Fire Alarm & Emergency Communication System Limitations

While a life safety system may lower insurance rates, it is not a substitute for life and property insurance!

An automatic fire alarm system—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel (FACP) with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

An emergency communication system—typically made up of an automatic fire alarm system (as described above) and a life safety communication system that may include an autonomous control unit (ACU), local operating console (LOC), voice communication, and other various interoperable communication methods—can broadcast a mass notification message. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire or life safety event.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premises following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. This document can be found at http://www.systemsensor.com/appguides/. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or “smoke” from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, chimneys, even wet or humid areas may inhibit particle or smoke flow.
- Smoke particles may become “cold,” stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets, such as air conditioning vents.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of “smoke” present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectric sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, compromising its ability to report a fire.

Audible warning devices such as bells, horns, strobes, speakers and displays may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol, or medication. Please note that:

- An emergency communication system may take priority over a fire alarm system in the event of a life safety emergency.
- Voice messaging systems must be designed to meet intelligibility requirements as defined by NFPA, local codes, and Authorities Having Jurisdiction (AHJ).
- Language and instructional requirements must be clearly disseminated on any local displays.
- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond to or comprehend the meaning of the signal. Audible devices, such as horns and bells, can have different tonal patterns and frequencies. It is the property owner's responsibility to conduct fire drills and other training exercises to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A life safety system will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

Telephone lines needed to transmit alarm signals from a premises to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of life safety system malfunction is inadequate maintenance. To keep the entire life safety system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt, or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional life safety system installers only. Adequate written records of all inspections should be kept.
Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

**WARNING** - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until manuals are read and understood.

**CAUTION** - System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Re-acceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49°C/32-120°F and at a relative humidity 93% ± 2% RH (non-condensing) at 32°C ± 2°C (90°F ± 3°F). However, the useful life of the system’s standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15-27°C/60-80°F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interference, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, or printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation.

---

**FCC Warning**

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing devices pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when devices are operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his or her own expense.

**Canadian Requirements**

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n’émite pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

---

LiteSpeed™, Lite-Connect™, and SWIFT™ are trademarks; and Fire-Lite® Alarms is a registered trademark of Honeywell International Inc. Microsoft® and Windows® are registered trademarks of the Microsoft Corporation. The Chrome™ browser is a trademark of Google Inc.

©2015 by Honeywell International Inc. All rights reserved. Unauthorized use of this document is strictly prohibited.
Software Downloads

In order to supply the latest features and functionality in fire alarm and life safety technology to our customers, we make frequent upgrades to the embedded software in our products. To ensure that you are installing and programming the latest features, we strongly recommend that you download the most current version of software for each product prior to commissioning any system. Contact Technical Support with any questions about software and the appropriate version for a specific application.

Documentation Feedback

Your feedback helps us keep our documentation up-to-date and accurate. If you have any comments or suggestions about our online Help or printed manuals, you can email us.

Please include the following information:

- Product name and version number (if applicable)
- Printed manual or online Help
- Topic Title (for online Help)
- Page number (for printed manual)
- Brief description of content you think should be improved or corrected
- Your suggestion for how to correct/improve documentation

Send email messages to:

FireSystems.TechPubs@honeywell.com

Please note this email address is for documentation feedback only. If you have any technical issues, please contact Technical Services.
Table of Contents

Section 1: ECC-50DA Remote Amplifier .................................................................6
  1.1: Installation ....................................................................................................6
  1.1.1: Board Layout .........................................................................................6
  1.1.2: Mounting the Cabinet ...........................................................................7
  1.1.3: Wiring Specifications .............................................................................8
  1.1.4: Speaker Wiring.......................................................................................9
    Wiring Lengths .................................................................................................9
    Class B (Style Y) .............................................................................................9
    Class A (Style Z) ............................................................................................10
  1.1.5: Audio Riser Wiring ................................................................................10
  1.1.6: Data BUS Wiring ...................................................................................11
  1.1.7: Connecting AC Power .........................................................................12
  1.1.8: Backup Battery ....................................................................................13
  1.1.9: Calculating Current Draw and Standby Battery ...............................14

Section 2: ECC-125DA Remote Amplifier ............................................................16
  2.1: Installation ..................................................................................................16
    2.1.1: Board Layout .......................................................................................16
    2.1.2: Mounting the Cabinet .......................................................................17
    2.1.3: Wiring Specifications ........................................................................18
    2.1.4: Speaker Wiring ..................................................................................19
      Wiring Lengths ............................................................................................19
      Class B (Style Y) .......................................................................................19
      Class A (Style Z) ......................................................................................20
    2.1.5: Audio Riser Wiring ............................................................................21
    2.1.6: Data BUS Wiring ...............................................................................22
    2.1.7: Connecting AC Power ......................................................................23
    2.1.8: Backup Battery .................................................................................24
    2.1.9: Calculating Current Draw and Standby Battery .............................25
  2.1.8: Backup Battery ....................................................................................24

Section 3: ECC-50BDA Backup Remote Amplifier .............................................26
  3.1: UL 464 Low Frequency Sounders ...........................................................26
  3.2: Installation ................................................................................................26
    3.2.1: Board Layout .....................................................................................27
    3.2.2: Mounting the Cabinet ......................................................................28
    3.2.3: Installing the Optional ECC-50WBU ..............................................29
    3.2.4: Wiring Specifications ......................................................................30
    3.2.5: Speaker Wiring .................................................................................31
      Wiring Lengths .........................................................................................31
      Class B (Style Y) ....................................................................................31
      Class A (Style Z) ....................................................................................32
      Audio Riser Wiring ................................................................................32
    3.2.6: Data Bus Wiring ...............................................................................33
    3.2.7: Setting the ECC-50BDA Amplifier Mode .........................................34
    3.2.8: Test Switch Use ................................................................................34
      SW1 - AMPLIFIER A ................................................................................34
      SW2 - AMPLIFIER B ................................................................................34
    3.2.9: Connecting AC Power .....................................................................34
    3.2.10: Backup Battery for ECC-50BDA ..................................................35
    3.2.11: Calculating Current Draw and Standby Battery ..........................36

ECC-50/125DA Instruction Manual — P/N LS10027-000FL-E:D  5/21/2015
Section 1: ECC-50DA Remote Amplifier

1.1 Installation

This section provides information on how to install the ECC-50DA for use with the ECC-50/100 Emergency Command Center.

NOTE: The term ECC-50DA is used in this manual to refer to both the ECC-50DA (120 VAC version) and the ECC-50DAE (240 VAC version) amplifier unless specified.

SW2 on the ECC-50/100’s display board must be set to the UP position if any ECC-50DAs are installed in the system. Refer to the ECC-50/100 Instruction Manual, P/N LS10001-000FL-E, for more information. The ECC-50DA must also be enabled in user programming. 70 volt operation of the ECC-50DA is also set up in user programming. Refer to the programming section of the ECC-50/100 Instruction Manual, LS10001-000FL-E.

1.1.1 Board Layout

Figure 1.1 shows the location of terminals, dip switch, and circuit expander connection, used in the installation of the ECC-50DA.

![Figure 1.1 ECC-50DA Board Layout](ecc-50da.wmf)
1.1.2 Mounting the Cabinet

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. Note that knockouts are also located on the back of the cabinet. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

The cabinet can be surface or flush-mounted. For flush-mount installation of the cabinet, the hole for the enclosure should be 14.5” W x 24.75” H x 3.438” D (36.8cm W x 62.9cm H x 8.73cm D). Do not flush-mount in a wall designated as a fire break. The outside dimensions of the cabinet are 16” W x 26.25” H x 4.125” D (40.64cm W x 66.68cm H x 10.48cm D).

Follow these steps to properly mount the cabinet.

1. Mark and predrill holes for the top two backbox keyhole mounting bolts using the dimensions shown.
2. Install two upper fasteners in the wall with the screw heads protruding.
3. Using the upper 'keyholes', mount the backbox over the two screws.
4. Mark and drill the lower two holes.
5. Install the remaining fasteners and tighten all fasteners to complete backbox mounting.

![Figure 1.2 Cabinet Flush-Mount Dimensions and Mounting Hole Locations](image-url)
1.1.3 Wiring Specifications

To avoid induced noise (transfer of electrical energy from one wire to another), keep input wiring isolated from high-current output and power wiring. Avoid pulling one multiconductor cable for the entire panel. Power-limited, nonpower-limited, and audio circuit wiring must remain separated in the cabinet. Maintain at least 0.25” (6.35 mm) spacing. Power-limited, nonpower-limited, and audio circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. For the same reasons, wiring within the cabinet should be routed around the perimeter of the cabinet. It should not cross the printed circuit board where it could induce noise into the sensitive microelectronics or pick up unwanted RF noise from the high speed circuits.

High frequency noise, such as that produced by the inductive reactance of a speaker or bell, can also be reduced by running the wire through ferrite beads or by wrapping it around a ferrite toroid core. Figure 1.3 provides an example.

![Figure 1.3 Wire Routing Example for ECC-50DA](image)

Refer to the ECC-CE4 Installation Instructions, LS10002-000FL-E, for more information on mounting and wiring the CE4 Circuit Expander. The CE4 provides 4 additional speaker circuits.

Use a 1” spacer and wire clamps to ensure 0.25” spacing between power-limited and nonpower-limited wiring.

---

**Figure 1.3 Wire Routing Example for ECC-50DA**
1.1.4 Speaker Wiring

Each ECC-50DA supplies four NAC (Notification Appliance Circuit) for speaker connection. The speaker circuit can be supervised and wired Class B (Style Y) or Class A (Style Z). The speaker circuit is capable of 50 watts of power at 25 Vrms or 70.7 Vrms.

Wiring Lengths

<table>
<thead>
<tr>
<th>Number Of Speakers</th>
<th>Total Load</th>
<th>Wire Distance in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@1/2 W</td>
<td>18 AWG</td>
</tr>
<tr>
<td></td>
<td>@1 W</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>25Vrms 5W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 5W</td>
</tr>
<tr>
<td>20</td>
<td>10</td>
<td>25Vrms 10W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 10W</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>25Vrms 15W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 15W</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
<td>25Vrms 20W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 20W</td>
</tr>
<tr>
<td>50</td>
<td>26</td>
<td>25Vrms 26W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 26W</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>25Vrms 40W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 40W</td>
</tr>
<tr>
<td>100</td>
<td>50</td>
<td>25Vrms 50W</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70Vrms 50W</td>
</tr>
</tbody>
</table>

Table 1.1 Wire Lengths

NOTE: The above table assumes a uniform distribution of the speakers, and that a max of 20% voltage drop on the last speaker is allowed.

Class B (Style Y)

Figure 1.4 illustrates how to wire speakers to the ECC-50/100 using Class B (Style Y) supervision.

Figure 1.4 Class B (Style Y) Speaker Configuration
Class A (Style Z)

Figure 1.5 illustrates how to wire speakers to the ECC-50/100 using Class A (Style Z) wiring.

1.1.5 Audio Riser Wiring

The Audio Riser is an analog voice bus that carries the recorded voice messages from the display board to the ECC-50DAs, or the voice messages generated from a system microphone to the ECC-50DAs. The maximum resistance on the Audio Riser is 20Ω.

Connect the Audio Riser from TB22 on the ECC-50/100 main control board to the ECC-50DAs as shown in Figure 1.6.
1.1.6 Data BUS Wiring

This section contains information on how to connect ECC-50DAs (up to 8) onto the main control Data BUS. Refer to the ECC-50/100 and/or FACP Manual for Data BUS specifications. Wire the Data BUS from TB12 on the main control board to the ECC-50DA shown in Figure 1.7 or Figure 1.8.

**Figure 1.7 Data BUS Connections of the ECC-50DA**

**Figure 1.8 Connecting Multiple ECC-50DAs to the Data BUS**
1.1.7 Connecting AC Power

To install the AC transformer into the ECC-50DA cabinet, follow these steps:

1. Open the cabinet door.
2. To access cabinet interior, open the dress panel by removing the upper screw and the mid-door retaining screw.
3. Mount the transformer onto the threaded cabinet transformer mounting studs using the supplied locking hex nuts as shown in Figure 1.9.

<table>
<thead>
<tr>
<th>Module</th>
<th>Voltage</th>
<th>Transformer P/N</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50DA 25V</td>
<td>120 VAC, 60 Hz</td>
<td>115061</td>
<td>350 mA</td>
<td>1100 mA</td>
</tr>
<tr>
<td>ECC-50DAE 25V</td>
<td>230 VAC, 50 Hz</td>
<td>115031</td>
<td>200 mA</td>
<td>600 mA</td>
</tr>
<tr>
<td>ECC-50DA 70V</td>
<td>120 VAC, 60 Hz</td>
<td>115061</td>
<td>350 mA</td>
<td>1200 mA</td>
</tr>
<tr>
<td>ECC-50DAE 70V</td>
<td>230 VAC, 50 Hz</td>
<td>115031</td>
<td>200 mA</td>
<td>600 mA</td>
</tr>
</tbody>
</table>

Table 1.2 ECC-50DA AC Current Draw

Figure 1.9 Transformer Mounting
4. Connect AC power to the transformer, making sure to properly ground the unit. Then, plug the transformer output to the AC connector on the control panel. See Figure 1.10 below.

1.1.8 Backup Battery

The following steps explain how to connect the batteries (refer to Figure 1.11):

1. Connect the black wire of the battery harness to the negative (−) side of battery #2.
2. Connect the jumper wire provided from the positive (+) side of battery #2 to the negative side (−) of battery #1.
3. Connect the red wire from the battery harness to the positive (+) side of battery #1.

![Figure 1.11 Battery Connections to the ECC-50DA](image)

Note: Batteries have been rotated to show the top sides for illustration purposes only.

### 1.1.9 Calculating Current Draw and Standby Battery

This section helps determine the current draw and standby battery needs for your installation (18 Ampere Hours max. will fit in cabinet). Complete the remaining instructions in Table 1.3.

For batteries larger than 18 AH, use the BB-26 or BB-55F Battery Box. A maximum of 33 Ampere Hours is allowed per system.

<table>
<thead>
<tr>
<th>Device</th>
<th>No. of Devices</th>
<th>Current Per Device</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50DA (25V system)</td>
<td>1</td>
<td>Standby: 85 mA</td>
<td>85 mA</td>
<td>525 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 525 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECC-50DA (70.7V system)</td>
<td>1</td>
<td>Standby: 100 mA</td>
<td>100 mA</td>
<td>580 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 580 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECC-CE4</td>
<td>0 or 1</td>
<td>Standby: 20 mA</td>
<td>20 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm (All Channels): 180 mA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A Current Subtotals: mA mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Current Subtotals: mA mA</td>
</tr>
<tr>
<td>C Total current rating of all devices in system (Line B) X .001</td>
</tr>
<tr>
<td>D Number of standby hours (24 or 60 for NFPA 72)</td>
</tr>
<tr>
<td>E Multiply line C (standby current) and D: Total standby AH</td>
</tr>
<tr>
<td>F Alarm sounding period in hours (For example, 5 minutes = .0833 hours):</td>
</tr>
<tr>
<td>G Multiply line C (alarm current) and F: Total alarm AH</td>
</tr>
<tr>
<td>H Add lines E and G (AH = Ampere Hours): Total AH required</td>
</tr>
</tbody>
</table>

Table 1.3 Current Draw Calculations
Section 2: ECC-125DA Remote Amplifier

2.1 Installation

This section provides information on how to install the ECC-125DA for use with the ECC-50/100 Emergency Command Center.

NOTE: The term ECC-125DA is used in this manual to refer to both the ECC-125DA (120 VAC version) and the ECC-125DAE (240 VAC version) amplifier unless specified.

SW2 on the ECC-50/100’s display board must be set to the UP position if any ECC-125DAs are installed in the system. Refer to the ECC-50/100 Instruction Manual for more information. The ECC-125DA must also be enabled in user programming. Refer to the programming section of the ECC-50/100 Instruction Manual, LS10001-000FL-E.

2.1.1 Board Layout

Figure 2.1 shows the location of terminals, dipswitches, and expander connection, used in the installation of the ECC-125DA.

![Figure 2.1 Components Layout of ECC-125DA](ecc-125da.wmf)
2.1.2 Mounting the Cabinet

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. Note that knockouts are also located on the back of the cabinet. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

The cabinet can be surface or flush-mounted. For flush-mount installation of the cabinet, the hole for the enclosure should be 14.5" W x 24.75" H x 3.438" D (36.8cm W x 62.9cm H x 8.73cm D). Do not flush-mount in a wall designated as a fire break. The outside dimensions of the cabinet are 16" W x 26.25" H x 4.125" D (40.64cm W x 66.68cm H x 10.48cm D).

Follow these steps to properly mount the cabinet.

1. Mark and predrill holes for the top two backbox keyhole mounting bolts using the dimensions shown.
2. Install two upper fasteners in the wall with the screw heads protruding.
3. Using the upper 'keyholes', mount the backbox over the two screws.
4. Mark and drill the lower two holes.
5. Install the remaining fasteners and tighten all fasteners to complete backbox mounting.

![Figure 2.2 Cabinet Flush-Mount Dimensions and Mounting Hole Locations](image-url)
2.1.3 Wiring Specifications

To avoid induced noise (transfer of electrical energy from one wire to another), keep input wiring isolated from high-current output and power wiring. Avoid pulling one multiconductor cable for the entire panel. Power-limited, non-power-limited, and audio circuit wiring must remain separated in the cabinet. Maintain at least 0.25” (6.35 mm) spacing. Power-limited, non-power-limited, and audio circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. For the same reasons, wiring within the cabinet should be routed around the perimeter of the cabinet. It should not cross the printed circuit board where it could induce noise into the sensitive microelectronics or pick up unwanted RF noise from the high speed circuits.

High frequency noise, such as that produced by the inductive reactance of a speaker or bell, can also be reduced by running the wire through ferrite beads or by wrapping it around a ferrite toroid core. Figure 2.3 provides an example.

Refer to the ECC-CE4 Installation Instructions, LS10002-000FL-E, for more information on mounting and wiring the CE4 Circuit Expander. The CE4 provides 4 additional speaker circuits.
2.1.4 Speaker Wiring

Each ECC-125DA supplies four NAC (Notification Appliance Circuit) for speaker connection. The speaker circuit can be supervised and wired Class B (Style Y) or Class A (Style Z). Speaker circuit 1 is capable of 100 watts of power at 25 Vrms. Speaker circuit 2-4 are capable of 50 watts (each) at 25 Vrms.

Wiring Lengths

<table>
<thead>
<tr>
<th>Number Of Speakers</th>
<th>Total Load</th>
<th>Wire Distance in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>@1/2 W @1 W</td>
<td>@1 W</td>
<td>18 AWG</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>@1/2 W</td>
<td>@1 W</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td>25Vrms</td>
</tr>
<tr>
<td>20</td>
<td>10</td>
<td>25Vrms</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>25Vrms</td>
</tr>
<tr>
<td>40</td>
<td>20</td>
<td>25Vrms</td>
</tr>
<tr>
<td>52</td>
<td>26</td>
<td>25Vrms</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>25Vrms</td>
</tr>
<tr>
<td>100</td>
<td>50</td>
<td>25Vrms</td>
</tr>
<tr>
<td>150</td>
<td>75</td>
<td>25Vrms</td>
</tr>
<tr>
<td>200</td>
<td>100</td>
<td>25Vrms</td>
</tr>
<tr>
<td>250</td>
<td>125</td>
<td>25Vrms</td>
</tr>
</tbody>
</table>

NOTE: The above table assumes a uniform distribution of the speakers, and that a max of 20% voltage drop on the last speaker is allowed.

Class B (Style Y)

Figure 2.4 illustrates how to wire speakers to the control panel using Class B (Style Y) supervision.

![Figure 2.4 Class B (Style Y) Speaker Configuration](image)
Class A (Style Z)

Figure 2.5 illustrates how to wire speakers to the control panel using Class A (Style Z) wiring.

Figure 2.5 Class A (Style Z) Speaker Configuration
2.1.5 Audio Riser Wiring

The Audio Riser is an analog voice bus that carries the recorded voice messages from the display board to the ECC-125DAs, or the voice messages generated from a system microphone to the ECC-125DAs. The maximum resistance on the Audio Riser is $20\,\Omega$.

Connect the Audio Riser from TB22 on the main control board to the ECC-125DAs as shown in Figure 2.6.
2.1.6 Data BUS Wiring

This section contains information on how to connect ECC-125DAs (up to 8) onto the main control Data BUS. Refer to the ECC-50/100 Manual for Data BUS specifications. Wire the Data BUS from TB12 on the main control board to the ECC-125DA as shown in Figure 2.7 or Figure 2.8.

![Figure 2.7 Data BUS Connections of the ECC-125DA](ECC-125DA_datawire.wmf)

![Figure 2.8 Connecting Multiple ECC-125DAs to the Data BUS](ECC-125DA_multidata.wmf)
2.1.7 Connecting AC Power

At installation, connect the AC terminals to the power source as shown in Figure 2.10. It may be necessary for a professional electrician to make this connection.

<table>
<thead>
<tr>
<th>Module</th>
<th>Voltage</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-125DA</td>
<td>120 VAC, 60 Hz</td>
<td>300 mA</td>
<td>2200 mA</td>
</tr>
<tr>
<td>ECC-125DAE</td>
<td>240 VAC, 50 Hz</td>
<td>250 mA</td>
<td>1250 mA</td>
</tr>
</tbody>
</table>

Figure 2.9 ECC-125DA AC Current Draw

Figure 2.10 AC Connection
2.1.8 Backup Battery

The following steps explain how to connect the batteries (refer to Figure 2.11):

1. Connect the black wire of the battery harness to the (-) side of the battery #2.
2. Connect the jumper wire provided from the positive (+) side of battery #2 to the negative side of battery #1.
3. Connect the red wire from the battery harness to the positive (+) side of battery #1.

![Figure 2.11 Battery Connection to ECC-125DA](image)

Note: Batteries have been rotated to show the tops for illustration purposes only.
### 2.1.9 Calculating Current Draw and Standby Battery

This section helps determine the current draw and standby battery needs for your installation (18 Ampere Hours maximum will fit in cabinet). Complete the remaining instructions in Table 2.2.

For batteries larger than 18 AH, use the BB-26 or BB-55FBattery Box. A maximum of 35 Ampere Hours is allowed per system.

<table>
<thead>
<tr>
<th>Device</th>
<th>No. of Devices</th>
<th>Current Per Device</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-125DA</td>
<td>1</td>
<td>Standby: 375 mA</td>
<td>375 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 700 mA</td>
<td>700 mA</td>
<td></td>
</tr>
<tr>
<td>ECC-CE4</td>
<td>0 or 1</td>
<td>Standby: 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm (All Channels): 180 mA</td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

**Current Subtotals:**

<table>
<thead>
<tr>
<th>Notification Devices</th>
<th>Refer to device manual for number of devices and current ratings.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Current Subtotals:</th>
<th>mA</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Total current rating of all devices in system (Line B) X .001</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>D</td>
<td>Number of standby hours (24 or 60 for NFPA 72)</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Multiply line C (standby current) and D:</td>
<td>Total standby AH</td>
<td>AH</td>
</tr>
<tr>
<td>F</td>
<td>Alarm sounding period in hours (For example, 5 minutes = .0833 hours):</td>
<td></td>
<td>H</td>
</tr>
<tr>
<td>G</td>
<td>Multiply line C (alarm current) and F:</td>
<td>Total alarm AH</td>
<td>AH</td>
</tr>
<tr>
<td>H</td>
<td>Add lines E and G (AH = Ampere Hours):</td>
<td>Total AH required</td>
<td>AH</td>
</tr>
</tbody>
</table>

Table 2.2 Current Draw Calculations
Section 3: ECC-50BDA Backup Remote Amplifier

3.1 UL 464 Low Frequency Sounders

This product complies with the requirements for a low frequency sounner (520Hz) as specified in UL 464 when used as part of a system with the following items.

**Amplifiers:**

<table>
<thead>
<tr>
<th>Amplifier/Audio Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50/100</td>
<td>Main console</td>
</tr>
<tr>
<td>ECC-50/100 with ECC-50W-25V</td>
<td>Main console with optional second 25V amplifier installed</td>
</tr>
<tr>
<td>ECC-50/100 with ECC-XRM-70V</td>
<td>Main console with 70V transformer installed</td>
</tr>
<tr>
<td>ECC-50/100 with ECC-XRM-70V and ECC-50W-70V</td>
<td>Main console with 70V transformer and optional second 70V amplifier installed</td>
</tr>
<tr>
<td>ECC-50/100 with ECC-50BDA</td>
<td>Main console with 50/100 watt remote amplifier (with or without internal options listed above), 25V or 70V</td>
</tr>
<tr>
<td>ECC-50/100 with ECC-50BDA and ECC-50WBU</td>
<td>Main console with 50/100 watt remote amplifier and optional backup amplifier (with or without internal options listed above), 25V or 70V</td>
</tr>
</tbody>
</table>

**Audio File:**

The 520 Hz audio file is available for download at Firelite.com.

**Speakers:**

For a complete list of speakers that can be used in an Emergency Command Center system with the above specifications, refer to the current version of the Device Compatibility document, p/n 15384.

3.2 Installation

This section provides information on how to install the ECC-50BDA for use with the ECC-50/100 Emergency Command Center.

**NOTE:** The term ECC-50BDA is used in this manual to refer to both the ECC-50BDA (120 VAC version) and the ECC-50BDAE (240 VAC version) amplifier unless specified.

SW2 on the ECC-50/100’s display board must be set to the UP position if any ECC-50BDAs are installed in the system. Refer to the *ECC-50/100 Instruction Manual*, P/N LS10001-000FL-E, for more information. The ECC-50BDA must also be enabled in user programming. 70 volt operation of the ECC-50BDA is also set up in user programming. Refer to the programming section of the *ECC-50/100 Instruction Manual*, LS10001-000FL-E.
### 3.2.1 Board Layout

Figure 3.1 shows the location of terminals, dip switch, and circuit expander connection, used in the installation of the ECC-50BDA.

![ECC-50BDA Board Layout](image-url)
3.2.2 Mounting the Cabinet

Carefully unpack the system and check for shipping damage. Mount the cabinet in a clean, dry, vibration-free area where extreme temperatures are not encountered. The area should be readily accessible with sufficient room to easily install and maintain the panel. Locate the top of the cabinet approximately five feet above the floor with the hinge mounting on the left. Determine the number of conductors required for the devices to be installed. Sufficient knockouts are provided for wiring convenience. Select the appropriate knockout(s) and pull the required conductors into the box. Note that knockouts are also located on the back of the cabinet. All wiring should be in accordance with the National and/or Local codes for fire alarm systems.

The cabinet can be surface or flush-mounted. For flush-mount installation of the cabinet, the hole for the enclosure should be 14.5\" W x 24.75\" H x 3.438\" D (36.8cm W x 62.9cm H x 8.73cm D). Do not flush-mount in a wall designated as a fire break. The outside dimensions of the cabinet are 16\" W x 26.25\" H x 4.125\" D (40.64cm W x 66.68cm H x 10.48cm D).

Follow these steps to properly mount the cabinet.

1. Mark and predrill holes for the top two backbox keyhole mounting bolts using the dimensions shown.
2. Install two upper fasteners in the wall with the screw heads protruding.
3. Using the upper 'keyholes', mount the backbox over the two screws.
4. Mark and drill the lower two holes.
5. Install the remaining fasteners and tighten all fasteners to complete backbox mounting.

![Figure 3.2  Cabinet Flush-Mount Dimensions and Mounting Hole Locations](image-url)
3.2.3 Installing the Optional ECC-50WBU

The ECC-50WBU provides backup capability when the ECC-50BDA is set for the 100 watt mode with backup.

The ECC-50WBU mounts onto the ECC-50BDA board with the standoffs provided. Figure 3.3 shows the location of the ECC-50WBU on the ECC-50BDA board.

To install the ECC-50WBU,
1. Make sure that all power supplied to the ECC-50BDA has been removed.
2. Insert the supplied M/F standoffs in the locations shown below.
3. Connect the backup amplifier cable harness (P/N 50116775-001) to the connector labeled “Backup Amplifier” on the ECC-50BDA.
4. Lay the ECC-50WBU over the standoffs installed in step 2 and secure with supplied screws.
5. Connect the other end of the cable harness to the header on the ECC-50WBU.

**Figure 3.3 Installing the ECC-50WBU onto the ECC-50BDA**
3.2.4 Wiring Specifications

To avoid induced noise (transfer of electrical energy from one wire to another), keep input wiring isolated from high-current output and power wiring. Avoid pulling one multiconductor cable for the entire panel. Power-limited, nonpower-limited, and audio circuit wiring must remain separated in the cabinet. Maintain at least 0.25” (6.35 mm) spacing. Power-limited, nonpower-limited, and audio circuit wiring must enter and exit the cabinet through different knockouts and/or conduits. For the same reasons, wiring within the cabinet should be routed around the perimeter of the cabinet. It should not cross the printed circuit board where it could induce noise into the sensitive microelectronics or pick up unwanted RF noise from the high speed circuits.

High frequency noise, such as that produced by the inductive reactance of a speaker or bell, can also be reduced by running the wire through ferrite beads or by wrapping it around a ferrite toroid core. Figure 3.4 provides an example.

![Figure 3.4 Wire Routing Example for ECC-50BDA](image-url)
### Speaker Wiring

Each ECC-50BDA supplies eight NAC (Notification Appliance Circuit) for speaker connection. The speaker circuit can be supervised and wired Class B (Style Y) or Class A (Style Z). The speaker circuits are capable of 50 watts (each) at 25 Vrms or 70.7 Vrms.

#### Wiring Lengths

<table>
<thead>
<tr>
<th>Number Of Speakers</th>
<th>Total Load</th>
<th>Wire Distance in Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18 AWG</td>
<td>16 AWG</td>
</tr>
<tr>
<td>@1/2 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>25Vrms</td>
<td>5W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>25Vrms</td>
<td>10W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>25Vrms</td>
<td>15W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>25Vrms</td>
<td>20W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>25Vrms</td>
<td>26W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>25Vrms</td>
<td>40W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>25Vrms</td>
<td>50W</td>
</tr>
<tr>
<td></td>
<td>70Vrms</td>
<td></td>
</tr>
</tbody>
</table>

#### Table 3.1 Wire Lengths

**NOTE:** The above table assumes a uniform distribution of the speakers, and that a max of 20% voltage drop on the last speaker is allowed.

#### Class B (Style Y)

Figure 3.5 illustrates how to wire speakers to the control panel using Class B (Style Y) supervision.

![Figure 3.5 Class B (Style Y) Speaker Configuration](image)
Class A (Style Z)

Figure 3.6 illustrates how to wire speakers to the control panel using Class A (Style Z) wiring.

Audio Riser Wiring

The Audio Riser is an analog voice bus that carries the recorded voice messages from the ECC display board to the ECC-50BDAs, or the voice messages generated from a system microphone to the ECC-50BDAs. The maximum resistance on the audio riser is 20Ω. The ECC-50BDA supports two audio riser channels. The wiring method is the same for both channels. Audio Riser 1 and Audio Riser 2 should never be wired together.

Connect the Audio Riser from TB22 on the main control board to the ECC-50BDAs as shown in Figure 3.7.
3.2.6 Data Bus Wiring

This section contains information on how to connect up to eight (8) ECC-50BDAs onto the main control Data BUS. Refer to the ECC-50/100 Manual for Data BUS specifications. Wire the Data BUS from TB12 on the main control board to the ECC-50BDA as shown in Figure 3.8 or Figure 3.9.

Refer to section 2 of the ECC-50/100 Manual for information on setting SBUS addresses.
### 3.2.7 Setting the ECC-50BDA Amplifier Mode

Set the amplifier dip switch SW4 for use with the ECC-50/100. The amplifier modes are as follows:

- **50 Watt with Backup** - Amplifier A powers audio circuits 1 - 8. Amplifier A is backed up by onboard Amplifier B. Set the dip switch to setting 2.
- **100 Watt with no Backup** - Amplifier A powers audio circuits 1 - 4. Amplifier B powers audio circuits 5 - 8. There is no backup in this configuration. Set the dip switch to setting 1.
- **100 Watt with Backup (requires ECC-50WBU)** - Amplifier A powers audio circuits 1 - 4. Amplifier B powers audio circuits 5 - 8. The ECC-50WBU will backup either Amplifier A or Amplifier B. Set the dip switch to setting 3.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Default)</td>
<td></td>
</tr>
<tr>
<td>1 (Setting 1)</td>
<td></td>
</tr>
<tr>
<td>2 (Setting 2)</td>
<td></td>
</tr>
<tr>
<td>3 (Setting 3)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.10 Amplifier Mode Dip Switch SW4 Settings

### 3.2.8 Test Switch Use

**SW1 - AMPLIFIER A**

Switch should be moved to the “ON” position for normal operation. Move this switch to the “Test” position to test backup amplifier.

**SW2 - AMPLIFIER B**

Switch should be moved to the “ON” position for normal operation. Move this switch to the “Test” position to test backup amplifier.

**NOTE:** Allow up to 3 minutes for the backup amplifier to engage.

### 3.2.9 Connecting AC Power

At installation, connect the AC terminals to the power source as shown in Figure 3.11. It may be necessary for a professional electrician to make this connection.

<table>
<thead>
<tr>
<th>Module</th>
<th>Voltage</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50BDA 25V</td>
<td>120 VAC, 60 Hz</td>
<td>190 mA</td>
<td>2380 mA</td>
</tr>
<tr>
<td>ECC-50BDAE 25V</td>
<td>240 VAC, 50 Hz</td>
<td>200 mA</td>
<td>1260 mA</td>
</tr>
<tr>
<td>ECC-50BDA 70V</td>
<td>120 VAC, 60 Hz</td>
<td>190 mA</td>
<td>2470 mA</td>
</tr>
<tr>
<td>ECC-50BDAE 70V</td>
<td>240 VAC, 50 Hz</td>
<td>200 mA</td>
<td>1310 mA</td>
</tr>
</tbody>
</table>

Table 3.2 ECC-50BDA AC Current Draw
3.2.10 Backup Battery for ECC-50BDA

The following steps explain how to connect the batteries (refer to Figure 3.12):

1. Connect the black wire of the battery harness to the (-) side of the battery #2.
2. Connect the jumper wire provided from the positive (+) side of battery #2 to the negative (-) side of battery #1.
3. Connect the red wire from the battery harness to the positive (+) side of battery #1.

Note: Batteries have been rotated to show the tops for illustration purposes only.
### 3.2.11 Calculating Current Draw and Standby Battery

This section helps determine the current draw and standby battery needs for your installation (18 Ampere Hours maximum will fit in cabinet). Complete the remaining instructions in Table 3.3.

Batteries larger than 18 AH will not fit in the main control cabinet and must be housed in the BB-26 or BB-55F Battery Box. A maximum of 35 AH is allowed per system.

<table>
<thead>
<tr>
<th>Device</th>
<th>No. of Devices</th>
<th>Current Per Device</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50BDA 25V</td>
<td>1</td>
<td>Standby: 110 mA</td>
<td>110 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 1.2 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECC-50BDA 70.7V</td>
<td>1</td>
<td>Standby: 110 mA</td>
<td>110 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 1.4 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECC-50WBU</td>
<td>1</td>
<td>Standby: 40 mA</td>
<td>40 mA</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alarm: 110 mA</td>
<td>110 mA</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3.3 Current Draw Calculations**

A. **Current Subtotals:**

<table>
<thead>
<tr>
<th>Device</th>
<th>No. of Devices</th>
<th>Current Per Device</th>
<th>Standby Current</th>
<th>Alarm Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECC-50BDA 25V</td>
<td>1</td>
<td>Standby: 110 mA</td>
<td>110 mA</td>
<td></td>
</tr>
<tr>
<td>ECC-50BDA 70.7V</td>
<td>1</td>
<td>Standby: 110 mA</td>
<td>110 mA</td>
<td></td>
</tr>
<tr>
<td>ECC-50WBU</td>
<td>1</td>
<td>Standby: 40 mA</td>
<td>40 mA</td>
<td></td>
</tr>
</tbody>
</table>

B. **Total current rating of all devices in system (Line B) X 0.001**

C. **Number of standby hours (24 or 60 for NFPA 72)**

D. **Total standby AH**

E. **Multiply line C (standby current) and D:**

F. **Alarm sounding period in hours (For example, 5 minutes = 0.0833 hours):**

G. **Multiply line C (alarm current) and F:**

H. **Add lines E and G (AH = Ampere Hours):**

Refer to device manual for number of devices and current ratings.
Manufacturer Warranties and Limitation of Liability

Manufacturer Warranties. Subject to the limitations set forth herein, Manufacturer warrants that the Products manufactured by it in its Northford, Connecticut facility and sold by it to its authorized Distributors shall be free, under normal use and service, from defects in material and workmanship for a period of thirty six months (36) months from the date of manufacture (effective Jan. 1, 2009). The Products manufactured and sold by Manufacturer are date stamped at the time of production. Manufacturer does not warrant Products that are not manufactured by it in its Northford, Connecticut facility but assigns to its Distributor, to the extent possible, any warranty offered by the manufacturer of such product. This warranty shall be void if a Product is altered, serviced or repaired by anyone other than Manufacturer or its authorized Distributors. This warranty shall also be void if there is a failure to maintain the Products and the systems in which they operate in proper working conditions.

MANUFACTURER MAKES NO FURTHER WARRANTIES, AND DISCLAIMS ANY AND ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THE PRODUCTS, TRADEMARKS, PROGRAMS AND SERVICES RENDERED BY MANUFACTURER INCLUDING WITHOUT LIMITATION, INFRINGEMENT, TITLE, MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE. MANUFACTURER SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL OR INDUSTRIAL USES OF ITS PRODUCTS.

This document constitutes the only warranty made by Manufacturer with respect to its products and replaces all previous warranties and is the only warranty made by Manufacturer. No increase or alteration, written or verbal, of the obligation of this warranty is authorized. Manufacturer does not represent that its products will prevent any loss by fire or otherwise.

Warranty Claims. Manufacturer shall replace or repair, at Manufacturer's discretion, each part returned by its authorized Distributor and acknowledged by Manufacturer to be defective, provided that such part shall have been returned to Manufacturer with all charges prepaid and the authorized Distributor has completed Manufacturer's Return Material Authorization form. The replacement part shall come from Manufacturer's stock and may be new or refurbished. THE FOREGOING IS DISTRIBUTOR'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A WARRANTY CLAIM.