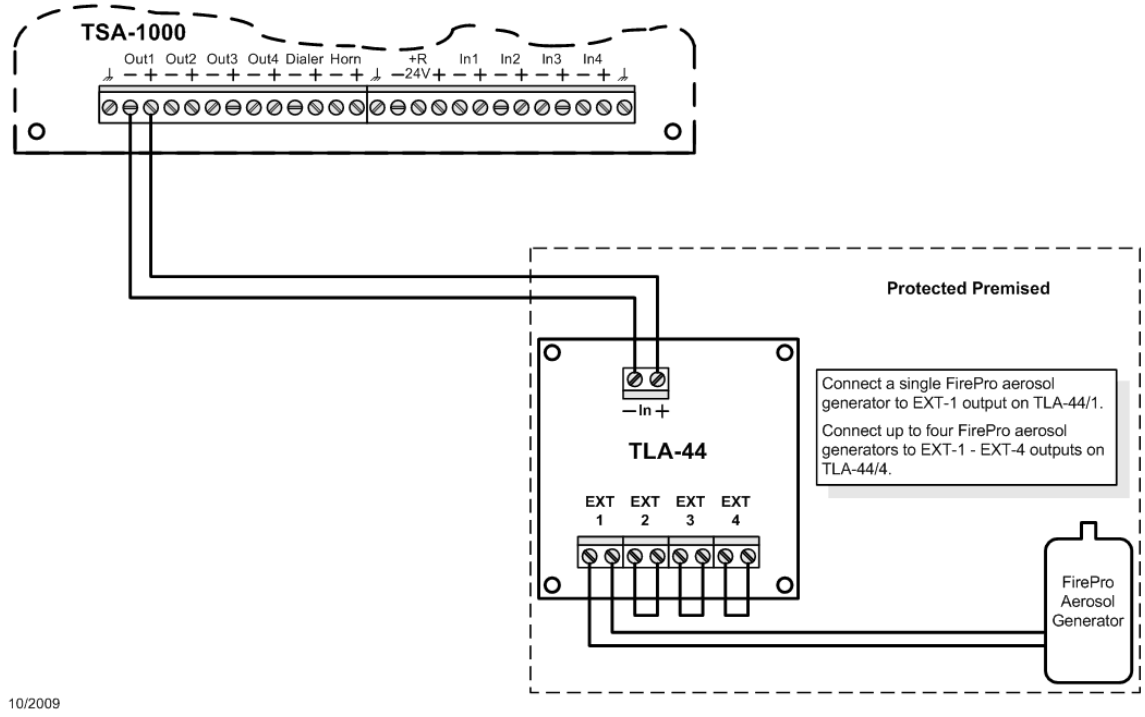

Figure 21 Connecting FirePro Aerosol Generators

13.8 A Typical Application – Extinguishing and Electricity Disconnect

The following example shows a TSA-1000 that is configured to activate extinguishing by cross-zone of zones 2 and 3, or activation of a manual extinguishing call point on zone 4; activating an extinguishing release sign on output 2; activating an evacuation horn on output 3; triggering electricity disconnect by relay RL3; and connection of a pressure switch to supervise the extinguishant pressure on zone 1.

Figure 22 shows a system that was configured as follows:

- Relay 3 – activated by cross-zone (**A**) of inputs 2 and 3, or input 4; not delayed; unsilenced
- Input 1 – pressure switch input (**Ξ**)
- Inputs 2 and 3 – standard detection zones (**d**); no delay
- Input 4 – pushbutton input (**P**)

- Output 1 – extinguishing output (**E**); 30 second delay; activated by cross-zone of inputs 2 and 3, or input 4; not delayed
- Outputs 2 and 3 – activated by cross-zone (**A**) of inputs 2 and 3, or input 4; not delayed; unsilenced

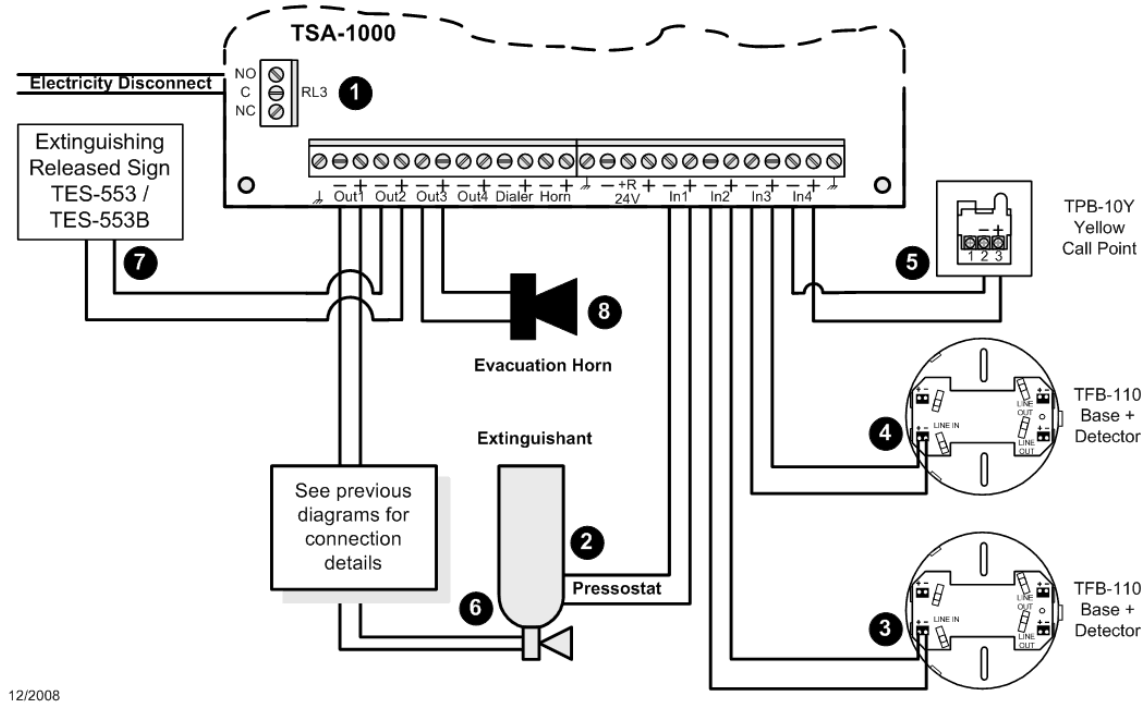

Figure 22 A typical application – cross-zone activation of electricity disconnect, evacuation volume extinguishing

14 Control Panel Programming

The TSA-1000's operating parameters can be easily modified in the field to allow for the specific requirements of each site.

System parameters modification is limited to access level 3 (programmer).

After entering programming mode you can modify the general settings (expansion modules, remote panels, and relay activation conditions); zone configuration, and output activation conditions.

14.1 Menu Structure

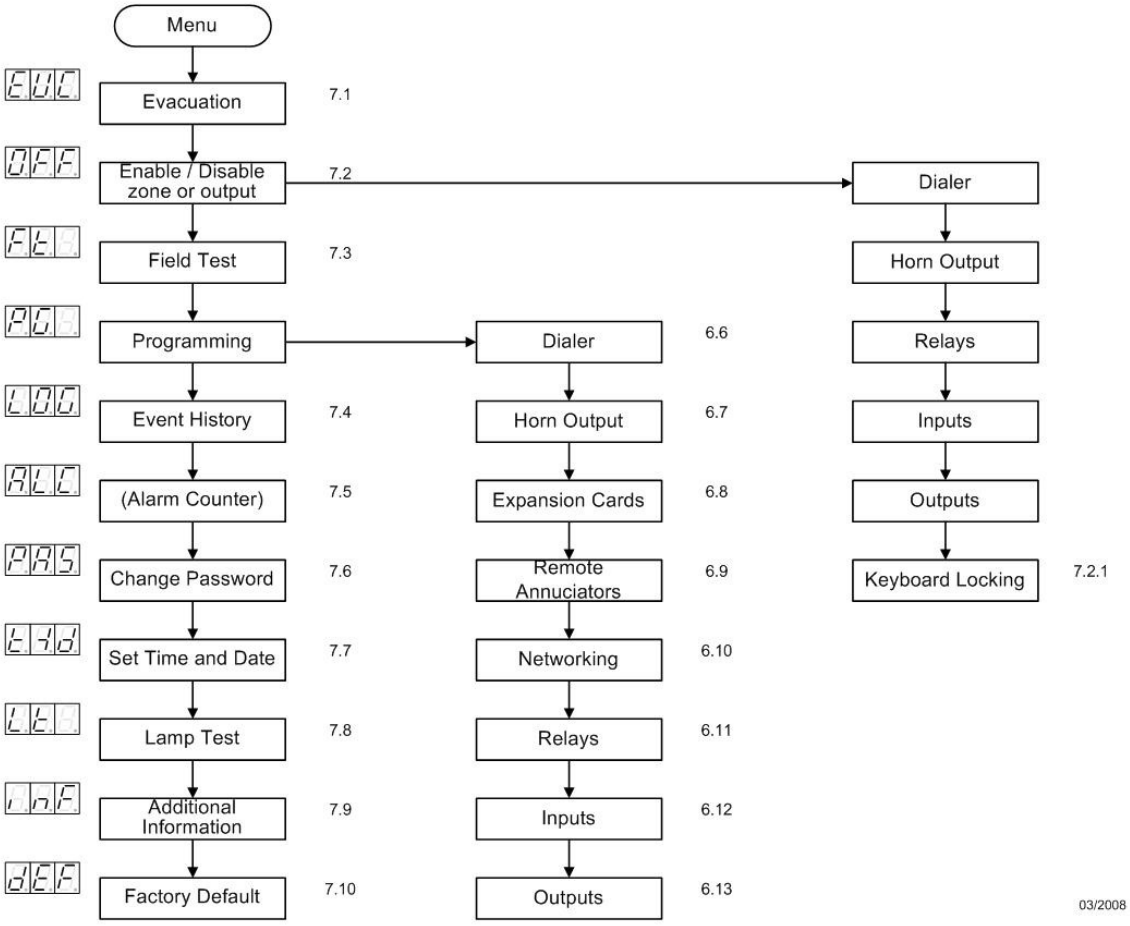

Figure 23 Programming Menu Structure

14.2 Entering Programming Mode

Press **Menu** to enter the main menu. Press the ▲ or ▼ keys until the display shows **PG** (programming mode). Press **Enter** to enter programming mode. The display will flash **PAS** (password) and the TSA-1000 will wait for the password (default **2222**).

14.3 Key Functions during Programming

The keyboard has different functions in programming mode.

Key	Function in Programming Mode
Menu (1)	Moves the "cursor" between programmable fields that vary according to the device and type selected

Key	Function in Programming Mode
▲ (2)	Navigates between options available in the selected field
▼ (3)	Navigates between options available in the selected field
Enter (4)	Selects, marks or removes a zone from the matrix
Ack/**Prog** (5)	Copies the temporary programming to the non-volatile memory
Reset	Exits programming mode without saving. The display shows **nSv** (not Saved) and will return to programming mode after a few seconds. Pressing the Reset key a second time will exit without saving.

14.4 Display During Programming

During programming the 3-digit 7 segment display represents:

- Leftmost digit – device type
- Middle digit – device (input, output, or relay) number
- Right digit – mode of operation

Event type field (the top three LEDs to the right of the digital display) will indicate the event type (alarm, fault or supervisory)

Delay field – represented by the six left LEDs and the bottom five LEDs on the right of the general display area indicate delay time in steps of 5 seconds.

The **Alarm** LED indicates alarm verification for inputs and **Silenced** for outputs.

The zone indicators represent input zones for output matrix programming. During matrix programming when the alarm zone LED is lit, it means that activating this zone will cause an alarm condition. During matrix programming when the supervisory zone LED is lit, it means that activating this zone will cause a supervisory fault condition.

Selected fields blink when selected.

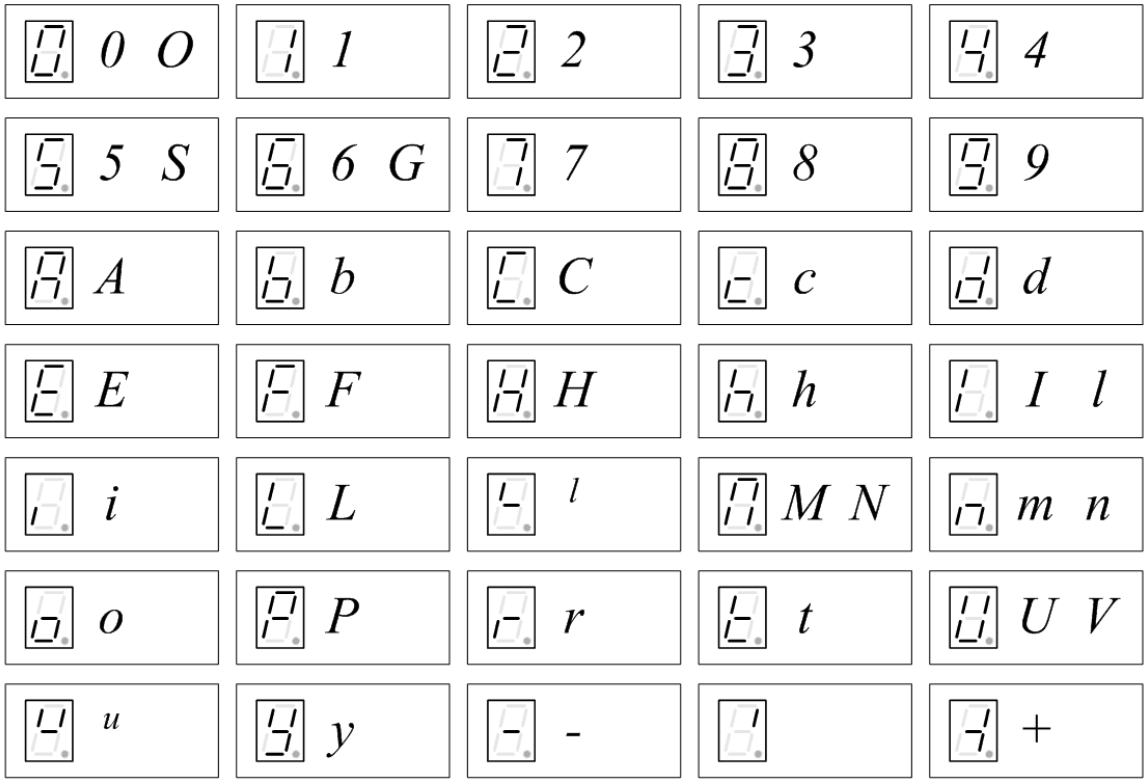

Figure 24 The seven-segment display and representation of digits and letters

14.5 Programming Sequence

14.5.1 Programming Steps

There are five steps to programming the control panel:

- Enter programming mode
- Program the control panel's general parameters
- Program inputs
- Program output modes and matrices
- Save to non-volatile memory

Note

When in programming mode, the buzzer sound after 30 minutes without use of the keyboard to remind you not to leave the control panel in programming mode.

14.5.2 Programming Sequence for Each Parameter

For each control parameter the programming sequence is as follows:

- Select the device type (left digit)
- Press the **Menu** key to move the cursor to the middle digit and select the device number
- Press the **Menu** key to move the cursor to the right digit and select the device mode
- Press the **Menu** key to move the cursor to select the event type with the LEDs to the right of the digital display
- Press the **Menu** key to move the cursor to select the delay. Each LED in this field represents a delay of 5 seconds

- Press the **Menu** key to move the cursor to select verification for input devices or silenced for output devices (Alarm LED) or delay
- Press the **Menu** key to move the cursor to select the input zones for the matrix (alarm LED of the in the zone display area)

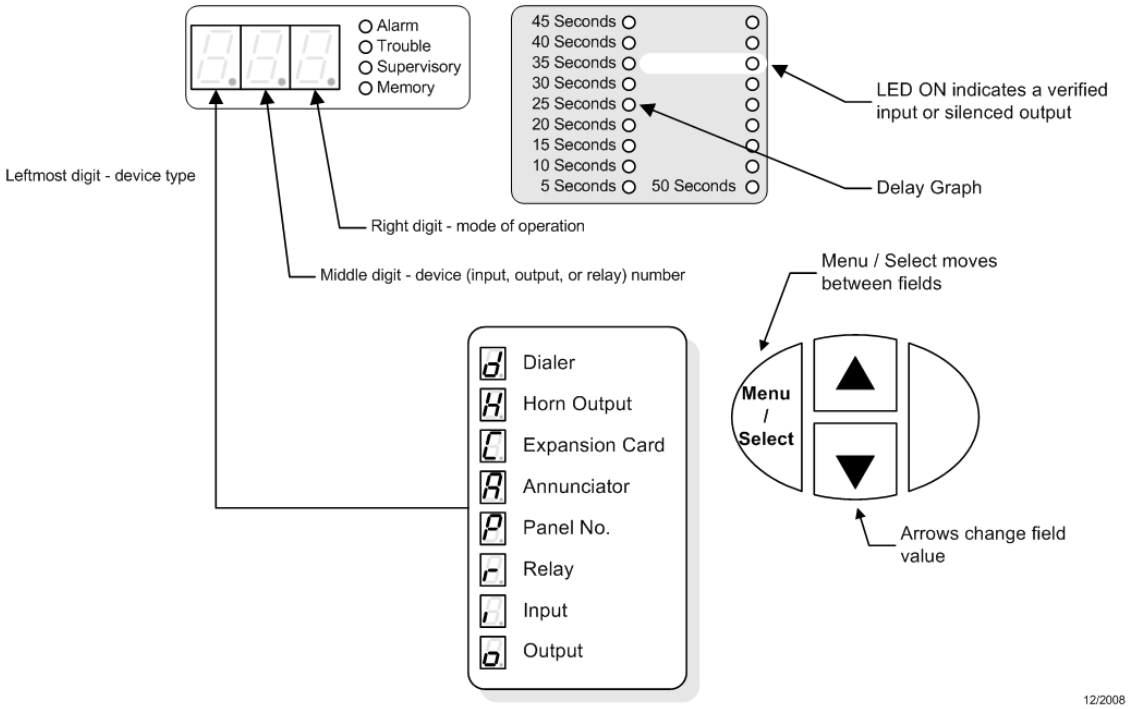

Figure 25 Device selection

14.6 Dialer Programming

The dialer's operating function is fixed – the display shows **d1G** (dialer output is general output).

14.7 Horn Output Programming

The horn's operating function is fixed except for the requirement of CP-10 (see below) – the display shows **H1G** (dialer output is general output).

CP 10

CP 10 Requirement

CP-10 specifies that in some cases the horn output may not be silenced for 3 minutes after alarm. To set this requirement press **Menu** until the third digit (**G**) will blink and use the ▲ or ▼ keys until the dot will show (feature enabled – **H1G.**, feature disabled – **H1G**).

When enabling this feature, paste a label stating "**Bell silence is disabled for a period of 3 minutes upon first alarm**" on the front door of the panel.

14.8 Expansion Card Programming

During expansion card programming the left digit will be **C** (expansion **C**ard). The middle digit represents the card number (**1** – first expansion module, **2** – second module, etc). Do not skip card numbers (i.e., do not program card 2 if you do not have card 1 installed). The right digit will show the card type:

- **0** – not installed
- **1** – TSA-1000E8 (8 zones)

- **2** – TSA-1000E8 (8 zones) and TSA-1000EM083 (8 open collector outputs + 3 relays)
- **3** – TSA-1000E8 (8 zones) and TSA-1000EM422 (4 zones, 2 programmable outputs, 2 relays)
- **4** – TSA-1000E4 (4 zones)
- 5 – TSA-1000E4 (4 zones) and TSA-1000EM083 (8 open collector outputs + 3 relays)

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Note

The card type represents the number of **Inputs**, **O**utputs, and **R**elays:
TSA-1000EM-**IOR** (**I** = number of inputs, **O** = number of outputs, **R** = number of relays)

14.9 Remote Annunciator Programming

During Annunciator programming the left digit will be **A** (**A**nnunciator). The middle digit represents the annunciator's number (1 – 4). The right digit represents the annunciator's type (**0** – not configured, **E** – English, **S** – **S**econdary language).

14.10 Network Programming

TSA-1000 control panel networking is in main/sub configuration. All panels require the optional TSA-1000C communication network. Physical connection is via a two-wire RS-485 cable.

A single Master Panel (panel No. 1) supervises up to 12 Sub Panels (panel addresses 5 to 16). The Master Panel uses its own zones 1 – 4, and indicates alarm and fault events on panels 5 – 16 as zones 5 – 16.

An alarm at any Sub Panel will activate all sounders (Horn output on the main board and any output defined as "General, Silenceable" on the main or expansion boards) of all control panels on the network. Am alarm can be silenced or reset only from the control panel that initiated the alarm or from the Master Panel.

14.10.1 Configuring the Main Panel

From the main programming menu press the ▲ or ▼ keys until the display changes to the panel number. Using the **Menu**, ▲, and ▼ keys set panel as panel No. 1. Press **Menu** again to select the sub panels. Zone 5 LED will flash – press **Enter** to include panel 5 as a sub-panel. Use the ▲ or ▼ keys to move to panels 6 – 16 to enable additional panels.

14.10.2 Configuring Sub Panels

Set the panel's number to a number between 5 and 16 to configure it as a Sub Panel.

14.11 Relay Programming

All the system's relays are programmable and can be configured as alarm, fault, or supervisory relay.

The main board contains 3 relays, numbered 1 – 3 from top to bottom. Relays on the expansion modules are indicated by a LED next to the relay's contacts on the expansion card that is lit when selected.

During relay programming the left digit will be **r** (**r**elay). The middle digit represents the relay number (**1** – first relay, **2** – second relay, etc). The rightmost digit represents the relay's operating mode (**G** – General; **A** – logical "And" of selected inputs, **b** – logical "Or" of selected inputs).

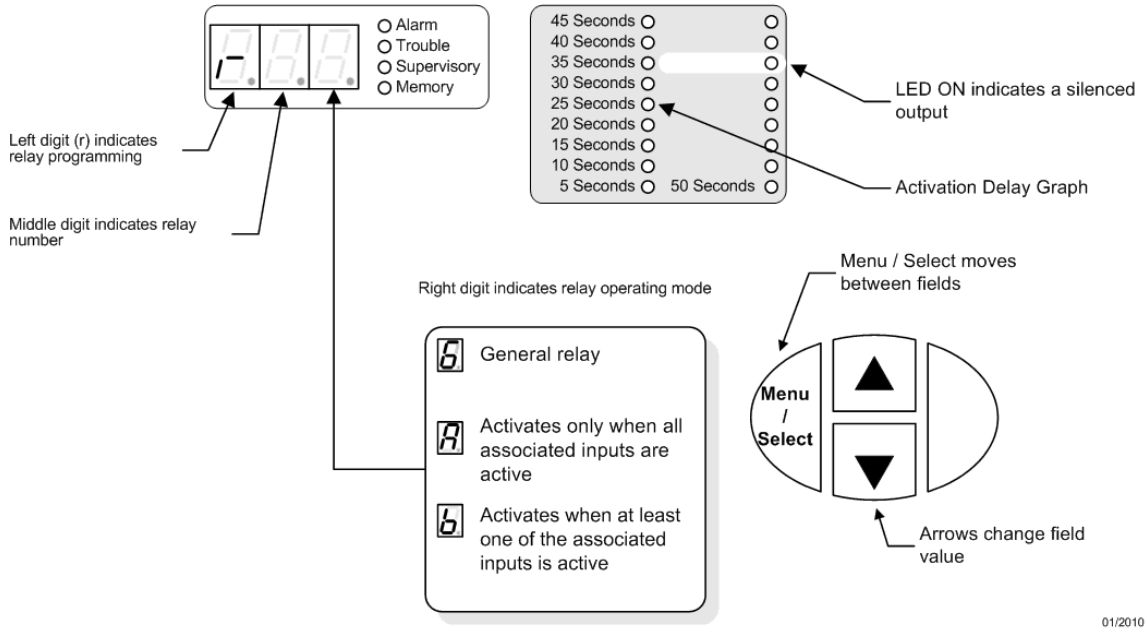

Figure 26 Display during relay programming

14.11.1 Additional Parameters for General Relays

A relay that is defined as a General relay can be programmed as an Alarm relay, Fault relay, or Supervisory relay using the LEDs to the right of the digital display.

When selecting an alarm relay we have additional fields to define, the delay field, "silenced" field, and the matrix field.

- General Alarm relays can be programmed with a delay, and defined as "silenced" or "not silenced".
- General Fault relays do not have any additional fields.
- General Supervisory relays can be programmed with a delay.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

14.11.2 Additional Parameters for Logical "And" Relays

A relay that is defined as a Logical "And" relay can be programmed as an Alarm or Supervisory relay using the LEDs to the right of the digital display.

- Logical "And" Alarm relays can be programmed with a delay, defined as "silenced" or "not silenced", and the zones that belong to the logical operation.
- Logical "And" Supervisory relays can be programmed with a delay, and the zones that belong to the logical operation.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

14.11.3 Additional Parameters for Logical "Or" Relays

A relay that is defined as a Logical "Or" relay can be programmed as an Alarm or Supervisory relay using the LEDs to the right of the digital display.

- Logical "Or" Alarm relays can be programmed with a delay, defined as "silenced" or "not silenced", and the zones that belong to the logical operation.
- Logical "Or" Supervisory relays can be programmed with a delay, and the zones that belong to the logical operation.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

i

Note

A relay that is defined as a Fault relay will be energized when the system is powered and in normal state (see diagram below).

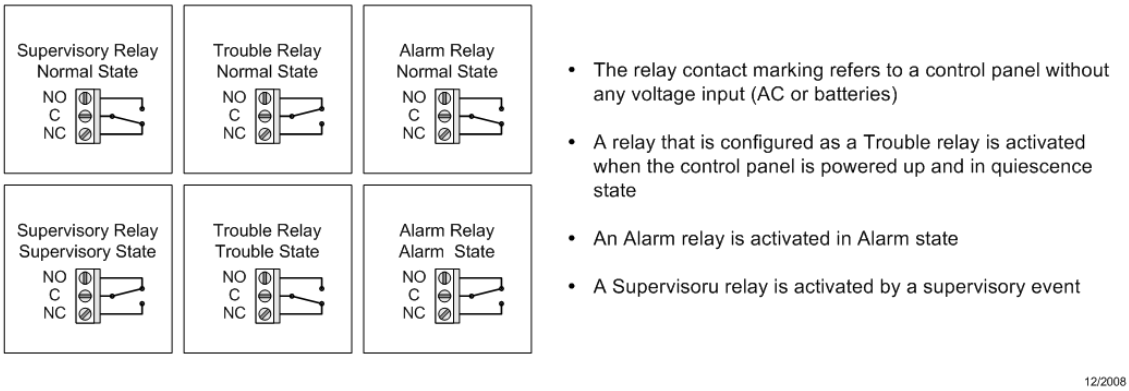

Figure 27 Programmable Relay Contacts During Normal Operations and Upon Activation

14.12 Zone Programming

In zone programming mode the leftmost digit will display **i** (**i**nput), the middle digit represents the zone number (zones 10 – 16 are represented by the letters A – G respectively), and the right digit represents the mode of operation as follows:

- **d** – Represents a standard initiating device zone (detectors, etc.) or supervisory input. Additional fields can set the verification delay time and verification enabling. Refer to section 14.5 on page 57 for a detailed explanation of these fields.
- P – Represents manual alarm call points zone

i

Note

A push-button input (**P**) has a higher priority than inputs defined as **h** (type 1 hold) or **H** (type 2 hold).

Activating a call-point connected to a type P input will result in release of extinguishing release even when hold extinguishing (h or H) is activated.

- Ξ – Represents a pressure switch input
- **A** – Represents an Abort switch input
- **F** – Represents a flow switch input
- **h** – Represents Hold switch (type 1 as per EN-12094-1)
- **H** – Represents Hold switch (type 2 as per EN-12094-1)
- ⌐┘ – Represents extinguisher mode of operation select switch. When activated, the extinguishing system will react to manual activation only. Extinguishing activation by detectors and fire call points is disabled.

Some of the input types may have additional fields such as verification and delay. Refer to section 14.5 on page 57 for a detailed explanation of these fields.

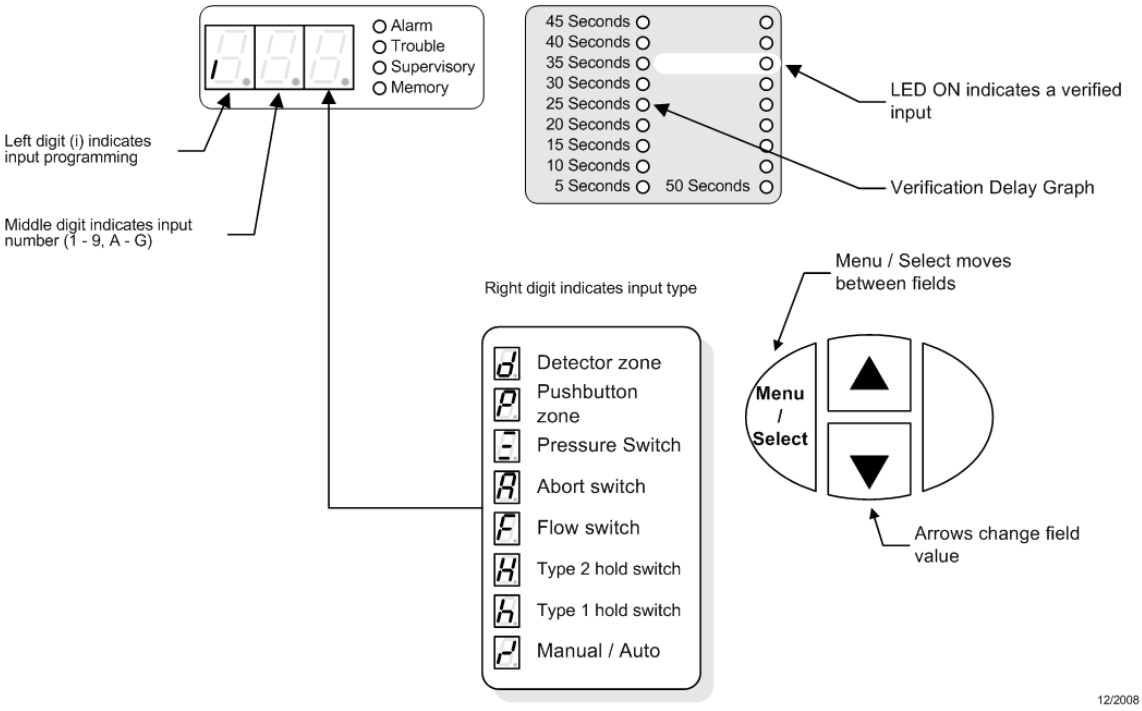

Figure 28 Display during input programming

CP 10

CP 10 Requirement

CP-10:2005 section 2.5.11 states "the following components shall not be subject to alarm verification feature:

(a) Alarm zone facilities containing only manual call points
(b) Circuits between sub alarm panels and the main alarm panel
(c) Detectors used to activate fire suppression systems
(d) Detectors installed in high-risk areas
(e) Alarm zone circuits from fire suppression systems".

IS 1220

IS 1220 Requirement

IS 1220 Part 3 does not allow delaying zones that are a part of cross-zone activation; zones that have heat detectors; and zones that have call points.

14.13 Output Programming

All the system's outputs are programmable and can be configured as either alarm or supervisory outputs.

The main board contains 4 outputs, numbered 1 – 4 from left to right. Outputs on the expansion modules are indicated by a LED next to the output's contacts on the expansion card that is lit when selected.

During output programming the left digit will be **o** (**o**utput). The middle digit represents the output number (**1.** – first output, **2.** – second output, etc). The rightmost digit represents the output's operating mode (**G** – General; **A** – logical "And" of selected inputs, **b** – logical "Or" of selected inputs; **E** – **E**xtinguishing output).

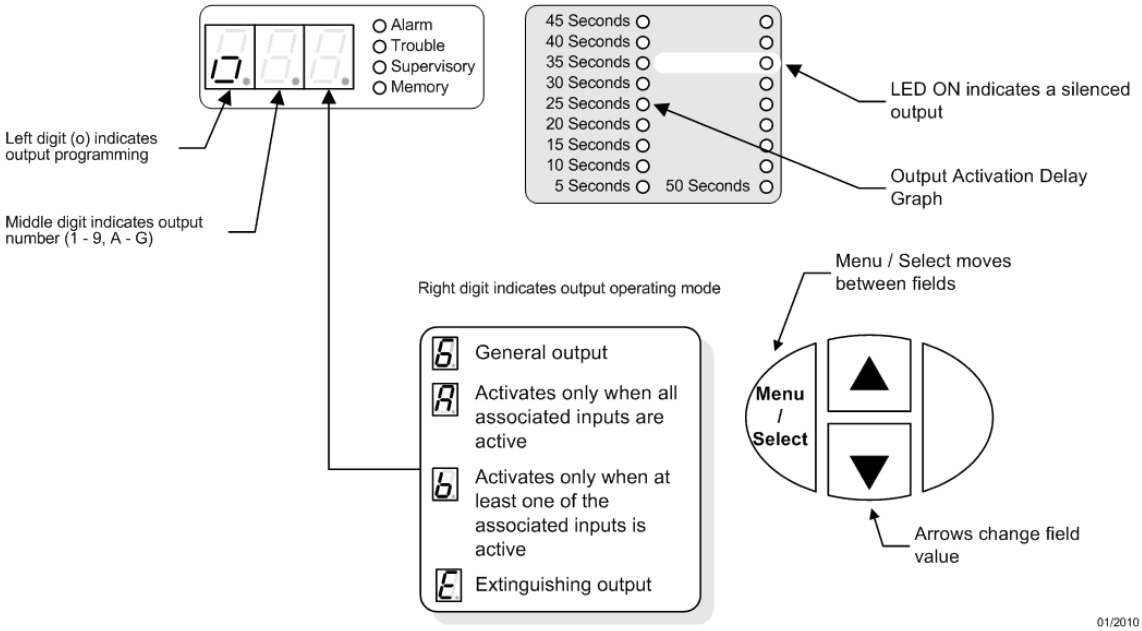

Figure 29 Display during output programming

14.13.1 Additional Parameters for General Outputs

An output that is defined as a General output can be programmed as an Alarm output or Supervisory output using the LEDs to the right of the digital display.

When selecting an alarm output we have additional fields to define, the delay field, "silenced" field, and the matrix field.

- General Alarm outputs can be programmed with a delay, and defined as "silenced" or "not silenced".
- General Supervisory outputs can be programmed with a delay.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

CP 10

CP 10 Requirement

CP-10:2005 section 2.5.8 states "no isolation and delay facilities shall be allowed for the transmission of fire alarm signals to fire alarm sounders". Programmable outputs that are defined as "silenced" are considered as fire alarm sounder outputs and can not be disabled.

14.13.2 Additional Parameters for Logical "And" Outputs

An output that is defined as a Logical "And" output can be programmed as an Alarm or Supervisory output using the LEDs to the right of the digital display.

- Logical "And" Alarm outputs can be programmed with a delay, defined as "silenced" or "not silenced", and the zones that belong to the logical operation.
- Logical "And" Supervisory outputs can be programmed with a delay, and the zones that belong to the logical operation.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

UL 864

UL Requirement

- UL 864 Edition 9 does not allow input zone delay in conjuncture with cross-zoning.
- UL 864 states that when utilizing more than one zone with verification, the max verification time shall not exceed 30 seconds

14.13.3 Additional Parameters for Logical "Or" Outputs

An output that is defined as a Logical "Or" output can be programmed as an Alarm or Supervisory output using the LEDs to the right of the digital display.

- Logical "Or" Alarm outputs can be programmed with a delay, defined as "silenced" or "not silenced", and the zones that belong to the logical operation.
- Logical "Or" Supervisory outputs can be programmed with a delay, and the zones that belong to the logical operation.

14.13.4 Additional Parameters for Extinguishing Outputs

An output that is defined as an Extinguishing output can be programmed with a delay and with the zones that activate it.

Refer to section 14.5 on page 57 for a detailed explanation of these fields.

14.14 Saving Data and Exiting Programming Mode

In order to store the parameters at the end of the programming all system configurations press the **Ack**/**Prog** key for a few seconds until the display will show **PPP** and a long beep will sound. If the programming process is successful the system will return to normal display (the digital display moves the figure **8** from left to right).

The system checks automatically the validity and integrity of the settings and will display an error message **E##** (**E**rror **##**). Please refer to section 16.4 on page 70.

When trying to exit programming mode without saving by pressing the **Reset** key, the system will display **nSv** (**n**ot **S**a**v**ed). This message will be displayed only when performing changes. Pressing the **Reset** key a second time will exit the system programming without any changes. When reviewing the programming without changes, the exit is without any warnings.

The system stores configuration programming permanently, even when both primary and secondary power sources are disconnected.

15 Operation and Maintenance

15.1 Evacuation (EVC)

Press the **Menu** key to enter the main menu. Press the ▲ or ▼ keys until the display shows **EVC**. Press the **Enter** key to activate all general outputs.

In a networked system the digital display will alternately display **EVC** and the panel number that has activated the evacuation (**P##**).

15.2 On / Off Zone or Output (OFF)

Press the **Menu** key to enter the main menu. Press the ▲ or ▼ keys until the display shows **OFF**. Press the **Enter** key to move the cursor to the device field. Select the device by pressing the ▲ or ▼ keys. Press the **Enter** key to toggle the device between normal and disabled. A disabled device will show **u** in the right digit.

Press the **Ack**/**Prog** key for a few seconds until the display will show **PPP** and a long beep will sound. The system will indicate the disabled zone or output on the digital display (**x#u**), the **Disabled** LED in the general display area, and the disabled zone's **Disabled** LED in the zone display area,

15.2.1 Keyboard Locking

Keyboard locking prevents system configuration modification by unauthorized personnel, when the system's keyboard is locked there is no possibility to perform any functions other than acknowledge an event, paging through memory to display alarm and fault events.

The system's default configuration is locked keyboard.

When the keyboard is locked the system requests a password to perform any operation. The system will return to locked keyboard automatically 30 minutes after the last key press in unlocked condition.

Press the **Enter** key to toggle between locked (**buL** – **bu**ttons **L**ocked) and unlocked (**bu**) keyboard

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Note

Lock the keyboard after programming or maintaining the system.

15.3 Field Test (ft)

Field test is used for periodic testing of the system by a single person. Field test can be selected for a single zone or a group of zones.

During field test activation of a device in the selected zones will light the device's alarm LED, indicate the zone on the control panel by the zone number and alarm LED in the digital display section. The test will not activate output devices. The system will reset the activated zone about 15 seconds after activation. An alarm from a zone that was not selected for testing will immediately activate the fire alarm condition on the panel.

Press the **Menu** key to enter the main menu. Press the ▲ or ▼ keys until the display shows **Ft**. Press the **Enter** key. Select the zones for testing by using the ▲ or ▼ keys. Press Enter to select the appropriate zone – the rightmost digit will show **t**. Press the **Ack**/**Prog** key to start the field test. The system will indicate Field Test mode by displaying the Test LED in the general display area, the private Test LED in the zone display area, and **– – –** on the digital display.

During the test the zone number and the alarm LED will light for 15 seconds. In case of an alarm or fault events that occur during field test the digital display will indicate them with a higher priority.

To quit field test and return to normal operation repeat the procedure listed above until all inputs do not have a **t** (test) displayed in the rightmost digit.

15.4 Event Log (LOG)

The event log (**LOG**) menu is used to display or print the alarm and fault event log and system configuration.

Page through the menus until the display shows **LOG**. Press **Enter**. The system will request the password (**PAS**). Enter the password (default **2222**) and use the **Menu**/**Select** key to page between the fields.

Left Digit	Middle Digit	Right Digit
Record type • **t** – fault event log • **A** – alarm event log • **C** – system configuration	Selects language • **E** – English • **S** – Secondary language	Action (press the **Buzzer**/**Ack**/**Prog** key to print or clear the log) • **P** – Printing • **c** – clear log

15.5 Alarm Counter (ALC)

The alarm counter displays the total number of alarms accumulated in the system.

Page through the menus until the display shows **ALC**. Press **Enter**. The system will request the password (**PAS**). Enter the password (default **2222**) and press **Enter**. The display will show the alarm count.

15.6 Changing Password (PAS)

This menu is used to change the Operator (access level 2) and Programmer (access level 3) passwords.

Page through the menus until the display shows **PAS**. Press **Enter**. The system will request the password by blinking **PAS**. Enter the programmer's password (default **2222**) and press **Enter**.

The leftmost digit will indicate which password is viewed or modified – Programmer's (**P**) or Operator's (**O**) password. The middle digit represents the digit number (1 – 4), and the rightmost digit shows the value of that digit (1 – 6). Navigate between the fields by pressing **Menu**. Change the field's value by using the ▲ and ▼ keys.

15.7 Setting Time and Date (t+d)

This menu is used to set the system's time and date.

Page through the menus until the display shows **t┤ d** (**t**ime **+ d**ate). Press **Enter**. The system will request the password (**PAS**). Enter the password (default **2222**) and press **Enter**. The leftmost field indicates the hour (**h**), minute (**m**), day (**d**), month (**M**), and year (**Y**). The middle and right digits represent the value of the left field.

To store the modified time and date press the **Ack**/**Prog** key for a few seconds until the display will show **PPP** and a long beep will sound. The system will return to normal display (the digital display moves the figure **8** from left to right).

To exit without modifying the time and date press the **Reset** key, the system will display **nSv** (**n**ot **S**a**v**ed). This message will be displayed only when performing changes. Pressing the **Reset** key a second time will exit without any changes.

15.8 Lamp Test (lt)

Page through the menus until the display shows **lt**.

Lamp test turns on all LEDs on the panel's keyboard / display and the digital display shows **8.8.8.**. The internal buzzer will also sound. The two dual color LEDs (**Telecom** and **Sounders**) in the general display area will be yellow and then red.

15.9 Additional Information (inF)

The additional information menu shows the system's software version, and total number of times the system was programmed.

15.10 Restoring Default Configuration (dEF)

This option allows the return to factory default (**dEF**).

The system requests you to enter the password twice in order to safeguard against accidental reconfiguration.

15.10.1 Default Configuration

Relays 1 and 2 General Alarm Relay

Relay 3 General Fault Relay

All Inputs Detector zone, unverified

All Programmable Outputs General Alarm, Silenced, no delay

Expansion Modules Not configured (TSA-1000/4)

Remote Annunciators Not configured

Warning

All system configuration and programming (including passwords, activation conditions and matrices) are set back to the factory default values.

Disconnect all extinguishing devices and other critical activation outputs before returning to factory default. Reconfigure the panel for the site's specific requirements and ensure that all input devices are in normal state and not in alarm and that the activation matrices are properly configured before reconnecting any extinguishers.

16 Troubleshooting

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Note

The # symbol in sections to represent the number of the input, output' relay' expansion module, etc.

16.1 Maintenance Alert

Photoelectric and multi-sensor smoke detects manufactured by Telefire have unique physical characteristics that allow them to operate for very long period under normal operating conditions.

The detectors perform drift compensation automatically as dust residue collects in the detector until such time that the detector can no longer compensate for the drift. At this time the detector will indicate the need to clean it by increasing the led flashing frequency from once every four and a half seconds to twice a second.

The TSA-1000 will indicate the zone with detector and maintenance fault by indicating the number of the zone in the left and middle digits in the digital display and by alternating the top and bottom lines in the right digit.

16.2 System States

–	**–**	**–**	Field Test
	V	**#**	Zone # verification
V	**#**	**#**	Zone ## verification
#	**#**	⌐	A manual–only switch was activated in input ##
#	**#**	**A**	An Abort switch was activated in input ##
#	**#**	**h**	A type 1 hold (h) was activated in input ##
#	**#**	**H**	A type 2 hold (H) was activated in input ##
#	**#**	**u**	Zone ## disabled
#	**#.**	**u**	Output ## disabled
r	**#**	**U**	Relay # is disabled

16.3 System Faults

	A	**C**	No input power – AC LED
	d	**–**	Open wire on Dialer output
	d	**u**	Dialer disabled
	d	**'**	Short wire on Dialer output

	H	**–**	Open wire on Horn output
	H	**u**	Horn output disabled
	H	**ʻ**	Short wire on Horn output
	V	**d**	24Vdc fault
	V	**r**	24Vdc (resettable) fault
#	**#**	**'**	Short wire on zone #
#	**#**	**–**	Open wire on zone #
#	**#**	**Ξ**	A pressostat input (Ξ) input was activated on input ##
#	**#.**	**'**	Short wire on programmable output #
#	**#.**	**–**	Open wire on programmable output #
#	**#.**	**|**	Over–current on output ##
2	**4**	**i**	Faulty 24V supply from the power supply
A	**#**	**'**	Annunciator # is disconnected
A	**#**	**A**	Annunciator # is connected, but is not configured
b	**t**	**–**	Disconnected battery
b	**t**	**L**	Low battery voltage
C	**#**	**–**	Expansion Module # is not connected
C	**#**	**c**	Expansion module # – configuration error
C	**#**	**E**	Expansion Module # is connected, but is not configured
C	**h**	**–**	Charger fault (disconnected)
C	**H**	**L**	Low charge
C	**h**	**ʻ**	Charger fault (short)
C	**o**	**d**	Checksum error – return the TSA–1000 to the manufacturer for repair
C	**P**	**r**	Hardware reset (CP 10 version only)
d	**A**	**t**	Checksum error on site–specific data. Return the control panel to the factory default configuration (see section 15.10.115.10 on page 67). Reconfigure the control panel, including input, outputs, and activation matrices.
d	**t**	**'**	FWRE output is shorted
d	**t**	**–**	FWRE output is open
E	**#.**	**A**	Extinguishing output # activated. **This display remains even after control panel reset to ensure replacement of extinguishing agent. To clear this status enter programming mode and return to normal after a few seconds.**

E	**E**	**P**	EPROM failure – return to manufacturer for repair
G	**F**	**–**	Ground fault – negative wire leakage
G	**F**	**┤**	Ground fault – positive wire leakage

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Note

Ground leakage faults may affect output fault display. Resolve the ground fault issues first.

16.4 Programming Faults

	#	**E**	Extra Device – a control panel exists in the network but is not defined as a Sub Panel
E	**r**	**r**	Wrong password
E	**0**	**1**	Expansion module configuration error
E	**0**	**2**	The expansion module that is installed is not the type that was configured
E	**2**	**0**	Zone definition error
E	**2**	**1**	Non-consecutive zone number (e.g., an expansion module was configured as zones 6 – 13 instead of 5 – 12)
E	**4**	**0**	An output was defined as neither an alarm nor a supervisory output
E	**4**	**1**	An extinguishing output was defined as a supervisory output
E	**4**	**2**	A supervisory output is defined without supervisory inputs
E	**4**	**3**	Output configuration error
E	**4**	**4**	Non-consecutive output number (e.g., an expansion module was configured as outputs 6 – 13 instead of 5 – 12)
E	**4**	**5**	A supervisory matrix configuration error: • A supervisory output matrix includes alarm or trouble inputs • A supervisory output has no supervisory inputs • An "And" (A) supervisory output has less than 2 inputs • An Or (b) supervisory output does not include any inputs
E	**4**	**6**	An alarm or extinguishing matrix configuration error: • An alarm output matrix includes supervisory or trouble inputs • An extinguishing output matrix includes trouble inputs • An alarm or extinguishing output has no alarm inputs • An "And" (A) alarm output has less than 2 inputs • An Or (b) alarm output does not include any alarm inputs

E	**6**	**0**	A relay was defined without defining output type
E	**6**	**1**	Non-consecutive relay number (e.g., an expansion module was configured as relays 5 – 7 instead of 4 – 6)
E	**6**	**2**	A relay was defined as a supervisory output, but no supervisory input was defined
E	**6**	**3**	Wrong definition of alarm relay
E	**6**	**4**	A supervisory relay is defined without supervisory inputs
E	**6**	**5**	A relay matrix is defined without inputs
n	**S**	**v**	**N**ot **S**a**v**ed – the programming modification was not saved to permanent memory

17 Commissioning

- Verify that ALL POWER SOURCES are disconnected.
- Verify that THE EXTINGUISHER IS DISCONNECTED (disconnect both wires to the extinguisher), connect a DUMMY load to the extinguisher output.
- Verify that all required interfaces are connected. Verify correct wiring.
- Verify presence and connection of required (ONLY) and correct EOL resistors.
- Connect mains and battery.
- Fix all faults
- When ALL faults are fixed and the ECD is in the quiescent state, configure and program the ECD as required.
- Update site specific data and date and time
- Change the level 2 and 3 passwords (Recommended).
- Verify that the POWER LED is ON with short OFF pulses
- Perform a full Field Test,
- Perform an activation test.
- Test and verify correct operation from detectors and from manual activation
- Verify that the ECD lock and switch keys are available and accessible to operators
- Attach the required documentation to or near the Control Panel
- Disconnect ALL power, Remove the dummy load, and connect the extinguisher to the extinguishing output or output lines.
- Connect mains and batteries.
- Fix all problems
- Verify that the ECD is in the quiescent state.

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Note

Do not access, probe, or touch the area near the AC input terminals when the CP is powered, to avoid electric shock.

17.1.1 Additional System Documentation

In different countries and according to some CP installation regulations, it is sometimes required to place a document containing condensed system information and operating instructions, on or near the CP.

Attach the condensed instructions document to the system's front panel, or frame it and place it in a prominent, highly visible position nearby.

It is recommended that the document shall at least contain the following;

- Actions to be taken upon events of alarm or fault by the operators
- A list of areas/zones as installed in the protected premises, and blank spaces for their details and description
- Text referring to The name, address and phone number of the service representative, and blank spaces to fill in the details after installation
- Text referring to the name, address and phone number of the Installing representative, and blank spaces to fill in the details after installation.

- Document issue number and date
- If the document is not attached to the CP front panel, a note at the bottom stating that it shall be framed and placed near the CP for ready reference.

A sample form is attached at the end of this manual.

18 Maintenance

No specific maintenance is required for the TSA1000.

Keep the TSA1000 clean and dry. If necessary, clean the outside of the enclosure with a slightly damp cloth.

The batteries should be tested and replaced according to the instructions of the battery's manufacturer.

If the batteries show any signs of swelling, leakage or corrosion, or the ECD indicates a battery fault, replace with a new set.

Maintenance routine:

Verify that the field wires are fully inserted into the TB, and no wires are broken.

Tighten the TBs, if necessary

Verify ECD is in the quiescent condition

19 Routine Testing

The TSA-1000 shall be tested weekly as specified in the next paragraph.

The system should be fully tested at least twice a year, or as required by national and/or local fire codes. All devices, system wiring and component functions should be tested and maintained. These inspections should be performed in addition to the routine maintenance activities such as cleaning the detectors (which should be performed in accordance with Telefire's instructions).

Perform a Field Test of each zone.

Maintenance and test actions shall be conducted by a company or service technician authorized by Telefire.

Records of all inspection and maintenance activities should be kept.

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Note

Testing shall be performed by authorized service personnel that are employed by authorized companies.

19.1 Weekly Inspection – To Be Performed by Site Personnel

The site's safety supervisor should inspect the control panel weekly and verify that all of the following conditions exist:

- The green LED is on and is not blinking
- None of the yellow or red LEDs are on or blinking
- The control panel's fault buzzer does not sound
- The digital display moves the figure **8** from left to right

Call your service representative if any of these conditions is not met

20 Certification

Telefire's TSA-1000 Conventional Multi-Zone Fire Alarm and Extinguishing Control Panel has the following approvals:

- EN 54-2 and EN 54-4 Certified
- SI 1220 Certified
- GOST 53325-2009 Certified
- CE Marked
- UL 864 edition 9 Compliant

TELEFIRE
FIRE & GAS DETECTORS

TSA-1000 Instructions for Immediate Action

Normal		**"Power"** LED is **ON** and the digital display scrolls a figure **8** from left to right.
Alarm	Condition	**"Alarm"** LEDs, internal buzzer and the Alarm Sounder are ON.
	Action	Take appropriate actions in accordance with the pertinent instructions at your site, and notify the relevant entities.
	Silencing	To silence the Alarm Sounder press ***"Silence/Resound"*** key.
Return to Normal Operation from Alarm		After taking the actions detailed above, restore the system to normal operation by pressing the "***Reset***" key.
Automatic Extinguishing		Extinguishing is performed automatically, without human intervention (Except for triggering by Manual Release). After the extinguishing pulse ends, the TSA-1000 enters the "Extinguishing Fault" state. Call the service representative listed below if the extinguishers were activated, to replenish the extinguishant, restore extinguishing capability and return to normal operation.
Fault	Condition	The General and specific "***Fault***" LEDs turns on, and the internal buzzer sounds.
	Action	Take appropriate actions in accordance with the pertinent instructions at your site. Resolving the fault will automatically restore the system to normal operating conditions.
	Silencing	To silence the internal buzzer press the "***Buzzer Off"*** key.

Please refer to the TSA-1000 Technical Manual for further details.

Zone	Description
1	
2	
3	
4	
5	
6	
7	
8	

Zone	Description
9	
10	
11	
12	
13	
14	
15	
16	

Service Representative Name:_____**Address:**_____
Phone_____ _____
Installing Representative: Name _____**Address:**_____ _____
Phone:_____ _____

This document shall be framed, details filled, and placed adjacent to the control unit