

FA-103 and FA-106

Fire Alarm Control Panels



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Introduction

The FA-106 is a supervised six-zone 24VDC Fire Alarm Control Panel. The FA-103 is a supervised three-zone 24VDC Fire Alarm Control Panel. The panels are ULC listed and meet all performance and operational requirements of ULC. The FA-106 provides the following features:

- Six Class B (Style B) detection (IDC) zones
- Two Class B (Style Y) signal zones (NACs), 1.25A max per zone, 2A max total
- DIP switch selectable NAC outputs such as Temporal or Steady
- Alarm and trouble relay contacts
- Remote trouble buzzer and indication with the use of an RTI-1 Remote Indicator
- Individual zone silence/disable switch
- Buzzer silence button
- Subsequent alarm operation
- LED indicators for zone alarm and trouble, A.C. Power On, Common Trouble, Ground Fault, Battery Fault, CPU Fault, Signal Silenced and Common Alarm.

The FA-103 has the same features as above except there are only three detection zones. The enclosures and boards are identical except the FA-103 is depopulated and has terminal connections for three detection zones only. Use of the reference “the panel” will apply to both models FA-106 and FA-103.

Models available are:

FA-103	Three detection zones, two NACs FACP with white door and black backbox.
FA-103R	Three detection zones, two NACs FACP with red door and black backbox.
FA-106	Six detection zones, two NACs FACP with white door and black backbox.
FA-106R	Six detection zones, two NACs FACP with red door and black backbox.

Mechanical Installation

The panel can be surface or flush mounted. Refer to Figure 1 on page 2 for dimensions.

Surface Mounting

1. Mark the location of the four mounting holes.
2. Install the top two screws into the wall and place the panel over the screws.
3. Install the bottom screws and tighten down all four screws.

Flush Mounting

1. Make the wall cut-out according to the panel dimensions.
2. Remove the control panel door.
3. Mount the flush mounting trim (model FA-102TR) to the back box using the screws and nuts provided with the flush mounting kit.
4. Re-install the door on top of the flush trim. The cam lock may require a minor adjustment in order to compensate for the flush trim.

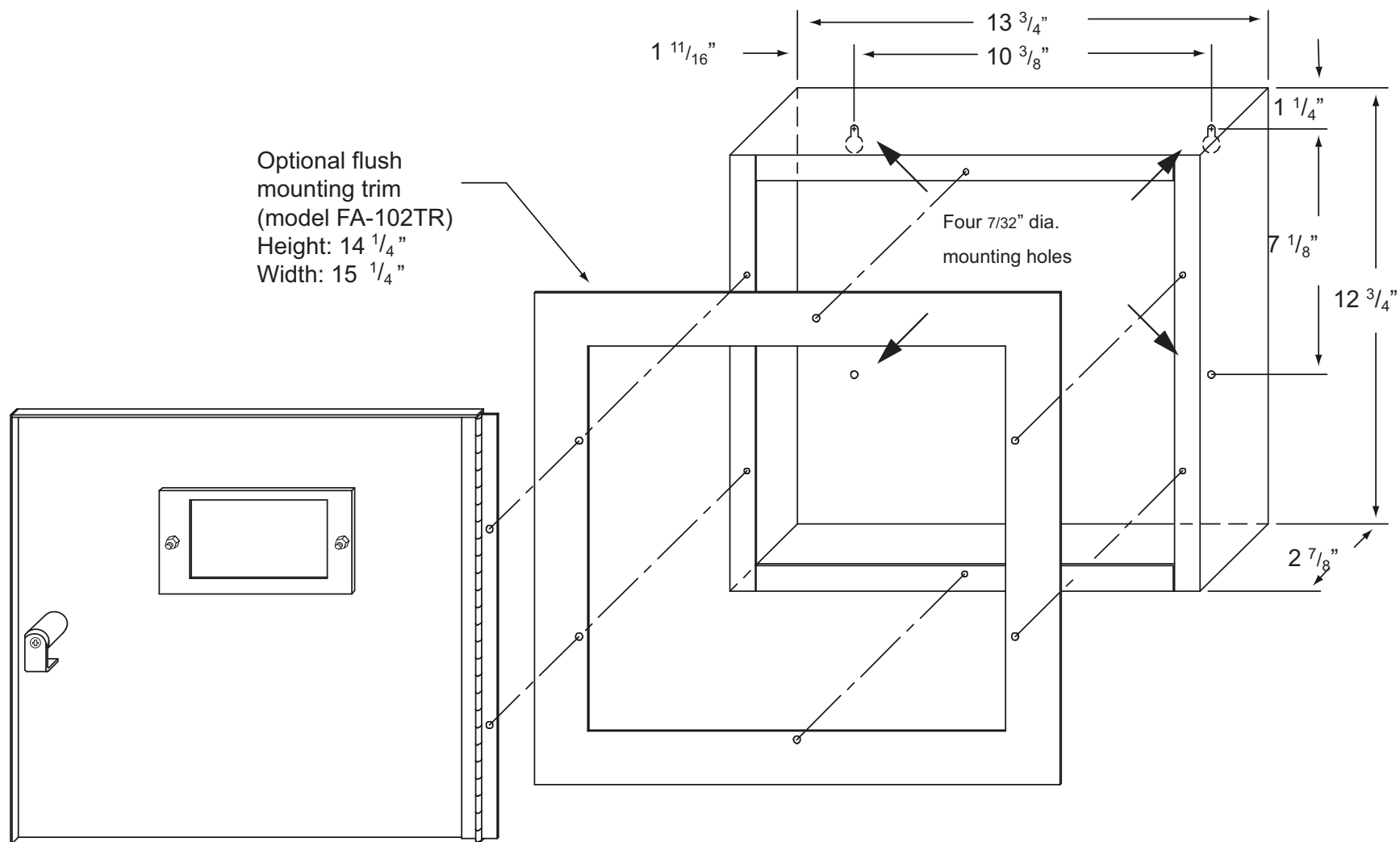
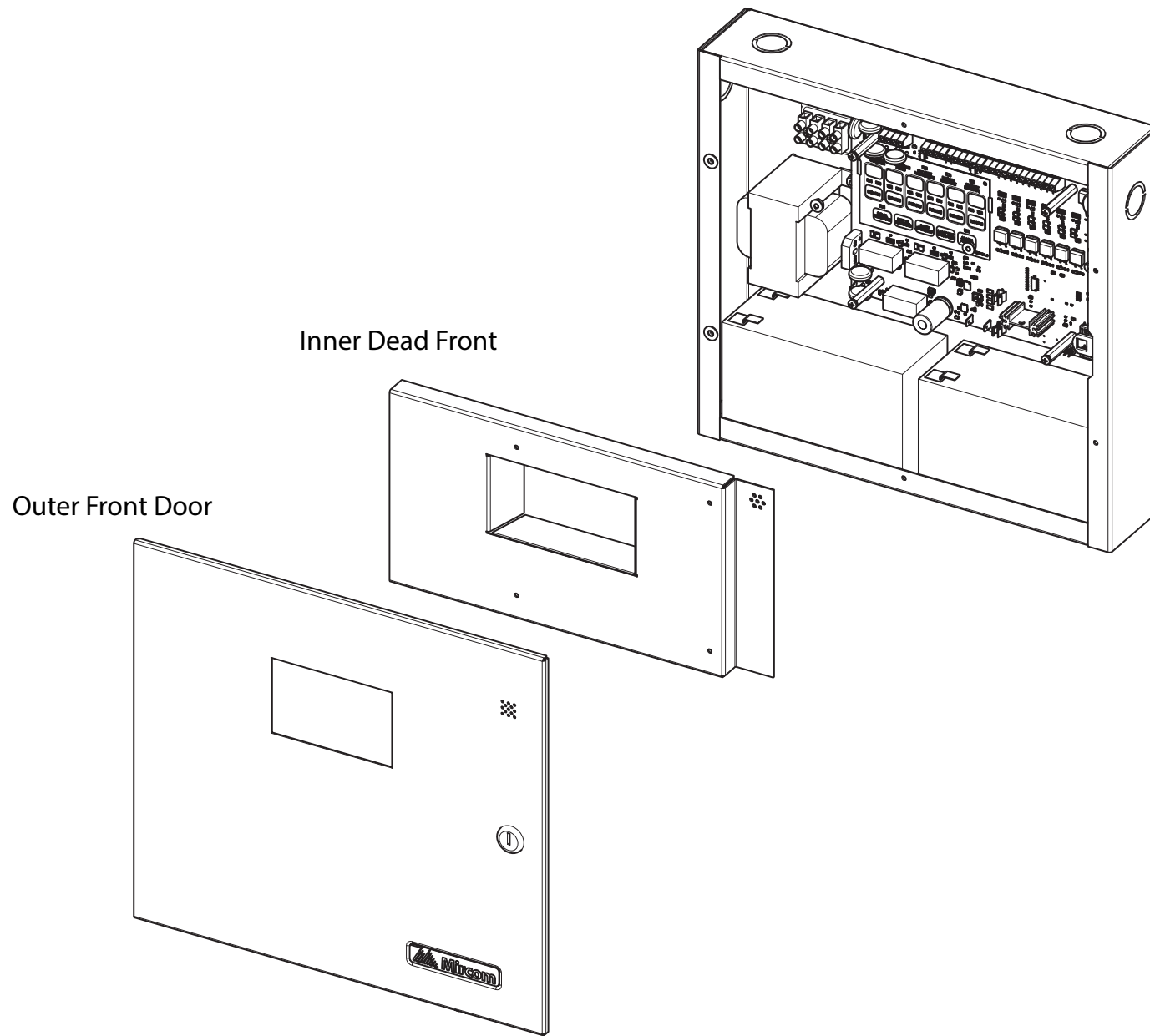
Figure 1: Backbox and flush trim mounting details

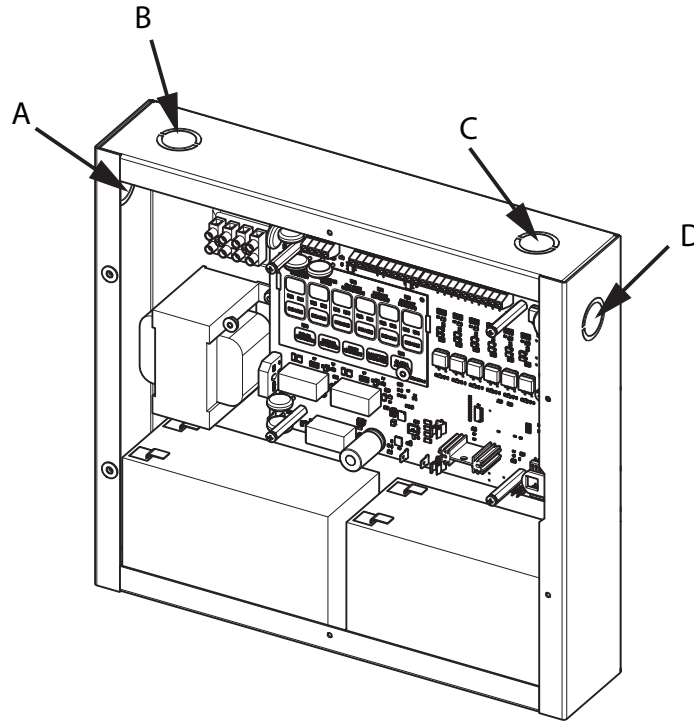
Figure 2: Assembly of FA-106 and FA-103 Fire Alarm Panels



Conduits for Wiring

AC power must be run through a dedicated conduit, in knockouts A or B, shown in Figure 3. All other circuits are current limited, and must be run through knockouts C or D.

Figure 3: Conduits for Wiring



Clearances

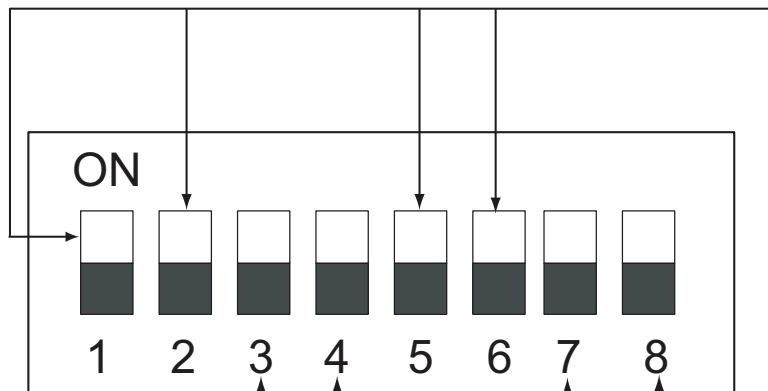
The controls shall be no less than 600 mm and no more than 1800 mm above the finished floor.

DIP SWITCH SELECTION

DIP switch SW12 is used to set the preferred signal zone outputs, the signal silence inhibit, the detection zone operation and auxiliary functions. DIP switch SW12 is located in the bottom right corner of the main printed circuit board, refer to Figure 6 on page 7.

Figure 4: Setting the DIP Switch functions

DIP switch SW12



Signal Silence

ON - 1 minute signal silence inhibit
OFF - normal signal silence (default)

Alarm Relay

ON- Disconnects the Alarm Relay; panel will remain in trouble with this switch in the ON position.

OFF- Alarm Relay always active during alarm (default)

1 NAC Zone 1

ON - Steady
OFF - temporal code (default)

2 NAC Zone 2

ON - Steady
OFF - temporal code (default)

5 Aux 24V

ON- Resettable
OFF - Always 24V

6 Enable Zone Disconnect

ON - Disable (disconnect) available per zone

OFF - Disable function not available (default)

DIP switch 7 and 8 are set as per input voltage used, see table below

- **Temporal Code:** 3 rounds of 0.5 second ON, 0.5 second OFF, then 1.5 second pause.
- **Steady:** Signal on continuously.

Set DIP SW12 switches 7 and 8 according to the input voltage which will be connected to the fire alarm panel.

Input Voltage	DIP SWITCH SW12-7	DIP SWITCH SW12-8
120V	OFF	OFF
240V	ON	OFF
220V	OFF	ON

Wiring

Detection (IDC) Zones

The system has six detection zones (three for the FA-103). Refer to Figure 7 on page 8 for wiring instruction and to Table 1 on page 9 for wire size.

Signal (NAC) Zones

There are two signal zones available for bells and horns providing 1.25A maximum per zone with 2A maximum total signal power. Refer to Figure 7 on page 8 for NAC circuit for wiring instruction and to Table 2 on page 9 for wire size.

Alarm and Trouble Relays

Alarm and trouble relay contacts are provided. Refer to Figure 8 on page 10 for contact location and designation.

Remote Annunciation

Annunciation outputs are provided for connection to an RTI-1 Remote Trouble indicator. Refer to Figure 8 on page 10 for wiring instruction.

A.C. Power and Batteries

The A.C. power is connected to the terminal block above the transformer.



Note: SET DIP SW12 SWITCHES 7 AND 8 ACCORDING TO INPUT VOLTAGE USED. SEE PAGE 5.

Use Gel Cell or Sealed Lead-Acid type of batteries only. Connect the batteries after power up. For greater accuracy, use the battery calculations chart located in Appendix C on page 16.

ELECTRICAL RATING: 120V, 60Hz, 1A / 240V, 50Hz, 0.5A

Figure 5: A.C. Power and Battery Connection

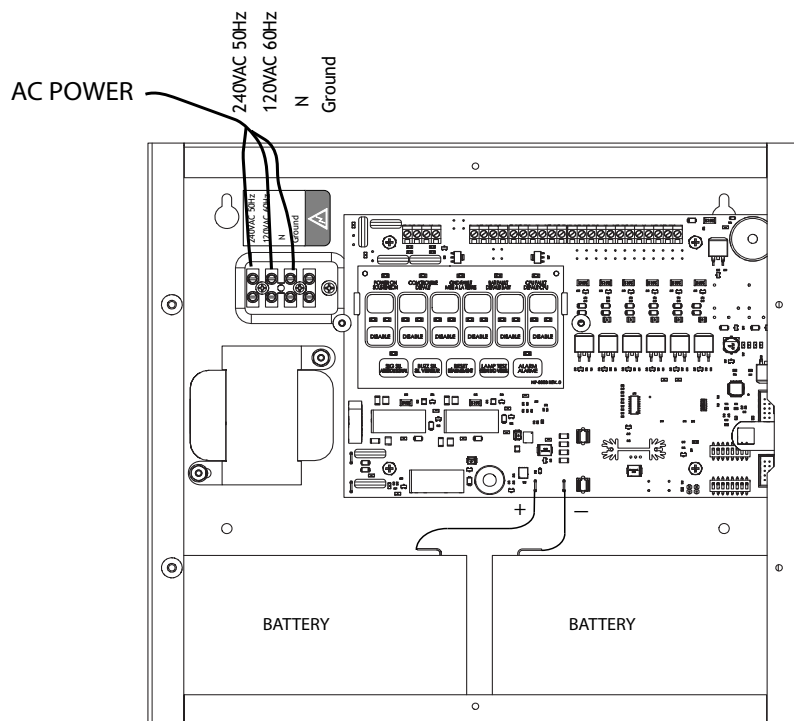


Figure 6: Circuit Board Layout

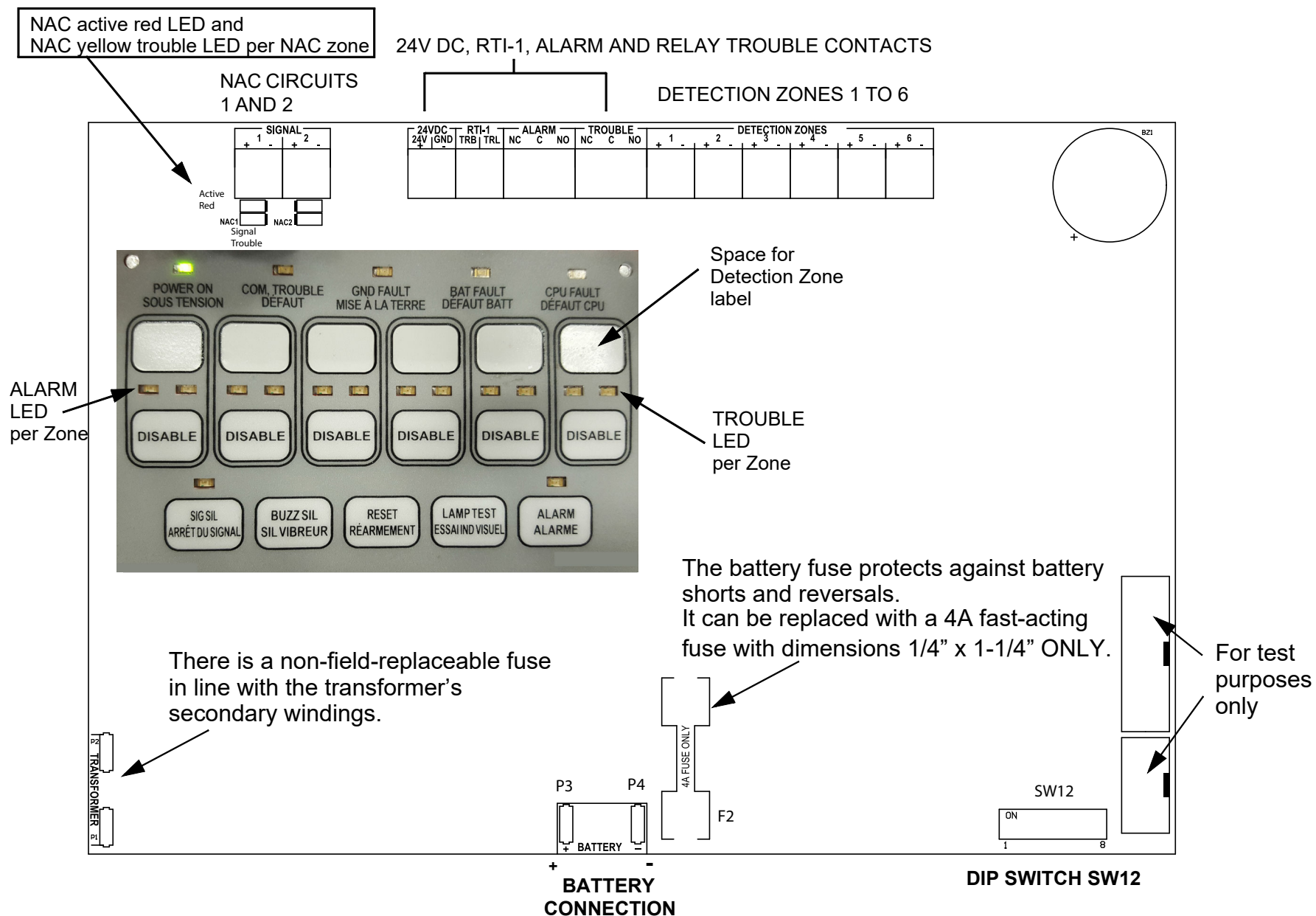
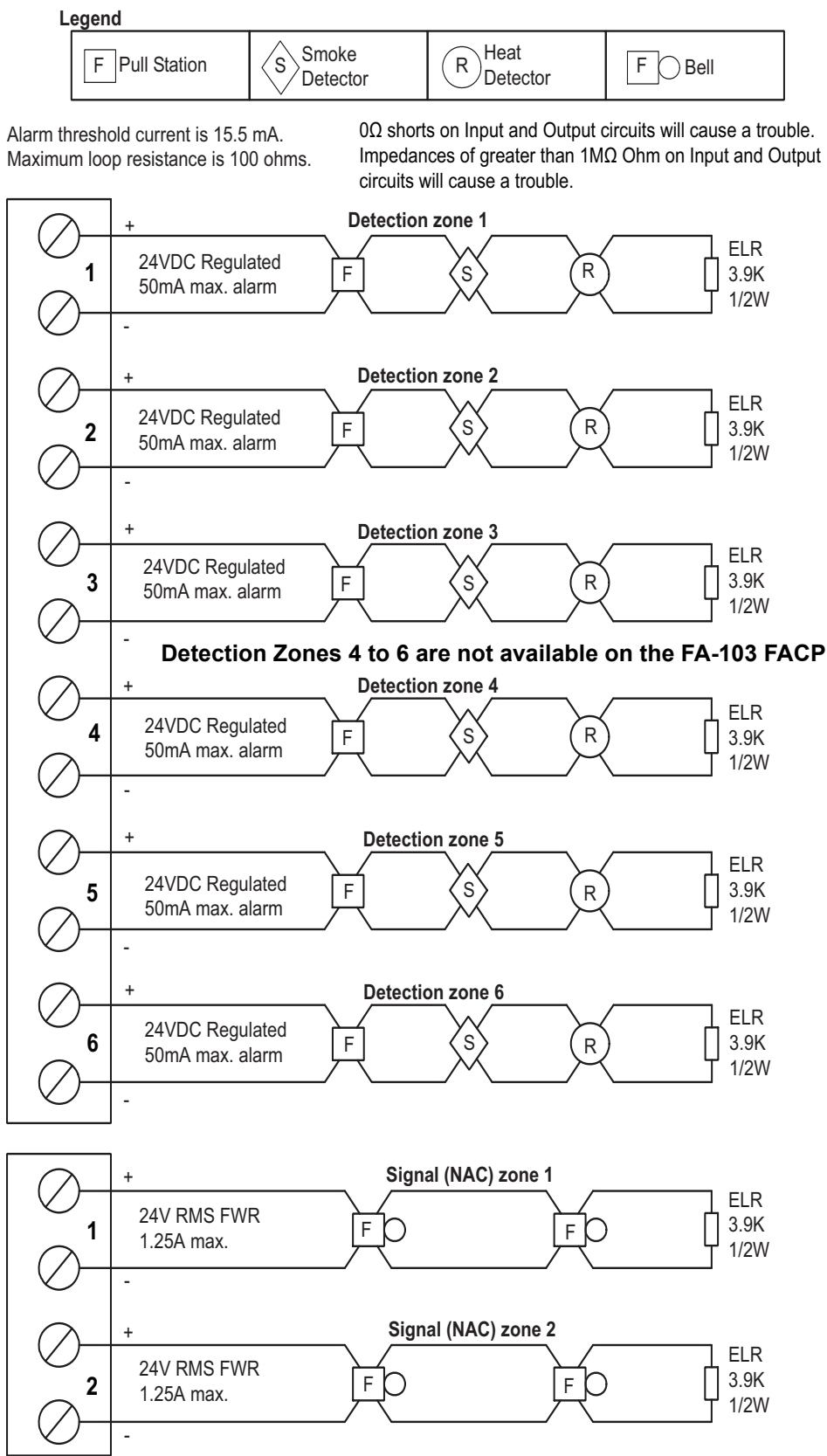


Figure 7: Detection and signal wiring

Note: Whether mixing different models of compatible smoke detectors or using the same model on the same initiating circuit, the total standby current of all detectors must not exceed 3mA.

Wiring Tables and Information



Note: The panel must be wired by a certified electrician in accordance with CEC part 1, section 32 “Fire alarm systems, fire pumps, and carbon monoxide alarms”.

Table 1: Wiring table for detection zone

Wire Gauge (AWG)	Maximum Wiring Run to Last Device (ELR)	
	ft.	m
18	7560	2300
16	12000	3600
14	19000	5800
12	30400	9200



Note: Maximum loop resistance should not exceed 100 ohms.

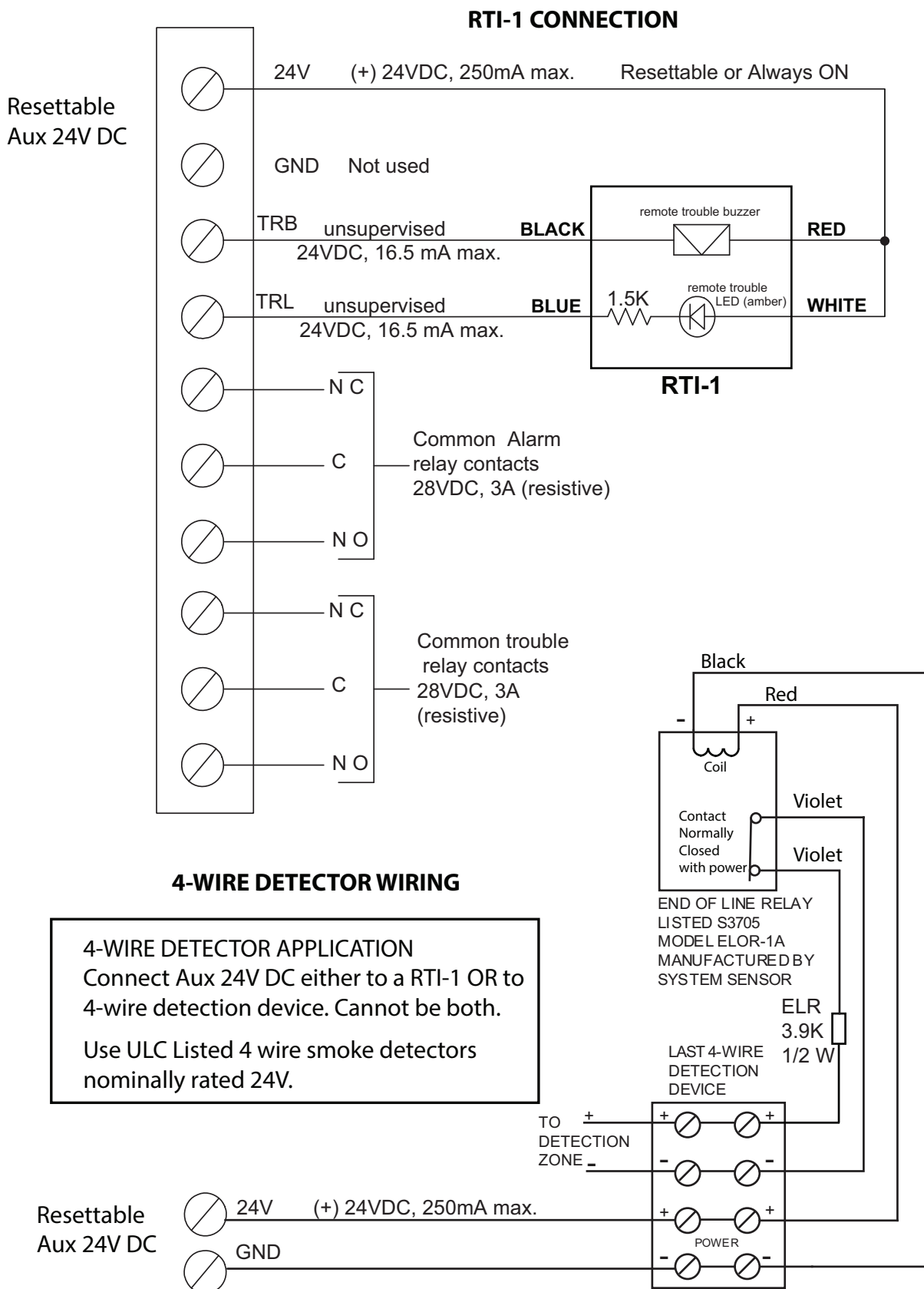
Table 2: Wiring table for bells and horns

Signal circuits are rated for 1.25 amperes each.

Total Signal Load	Maximum Wiring Run to Last Device (ELR)								Max Loop Resistance
	18AWG		16AWG		14AWG		12AWG		
Amperes	ft.	m	ft.	m	ft.	m	ft.	m	Ohms
0.06	2350	716	3750	1143	6000	1829	8500	2591	30
0.12	1180	360	1850	567	3000	915	4250	1296	15
0.30	470	143	750	229	1200	366	1900	579	6
0.60	235	71	375	114	600	183	850	259	3
0.90	156	47	250	76	400	122	570	174	2
1.25	109	33	171	52	277	84	450	137	1.4



Note: Maximum voltage drop should not exceed 1.8 volts.

Figure 8: Alarm and trouble relay contacts, remote annunciation and four-wire detector wiring instructions

Trouble Indicators and Controls

Common Trouble LED

The yellow Common Trouble LED will flash and the buzzer will sound for any trouble in the panel.

Buzzer/Buzzer Silence Pushbutton

The buzzer will sound intermittently for any trouble. The buzzer will sound steadily for any alarm in the system. Pushing the Buzzer Silence button will silence the buzzer. Any subsequent alarm will resound the buzzer.

Detection Zone Trouble LED

The yellow Detection Zone Trouble LED (on the right) will flash for an open or bypass in the zone wiring. Refer to Figure 9 below and Figure 6 on page 7 for the location of indicators and control.

Label the individual detections zones on the NP-3334 blank label. Once complete, slide across into the front display.

Ground Fault LED

Any ground fault of 1K ohms or less will flash the yellow Ground Fault LED, flash the yellow Common Trouble LED and sound the common trouble buzzer intermittently.

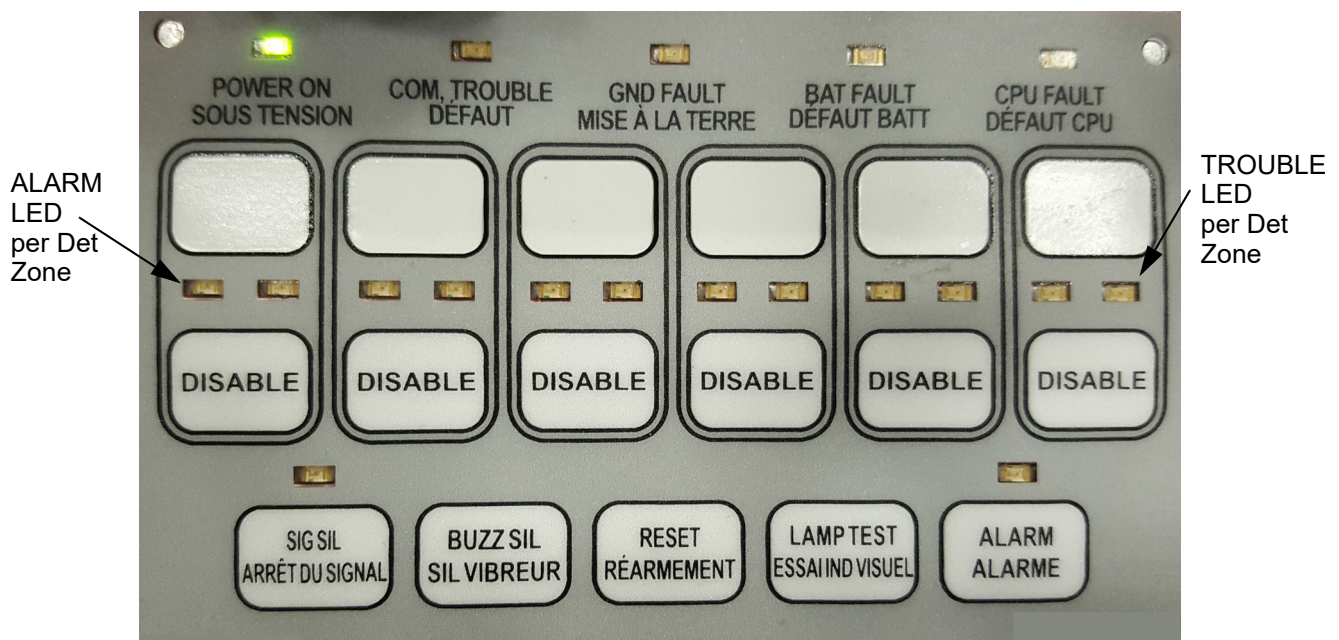
Battery Fault LED

Battery removal, low voltage and open battery leads will flash the yellow Battery Fault LED, the yellow Common Trouble LED and the common trouble buzzer will sound intermittently.

Detection Zone Disable

Pressing this button will disconnect the associated detection zone (if DIP switch SW12-6 is set in the ON position). This action will flash the yellow detection zone trouble LED and the yellow Common Trouble LED, activate the Common Alarm Relay and the buzzer will sound intermittently. Pressing the Disable button again will reconnect the detection zone. The Disable button will not function if the DIP switch SW12-6 is set in the OFF position.

Figure 9: Front Panel Display



Sequence of Operation

Refer to Figure 6 on page 7 for the location of indicators and controls.

Normal

All indicators are normally OFF except for the green Power On LED. If there is an AC fail, the green Power On LED will flash, the yellow Common Trouble LED will flash and the buzzer will sound.

Alarm

A red zone alarm LED will illuminate steadily for incoming alarm.

Signal silence (SIG SIL)

If the 1 minute signal silence inhibit is selected, the signals cannot be silenced for 60 seconds after an alarm initiation. Once the 60 seconds have expired, pushing the signal silence button will silence all the bells and horns. Once the signals has been silenced, the yellow signal silenced LED will flash and the yellow common trouble LED will flash.

Reset

Pushing the reset button will restore all latched functions in the panel. The Reset button will not function during the 1 minute signal silence inhibit time (if selected via DIP switch SW12-3). The Reset button will not affect the disabled zones (if used).

Lamp Test

Press this button and hold to illuminate all the LEDs. **NOTE:** The CPU FAIL LED will not illuminate during Lamp Test.

System Checkout

Before turning the power on,

1. Check all external wiring for opens, shorts or grounds.
2. Check that transformer cables are securely connected.
3. Check the A.C. power wiring for proper connection. To prevent sparking, *do not* connect batteries.
4. Check all DIP switches are set as required.

Power up and Troubleshooting

1. After completing all of the system checkout procedures, power up the panel. The Power On LED should illuminate. The trouble buzzer should sound intermittently, and the Common Trouble LED should flash, indicating battery fault.
2. Connect the batteries carefully, observing the correct polarity. The Common Trouble LED should extinguish. If the Common Trouble LED stays on, check the front panel for illumination of the following LEDs:
 - **Battery LED** indicates that the battery voltage may be too low (below 20.4V).
 - **Ground Fault LED** indicates a ground on one or more of the extended wires.
 - **Zone Trouble LED** indicates an open loop on the detection zone specified.
 - **Common Trouble LED** alone indicates a possible open loop or short in the signal zone. To determine which NAC zone, you may view which NAC 1 or 2 yellow trouble LEDs is flashing (the main board top left LEDs), see Figure 6 on page 7.

Appendix A: Electrical Specifications

FA-106 Six Zone and FA-103 Three Zone Fire Alarm Control Panels		
Electrical ratings	AC line voltage	120VAC 60Hz 1A / 240VAC 50Hz 0.5A, 4A fast blow fuse on secondary of transformer
	Power supply rating	3 Amp maximum (secondary of transformer)
Battery	Type	24VDC Gel Cell/Sealed lead acid – Models BAT-12V5 and BAT-12V7
	Charging compatibility	5AH to 7AH
	Protection	4A on board (F2) fast blow fuse
	Charging current	0.67A
	Standby current rating at full load	0.47A
Detection Circuits	6 supervised style Y (Class B) initiating circuits. Terminals are labelled as “Detection Zones 1, 2, 3, 4, 5, and 6”. Detection circuits are Compatibility ID “A” Standby: 9 mA Alarm: 1 zone active 95mA 2 zone active 136mA 3 zone active 177mA 4 zone active 218mA (Zones 4 to 6 not available on the FA-103) 5 zone active 259mA 6 zone active 300mA Maximum current of Aux Power and Detector Circuits cannot exceed 300mA Operating voltage range: 22 VDC - 25 VDC	
Signal (NAC) Circuits	2 supervised Class B (Style Y) indicating circuits. Terminals are labelled as “Signal 1 and 2”	
	Rating	24V FWR / 1.25A @ 49°C per circuit
	Max power allowed	Total 2.0A
Resettable (or Non-resettable) Auxiliary Power	24VDC, terminals are labelled as 24V and GND. 24VDC regulated / 250mA max	
Auxiliary relays	Common Alarm/Trouble Must be connected to a listed power limited source of supply Form C / 28VDC / 3A max	
RTI-1 Remote Trouble Indicator	Remote Trouble Buzzer and Indicator. Terminals are labelled as TRB and TRL. Standby 0 A / alarm 35mA	
Environmental	Indoor use and dry locations Temperature range from 0°C to 49°C, up to 93% relative humidity	

Appendix B: Compatible Devices

FA-106 and FA-103 Underwriters Laboratories Canada ULC Listed 2-Wire Smoke Detectors



Notes:

- Reset time, hold for five seconds minimum.
- Total standby current of all detectors must not exceed 3 mA.
- Two-wire smoke detectors can be mixed or matched with different models on the same Initiating Circuit as long as the total standby current of all detectors does not exceed 3mA.

Make Model / Base	Maximum # of devices per circuit	Make Model / Base	Maximum # of devices per circuit
Mircom		System Sensor i3	
MIR-525	30	C2W-BA c/w base	30
MIR-525T	30	C2WT-BA c/w base	30
Apollo		System Sensor	
Series 60A Bases 45681-200,-220,-232,-251		1400A	30
Series 65A Bases 45681-255,-256,-257,-258		2400A	25
55000-325	30	1451A/B401BA	25
55000-326	30	2451A/B401BA	25
55000-327	30	1100	25
55000-328	30	1151A/ B110LPA	25
Hochiki		1151A/ B116LPA	25
DCD-135/HSC-220R	12	1451A/B401A	25
DCD-135/NS6-220	12	1451A/ B406BA	25
DCD-190/HSC-220R	12	1451DH/ DH400	25
DCD-190/NS4-220	12	2100A	30
DCD-190/NS6-220	12	2100TA	30
SU-24/HSC-220R	12	2151A/ B110LPA	15
SU-24/NS4-220	7	2151A/ B116LPA	25
SU-24/NS6-220	7	2400THA	25
SLR-24/HSC-220R	12	2451A / B401BA	25
SLR-24/NS4-220	12	2451A / B406BA	25

Make Model / Base	Maximum # of devices per circuit	Make Model / Base	Maximum # of devices per circuit
SLR-24/NS6-220	12	2451A / DH400	25
MGC Systems Corp.		System Sensor (continued)	
SD-100-2WP/SDB-104-2, SDB-104-4, SDB-106-4	21	2451THA / B401BA	25
SD-100-2WT/SDB-104-2, SDB-104-4, SDB-106-4	21	2451THA / B406BA	25
Detection Systems Inc.		2451A / B401A	25
DS282TH	30	2451THA / B401A	25
Siemens		5451A / B401BA	25
HI121 / (DB-11/DB-11C)	20	5451A / B401A	25
OH121 / (DB-11/DB-11C)	20	5451A / B406BA	25
OP121 / (DB-11/DB-11C)	20		
Sentrol - ESL			
429CST	30		
429CRT	30		
713-6U / 701E, 701, 702E, 702	30		
721U / 702E, 702U	30		
721UT / 702E, 702	30		
722U / 702E, 702U	30		
731U / 702E, 702U, 702RE, 702RU	30		
732U / 702E, 702U, 702RE, 702RU	30		

Appendix C: Battery Calculations (Selection Guide)

Use the form below to determine the required batteries.

IMPORTANT NOTICE							
The main AC branch circuit connection for the Fire Alarm Control Unit must provide a dedicated continuous power without provision of any disconnect devices. Use #12 AWG wire with 600-volt insulation and proper over-current circuit protection that complies with the local codes.							
Power Requirements (All currents are in amperes)							
Model Number	Description	Qty		Standby	Total Standby	Alarm	Total Alarm
FA-106	Fire Alarm, 6 Det, 2 Sig		X	0.170	=	0.262	=
FA-103	Fire Alarm, 3 Det. 2 Sig		X	0.143	=	0.244	=
RTI-1	Remote Trouble Indicator		X	0.035	=	0.035	=
2-Wire Smoke Detectors			X	♦ 0.0001	=	* 0.090	= 0.090
4-Wire Smoke Detectors			X		=		=
Signal Load (bells, horns, strobes, and etc.)							=
Auxiliary Power Supply							
Total currents (Add above currents)				Standby	(A)	Alarm	(B)

Total Current Requirement

ALARM (B) _____ Amps.

Battery Capacity Requirement

([STANDBY (A) _____] x [(24 or 60 Hours) _____]) + ([ALARM (B) _____] x [♣ Alarm in Hr.] _____) = (C) _____ AH

Battery Selection

Multiply (C) by 1.20 to derate battery.



Note: Batteries BAT-12V5A (5 AH) and BAT-12V7A (7 AH) fit in the backbox; all larger batteries such as BAT-12V12A (12AH) and the BAT-12V18A (18AH) require an external battery box.

- * Assuming three initiating circuits in alarm.
- ♣ Use 0.084 for five minutes of alarm as a multiplier figure.
- ♦ Using the C2W-BA 2-wire smoke detector. See Appendix B, for other available smoke detectors.

Warranty and Warning Information

WARNING!

Please read this document **CAREFULLY**, as it contains important warnings, life-safety, and practical information about all products manufactured by the Mircom Group of Companies, including Mircom and Secutron branded products, which shall include without limitation all fire alarm, nurse call, building automation and access control and card access products (hereinafter individually or collectively, as applicable, referred to as “**Mircom System**”).

NOTE TO ALL READERS:

1. **Nature of Warnings.** The within warnings are communicated to the reader out of an abundance of caution and create no legal obligation for Mircom Group of Companies, whatsoever. Without limiting the generality of the foregoing, this document shall NOT be construed as in any way altering the rights and obligations of the parties, governed by the legal documents that apply in any given circumstance.
2. **Application.** The warnings contained in this document apply to all Mircom System and shall be read in conjunction with:
 - a. the product manual for the specific Mircom System that applies in given circumstances;
 - b. legal documents that apply to the purchase and sale of a Mircom System, which may include the company's standard terms and conditions and warranty statements;
 - c. other information about the Mircom System or the parties' rights and obligations as may be application to a given circumstance.
3. **Security and Insurance.** Regardless of its capabilities, no Mircom System is a substitute for property or life insurance. Nor is the system a substitute for property owners, renters, or other occupants to act prudently to prevent or minimize the harmful effects of an emergency situation. Building automation systems produced by the Mircom Group of Companies are not to be used as a fire, alarm, or life-safety system.

NOTE TO INSTALLERS:

All Mircom Systems have been carefully designed to be as effective as possible. However, there are circumstances where they may not provide protection. Some reasons for system failure include the following. As the only individual in contact with system users, please bring each item in this warning to the attention of the users of this Mircom System. Failure to properly inform system end-users of the circumstances in which the system might fail may result in over-reliance upon the system. As a result, it is imperative that you properly inform each customer for whom you install the system of the possible forms of failure:

4. **Inadequate Installation.** All Mircom Systems must be installed in accordance with all the applicable codes and standards in order to provide adequate protection. National standards require an inspection and approval to be conducted by the local authority having jurisdiction following the initial installation of the system and following any changes to the system. Such inspections ensure installation has been carried out properly.
5. **Inadequate Testing.** Most problems that would prevent an alarm a Mircom System from operating as intended can be discovered by regular testing and maintenance. The complete system should be tested by the local authority having jurisdiction immediately after a fire, storm, earthquake, accident, or any kind of construction activity inside or outside the premises. The

testing should include all sensing devices, keypads, consoles, alarm indicating devices and any other operational devices that are part of the system.

NOTE TO USERS:

All Mircom Systems have been carefully designed to be as effective as possible. However, there are circumstances where they may not provide protection. Some reasons for system failure include the following. The end user can minimize the occurrence of any of the following by proper training, testing and maintenance of the Mircom Systems:

6. **Inadequate Testing and Maintenance.** It is imperative that the systems be periodically tested and subjected to preventative maintenance. Best practices and local authority having jurisdiction determine the frequency and type of testing that is required at a minimum. Mircom System may not function properly, and the occurrence of other system failures identified below may not be minimized, if the periodic testing and maintenance of Mircom Systems is not completed with diligence and as required.
7. **Improper Operation.** It is important that all system users be trained in the correct operation of the alarm system and that they know how to respond when the system indicates an alarm. A Mircom System may not function as intended during an emergency situation where the user is unable to operate a panic or emergency switch by reason of permanent or temporary physical disability, inability to reach the device in time, unfamiliarity with the correct operation, or related circumstances.
8. **Insufficient Time.** There may be circumstances when a Mircom System will operate as intended, yet the occupants will not be protected from the emergency due to their inability to respond to the warnings in a timely manner. If the system is monitored, the response may not occur in time enough to protect the occupants or their belongings.
9. **Carelessness or Safety Hazards.** Moreover, smoke detectors may not provide timely warning of fires caused by carelessness or safety hazards such as smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits or children playing with matches or arson.
10. **Power Failure.** Some Mircom System components require adequate electrical power supply to operate. Examples include: smoke detectors, beacons, HVAC, and lighting controllers. If a device operates only by AC power, any interruption, however brief, will render that device inoperative while it does not have power. Power interruptions of any length are often accompanied by voltage fluctuations which may damage Mircom Systems or other electronic equipment. After a power interruption has occurred, immediately conduct a complete system test to ensure that the system operates as intended.
11. **Battery Failure.** If the Mircom System or any device connected to the system operates from batteries it is possible for the batteries to fail. Even if the batteries have not failed, they must be fully charged, in good condition, and installed correctly. Some Mircom Systems use replaceable batteries, which have a limited life-span. The expected battery life is variable and in part dependent on the device environment, usage and type. Ambient conditions such as high humidity, high or low temperatures, or large temperature fluctuations may reduce the expected battery life. Moreover, some Mircom Systems do not have a battery monitor that would alert the user in the event that the battery is nearing its end of life. Regular testing and replacements are vital for ensuring that the batteries function as expected, whether or not a device has a low-battery monitor.
12. **Physical Obstructions.** Motion sensors that are part of a Mircom System must be kept clear of any obstacles which impede the sensors' ability to detect movement. Signals being communicated by a Mircom System may not reach the receiver if an item (such as metal, water, or concrete) is placed on or near the radio path. Deliberate jamming or other inadvertent radio signal interference can also negatively affect system operation.

13. **Wireless Devices Placement Proximity.** Moreover all wireless devices must be a minimum and maximum distance away from large metal objects, such as refrigerators. You are required to consult the specific Mircom System manual and application guide for any maximum distances required between devices and suggested placement of wireless devices for optimal functioning.
14. **Failure to Trigger Sensors.** Moreover, Mircom Systems may fail to operate as intended if motion, heat, or smoke sensors are not triggered.
 - a. Sensors in a fire system may fail to be triggered when the fire is in a chimney, walls, roof, or on the other side of closed doors. Smoke and heat detectors may not detect smoke or heat from fires on another level of the residence or building. In this situation the control panel may not alert occupants of a fire.
 - b. Sensors in a nurse call system may fail to be triggered when movement is occurring outside of the motion sensors' range. For example, if movement is occurring on the other side of closed doors or on another level of the residence or building the motion detector may not be triggered. In this situation the central controller may not register an alarm signal.
15. **Interference with Audible Notification Appliances.** Audible notification appliances may be interfered with by other noise sources such as stereos, radios, televisions, air conditioners, appliances, or passing traffic. Audible notification appliances, however loud, may not be heard by a hearing-impaired person.
16. **Other Impairments.** Alarm notification appliances such as sirens, bells, horns, or strobes may not warn or waken a sleeping occupant if there is an intervening wall or door. It is less likely that the occupants will be alerted or awakened when notification appliances are located on a different level of the residence or premise.
17. **Software Malfunction.** Most Mircom Systems contain software. No warranties are provided as to the software components of any products or stand-alone software products within a Mircom System. For a full statement of the warranties and exclusions and limitations of liability please refer to the company's standard Terms and Conditions and Warranties.
18. **Telephone Lines Malfunction.** Telephone service can cause system failure where telephone lines are relied upon by a Mircom System. Alarms and information coming from a Mircom System may not be transmitted if a phone line is out of service or busy for a certain period of time. Alarms and information may not be transmitted where telephone lines have been compromised by criminal tampering, local construction, storms or earthquakes.
19. **Component Failure.** Although every effort has been made to make this Mircom System as reliable as possible, the system may fail to function as intended due to the failure of a component.
20. **Integrated Products.** Mircom System might not function as intended if it is connected to a non-Mircom product or to a Mircom product that is deemed non-compatible with a particular Mircom System. A list of compatible products can be requested and obtained.

Warranty

Purchase of all Mircom products is governed by:

<https://www.mircom.com/product-warranty>

<https://www.mircom.com/purchase-terms-and-conditions>

<https://www.mircom.com/software-license-terms-and-conditions>

