



Remote Alarm Monitoring System

Operation and Service Manual



Model	Version
RA1	A
RA4	A

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Document History

Revision	Date	CO	Supersession	Revision Description
A	27 DEC 2005	3391	n/a	Initial release.
B	08 NOV 2007	4324	n/a	<ul style="list-style-type: none">▶ Added WEEE symbol to the product specification label and to the manual.▶ Added power supply outlet adapters.
C	04 MAR 2010	5475	n/a	<ul style="list-style-type: none">▶ Changed chamber and product specification label style.▶ Added ISO certification statement.▶ Deleted references to Entela.
D	20 FEB 2013	8268	n/a	<ul style="list-style-type: none">▶ Added caution label regarding alarm contacts.▶ Updated UL standards compliance label.▶ Changed manual format for improved readability and ease of locating information within manual.

* Date submitted for Change Order review. Actual release date may vary.

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Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the remote alarm and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “RA models” refers to all models of that configuration (RA1, RA4). This manual covers all remote alarms, which may be identified singly, by their size, or by their model designation (RA).

1.3 Copyright and Trademark

Helmer® is registered trademark of Helmer, Inc. in the United States of America. Copyright © 2013 Helmer, Inc. All other trademarks and registered trademarks are the property of their respective owners. Helmer, Inc., doing business as (DBA) Helmer Scientific and Helmer.

2 Safety

Includes general safety information for remote alarm monitoring system operation.

2.1 Labels



Caution: Risk of damage to equipment or danger to operator

2.2 Avoiding Injury

- ▶ Review safety instructions before installing, using, or maintaining the equipment.
- ▶ Avoid removing electrical service panels and access panels unless so instructed.
- ▶ Use supplied power cords only.



CAUTION

Decontaminate parts prior to sending for service or repair. Contact Helmer or your distributor for decontamination instructions and a Return Authorization Number.

3 General Recommendations

3.1 Intended Use

Helmer remote alarm monitoring systems are intended for the monitoring of alarm systems of refrigerators, freezers, and other medical and scientific products.

3.2 General Use

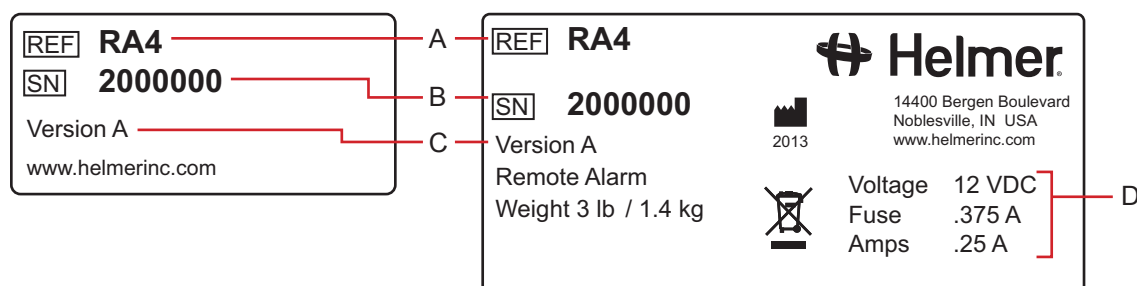
Allow remote alarm monitoring system to come to room temperature before switching power on.

During initial startup, high temperature alarm may sound while monitored equipment reaches operating temperature.

3.3 Model and Input Power

NOTE Service information varies depending on the model.

This information appears on the product specification label, located on the bottom of the monitoring system. The model also appears on a label located inside the remote alarm monitoring system.



Left: Inside label. Right: Product Specification label (located on the back).

Label	Description
A	Model (REF)
B	Serial number (SN)
C	Version
D	Power requirements

4 Operating Standards

These units are designed to operate under the following conditions:

- ▶ Indoor use only
- ▶ Ambient temperature range: 5 °C to 40 °C (41 °F to 104 °F)
- ▶ Relative humidity (maximum for ambient temperature): 80%
- ▶ Remote alarm monitoring system can be mounted up to 3000' (915 m) from monitored device, when connected with 22-gauge wire

4.1 Electrical Specifications

Refer to specification label for voltage and power consumption requirements. The remote alarm monitoring system is intended to be supplied by a LPS (limited power source) power unit, or one designated as "Class 2" and rated at 0.25 A, at 12 V (DC).

Fuse rating is 0.375 A.

4.1.1 Input Voltage and Frequency

- ▶ 100 V (AC) to 240 V (AC), 50 Hz to 60 Hz.
- ▶ Input power varies depending on the destination of the remote alarm.

4.2 Dimensions

4.2.1 Weight

Model	Weight
RA1, RA4	3 lbs 1.4 kg

4.2.2 Size

All dimensions are for the overall exterior and include items that protrude from the main unit.

	Wall-mounted	Desk-mounted
Width	8.25 in 210 mm	8.25 in 210 mm
Height	5.75 in 147 mm	2.75 in 70 mm
Depth	2.75 in 70 mm	5.75 in 147 mm

5 Regulatory Compliance

This device complies with the requirements of directive 93/42/EEC concerning Medical Devices, as amended by 2007/47/EC.

Sound level is less than 70 dB(A).



Emergo Europe
Molenstraat 15
2513 BH
The Hague, Netherlands

The label indicates compliance with UL 61010-1 and CSA 61010-1 and applicable provisions.

WEEE Compliance

The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for the labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ▶ Do not dispose of this product as unsorted municipal waste.
- ▶ Collect this product separately.
- ▶ Use the collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.



6 Warranty

6.1 USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Have the model and serial number available when calling.

6.1.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

6.1.2 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Batteries are expendable items. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

6.1.3 Labor

For a period of one (1) year, Helmer will cover repair labor costs, provided that the product is returned to Helmer for warranty service. Alternatively, your facility's staff may work with a Helmer technician to make repairs on site. Labor costs for repairs performed at a location other than Helmer, or for repairs made without the assistance of a Helmer technician, will be the responsibility of the end user.

6.1.4 Additional Warranty Information

The time periods set forth above begin two weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

6.2 Outside of USA and Canada

Consult your local distributor for warranty information.

7 Installation

7.1 Location Requirements

- ▶ Stable, flat horizontal surface (desk-mounted) or vertical surface (wall-mounted)
- ▶ Has a grounded outlet meeting electrical requirements
- ▶ Meets the limits specified for ambient temperature and relative humidity

7.2 Wall Installation

Required Tools:

- ▶ Pencil
- ▶ Tape measure
- ▶ #2 Phillips screwdriver

Install Wall Anchors:

- 1 Mark the wall with the locations for the anchors. The holes are 4-1/8" (105 mm) apart.
- 2 Install the self-drilling anchors at the marked locations.
- 3 Thread the screws into the anchors, leaving a 1/8" (3 mm) gap between the screw head and the anchor.
- 4 Place the monitoring system on the wall so the screw heads protrude into the lower part of the mounting holes.
- 5 Slide the monitoring system down until the top of the mounting holes rest on the screws.

7.3 Connect the Power Supply

The power supply and several adapters are provided for use with a variety of power outlets. The North American adapter is installed at the factory. The power supply and adapters are included with the remote alarm monitoring system.



Monitoring system with power supply and adapters (RA1 model shown with North American adapter installed).

Change the Power Supply Adapter:

- 1 On the power supply, slide the adapter away from the cord to remove it.
- 2 Slide the new adapter into place.

Connect the Power Supply to the Remote Alarm Monitoring System:

- ▶ On the top panel of the remote alarm, connect the power cord to the connector.



CAUTION

- ▶ The interface on the remote alarm monitoring system is intended for connection to the end user's central alarm system(s) that uses normally-open or normally-closed dry contacts.
- ▶ If an external power supply exceeding 33 V r.m.s. or 70 V (DC) is connected to the remote alarm monitoring system's circuit, the remote alarm will not function properly; may be damaged; or may result in injury to the user.

Connect the Power Supply to the Power Source:

- ▶ Plug the power cord into a grounded outlet that meets the electrical requirements as listed in chapter 4.1.1 (Input Voltage and Frequency). The Zone Secure lamps illuminate.

8

Configuration

Each zone on the remote alarm monitoring system is designed to connect to and monitor one device. Each zone will support one device.

- ▶ RA1: One zone (one monitored device)
- ▶ RA4: Four zones (four monitored devices)

NOTE

- ▶ Multiple devices to a single zone if all devices are identically configured (all normally-open or normally-closed).
- ▶ An active zone alarm indicates that at least one device connected to the zone has an active alarm but does not identify which device(s) in the zone has triggered the alarm.

8.1

Zone Configuration

Each zone can be independently configured as either a normally-open (NO) or normally-closed (NC) circuit to accommodate the capability of the device being monitored. At the factory, all zones on the monitoring system are configured as normally-closed circuits.

Normally-Closed Configuration

- ▶ Normal state is a closed circuit between the input and output connectors for the zone.
- ▶ Connecting a device extends the circuit to include that device.
- ▶ When a connected device opens the circuit, an alarm is activated on the remote alarm monitoring system for the corresponding zone.
- ▶ When the device returns the circuit to the closed state, the alarm is cleared.

Normally-Open Configuration

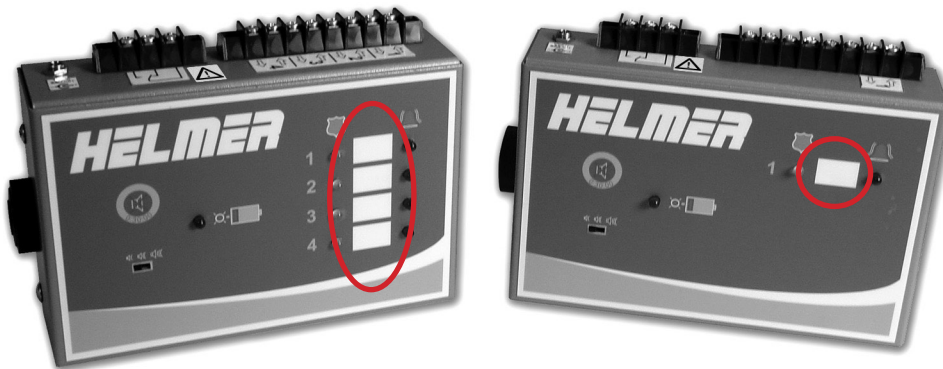
- ▶ Normal state is an open circuit between the input and output connectors for the zone.
- ▶ Connecting a device extends the circuit to include that device.
- ▶ When a connected device closes the circuit, an alarm is activated on the remote alarm monitoring system for the corresponding zone.
- ▶ When the device returns the circuit to the open state, the alarm is cleared.

NOTE

A normally-closed configuration allows for immediate detection if a zone connection is loose or a wire is damaged. These conditions open the circuit, which generates an alarm on the remote alarm monitoring system, even if monitored devices are not in an active alarm state.

8.2 Zone Labels

On the front of the remote alarm monitoring system, each zone has an area to place a label that identifies the monitored device. Blank labels are provided with the remote alarm monitoring system.

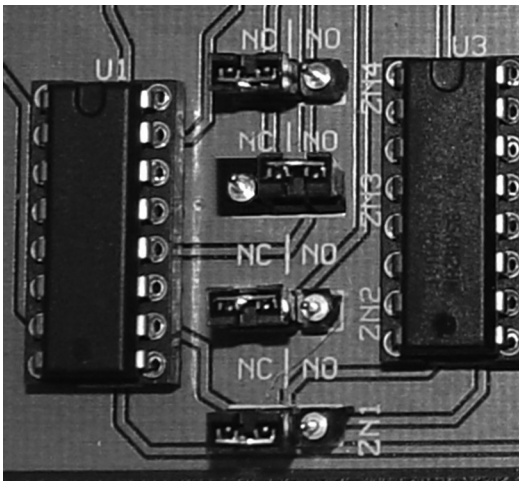


Label area for zone (circled).

8.3 Set Internal Jumpers for Zones

Each zone has a corresponding internal jumper that is used to configure it as a normally-open or normally-closed circuit. The internal jumpers are located on the circuit board inside the monitoring system.

NOTE Default factory setting is normally-closed.



Internal jumpers. Zones are labeled ZN and the positions for each zone are labeled NC and NO. RA4 model shown with zone 3 jumper in the NO position and the remaining zone jumpers in the NC position.

Set a Zone Jumper:



CAUTION

Before removing the cover, disconnect the power to the monitoring system to eliminate the potential of electric shock.

- 1 Disconnect the power to the remote alarm monitoring system.
- 2 Remove the cover from the base of the monitoring system. For instructions, see Section 3.5, "Removing and installing the cover."
- 3 Inside the monitoring system, on the circuit board, locate the jumper for the zone configuration to be changed.
- 4 Move the jumper to the appropriate position.
 - ▶ For a normally-closed configuration, move the jumper to connect the pins that are labeled NC.
 - ▶ For a normally-open configuration, move the jumper to connect the pins that are labeled NO.
- 5 Replace the cover.
- 6 Connect the power to the remote alarm monitoring system.

8.4

Connect Monitored Devices

NOTE

Each zone on the monitoring system is designed to monitor one device.

Multiple Devices Connected to a Single Zone

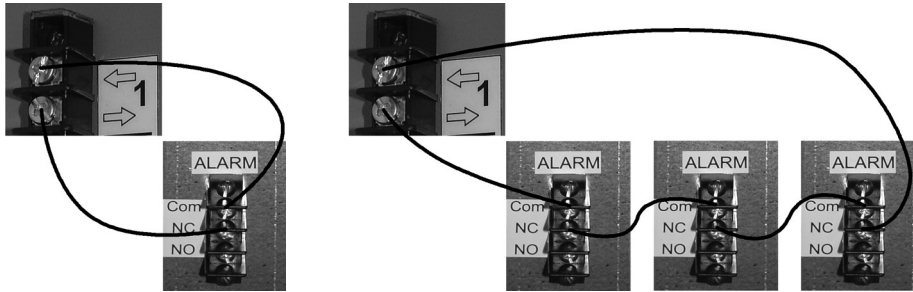
- ▶ Multiple devices may be connected to a single zone, provided all devices are identically configured (all normally-open or normally-closed).
- ▶ With multiple devices connected to a single zone, alarm information received by the remote alarm monitoring system would be limited.
- ▶ An active alarm indicated that at least one device connected to the zone has an active alarm.
- ▶ There is no way to identify which device(s) has the active alarm.

Maximum Distance for Monitored Devices

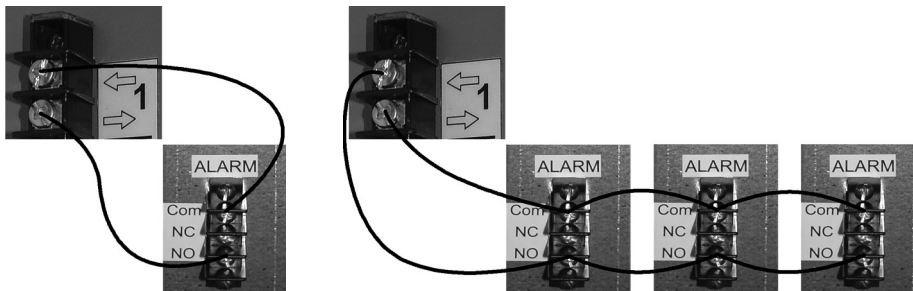
- ▶ Monitored devices can be a maximum of 3000' (915 m) away from the remote alarm monitoring system when connected with 22-gauge wire.
- ▶ When multiple devices are connected to a single zone, the maximum distance refers to the length of wire needed to reach the device farthest from the remote alarm monitoring system.

Default Connection Settings

- ▶ The default factory settings for the RA1 zone and RA4 zones is normally-closed.
- ▶ An external jumper connects the two terminals for each zone.
- ▶ The connections depend on whether the zone will be normally-open or normally-closed, and whether one or more devices is connected to the zone.



Zone connections for a normally-closed configuration. Left: One device. Right: Multiple devices.



Zone connections for a normally-open configuration. Left: One device. Right: Multiple devices.

Required supplies:

- ▶ Two-conductor, 22-gauge wire (not supplied)
- ▶ #2 Phillips screwdriver

Connect Devices to a Zone:

- 1 Confirm the internal jumper for the zone is set appropriately.
- 2 On the top panel of the remote alarm monitoring system, remove the external jumper that connects the terminals (if installed).
- 3 Connect the zone to the device(s) according to the illustrations above.

9

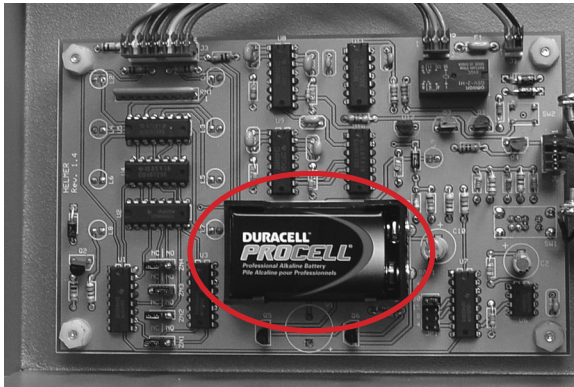
Install the Backup Battery

A backup battery provides power to the remote alarm monitoring system if AC power fails. The remote alarm monitoring system is shipped from the factory with the backup battery.

- ▶ The monitoring system has visual and audible alarms to notify when the remaining charge on the installed battery is low.
- ▶ The low-charge alarms remain active until the battery is removed.
- ▶ If AC power fails, and alarms are not active at the time of failure, the monitoring system can continue to operate on battery power for a maximum of two hours.

NOTE

The visual and audible alarms do not indicate whether a battery is installed. The alarms only indicate that the battery charge is low.



Battery holder with battery installed (circled).

Install the Battery:

NOTE Avoid using a battery that has been partially discharged. Install a new battery.

- 1 Disconnect the power to the remote alarm monitoring system.
- 2 Remove the cover from the base of the remote alarm monitoring system.
- 3 Install the battery in the battery holder on the circuit board.
- 4 Replace the cover.
- 5 Reconnect the power to the remote alarm monitoring system.

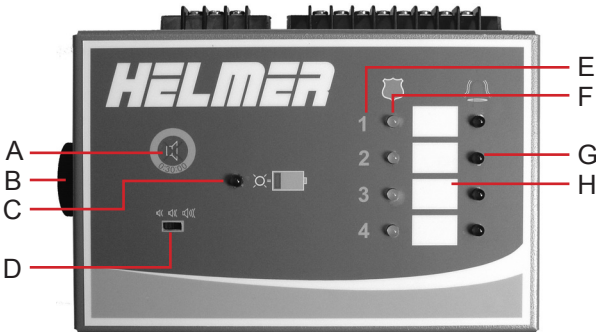
Remove the Battery:

- 1 Disconnect the power to the monitoring system.
- 2 Remove the cover from the base of the remote alarm monitoring system.
- 3 Remove the battery from the battery holder on the circuit board.
- 4 Replace the cover.
- 5 Reconnect the power to the remote alarm monitoring system.

Section II: Operation

10 Components

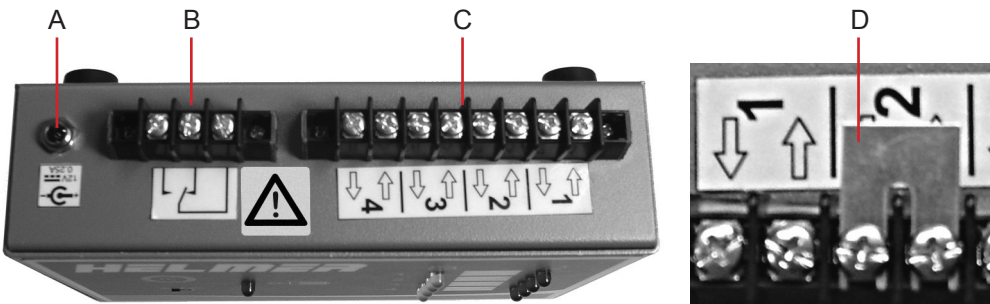
10.1 Front



Front features (RA4 model shown).

Label	Description	Function
A	Mute button	Mutes audible alarms for 30 minutes
B	Alarm buzzer	Audibly indicates an active alarm
C	Low battery indicator	Indicates low battery charge
D	Volume control	Controls the volume for audible alarms
E	Zone number	Identifies the zone used to monitor a device
F	Zone Secure lamp	Indicates when a zone is secure (no active alarms)
G	Zone Alarm lamp	Indicates when a zone is in an active alarm state
H	Zone identification label area	Description of the device being monitored

10.2 Top

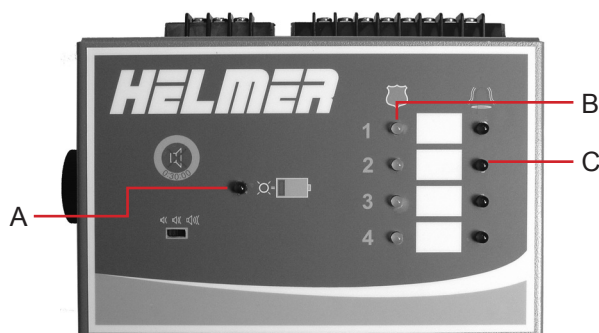


Top features (RA4 model shown).

Label	Description	Function
A	Power connector	Interface for the power cord
B	Remote alarm interface	Provides a dry contact connection to external central alarm systems
C	Zone input and output terminals	Connects to the remote alarm interface on devices
D	External jumper	Completes a normally-closed circuit

11 Alarms

11.1 Visual Alarms



Front features (RA4 model shown).

Label	Description	Function
A	Low battery indicator	Battery charge is low. Replace the battery.
B	Zone Secure lamp	<p>Lamp ON (flashing) indicates one of the following:</p> <ul style="list-style-type: none"> ▶ No active alarm(s) for the connected device(s). ▶ No devices are connected to the zone. <p>Lamp OFF indicates one of the following:</p> <ul style="list-style-type: none"> ▶ Active alarm(s) for the connected device(s). ▶ Power is disconnected from the remote alarm monitoring system.
C	Zone Alarm lamp	<p>Lamp ON (flashing) when the zone is in an alarm state, indicating one of the following:</p> <ul style="list-style-type: none"> ▶ Active alarm(s) for the connected device(s). ▶ Device(s) is connected incorrectly. ▶ Problem with the circuit (normally-closed configuration only). <p>Lamp OFF indicates one of the following:</p> <ul style="list-style-type: none"> ▶ No active alarm(s) for the connected device(s). ▶ Power is disconnected from the remote alarm monitoring system.

11.2 Audible Alarms

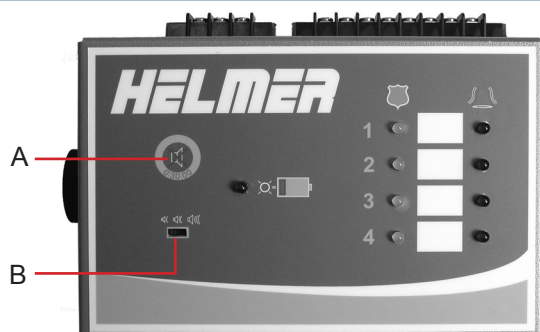
Tone	Indication
Constant	Zone alarm is active (if the alarm has not been muted).
Intermittent	Battery charge is low.

Zone Alarms

- ▶ Volume may be adjusted or muted.
- ▶ Changing volume or muting alarm applies to audible alarms on the remote alarm monitoring system.
- ▶ Volume or mute for the monitored device is controlled through the device itself.
- ▶ Muting an alarm silences the alarm for approximately 30 minutes.
- ▶ If another alarm is activated from a monitored device while an alarm on the remote alarm monitoring system is muted, the mute timer is reset and the alarm sounds.

Low Battery Alarm

- ▶ Volume can not be adjusted or muted.



Front features (RA4 model shown).

Label	Description	Function
A	Mute button	Mute an active zone alarm.
B	Volume switch	Adjust the volume of an active zone alarm.

Mute an Active Alarm:

- Press the Mute button.

Change Alarm Volume:

- Slide the volume switch to the position corresponding to the desired volume.

Section III: Service

12 Maintenance

12.1 Maintenance Schedule

Maintenance tasks should be completed according to the following schedule.

NOTE These are recommended minimum requirements. Regulations for your organization or physical conditions at your organization may require maintenance items to be performed more frequently, or only by designated service personnel.

Task	Frequency		
	Quarterly	Annually	As Needed
Test the alarms.	✓		
Check the backup battery. Replace the battery if it has been in service for 1 year.		✓	
Clean the exterior of the remote alarm monitoring system.			✓
Clean the interior of the remote alarm monitoring system.		✓	

NOTE

- ▶ During a power failure, the backup battery provides power to the remote alarm monitoring system.
- ▶ If the backup battery does not provide power to the remote alarm monitoring system during a power failure or battery test, replace the battery.
- ▶ If battery has been in service for 1 year, replace the battery.

12.2 Check the Remote Alarm Monitoring System Battery

The monitoring system does not indicate the charge level of the battery. Regularly test the battery. Replace battery if the test fails or if the battery has been in use for 1 year.

Test the battery:

- 1 Disconnect the power to the remote alarm monitoring system.
 - a Zone Secure lamp should remain illuminated.
 - b If the Zone Secure lamp is not illuminated, replace battery.
- 2 Connect the power to the remote alarm monitoring system.

NOTE Use a battery which meets specifications outlined in chapter 12.4 (Supplies).

12.3 Clean the Remote Alarm Monitoring System



CAUTION Disconnect remote alarm monitoring system from AC power when cleaning.

In environments where remote alarm monitoring system is exposed to excessive lint or dust, cleaning may be required more frequently than stated in preventive maintenance schedule.

12.3.1 Exterior

Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner. Clean alarm terminals with a soft brush and a vacuum cleaner.

12.3.2 Interior

Clean the interior using a soft brush and a vacuum cleaner.

12.4 Supplies

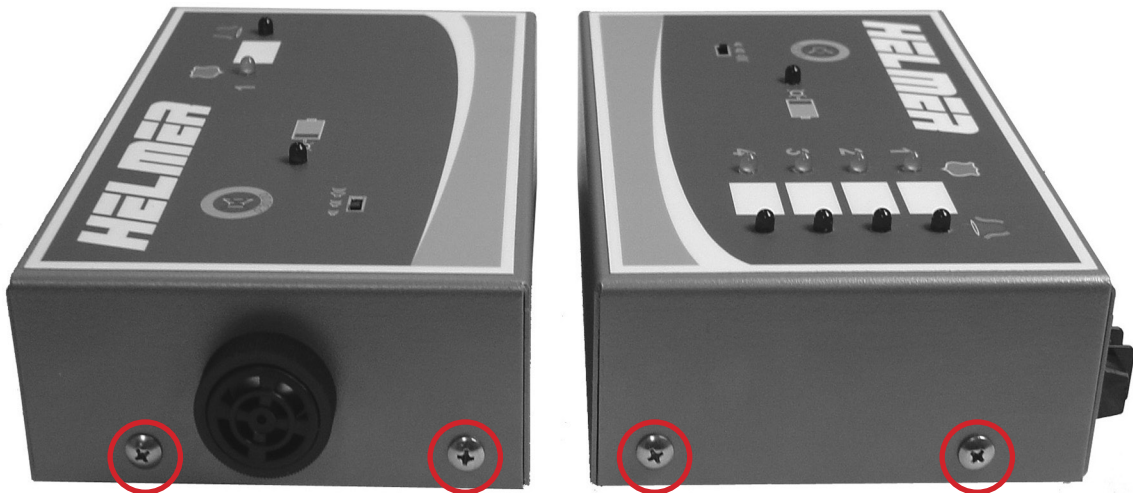
(1) 9 V non-rechargeable alkaline (or equivalent) battery: 120218

13 Remove and Install the Cover**CAUTION**

Before removing the cover, disconnect the power to the remote alarm monitoring system to eliminate the potential of electric shock.

NOTE

After removing the cover, internal wiring will connect the cover to the base.



Screws securing the cover to the base (circled).

Remove the Cover:

- 1 Disconnect the power to the remote alarm monitoring system.
- 2 Using a screwdriver, loosen and remove the screws that secure the cover to the base.
- 3 Remove the cover.

Install the Cover:

- 1 Place the cover over the base, aligning the screw holes.
- 2 Using a screwdriver, install the screws to secure the cover to the base.
- 3 Connect the power to the remote alarm monitoring system.

14 Replace the Circuit Board



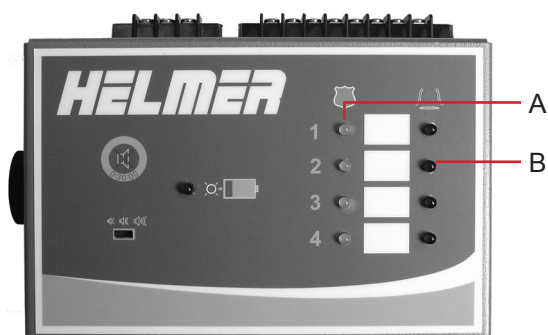
CAUTION

Before removing the cover, disconnect the power to the remote alarm monitoring system to eliminate the potential of electric shock.

- 1 Disconnect the power to the remote alarm monitoring system.
- 2 Using a screwdriver, loosen and remove the screws that secure the cover to the base.
- 3 Disconnect the wires from the circuit board.
- 4 Remove the four nuts that secure the board. Lift the board out of the base.
- 5 Install the new board and four nuts to secure the board.
- 6 Connect connect the wires to the circuit board.
- 7 Place the cover over the base, aligning the screw holes.
- 8 Using a screwdriver, install the screws to secure the cover to the base.
- 9 Connect the power to the remote alarm monitoring system.

15 Test Alarms

Test alarms to ensure they are working correctly. The remote alarm monitoring system provides real-time monitoring of alarm status for all connected devices.



Front features (RA4 model shown).

Label	Description	Function
A	Zone Secure lamp	Mute an active zone alarm.
B	Zone Alarm lamp	Adjust the volume of an active zone alarm.

Test the Alarms:

- 1 On a device monitored by the remote alarm monitoring system, manually trigger an alarm that is transmitted through the remote alarm interface.

NOTE

Refer to the device's service manual for information on which device alarms are transmitted through the respective device's remote alarm interface.

- 2 On the remote alarm monitoring system, verify the zone corresponding to the device with the alarm is in an alarm state. The red Zone Alarm lamp should be flashing.
- 3 On the monitored device, clear all active alarms.
- 4 On the remote alarm monitoring system, verify the tested zone is in a secure state. The green Zone Secure lamp should be illuminated.


CAUTION

Review all safety instructions prior to troubleshooting. Refer to chapter 2 (Safety).

Problem	Possible Cause	Action
No Zone Secure or Zone Alarm lamps are illuminated.	No power (AC or battery backup) to the remote alarm monitoring system.	<ul style="list-style-type: none"> ▶ Verify the power cord is connected. Secure the connections if necessary. ▶ Verify the fuse has not blown. Replace the fuse if necessary. ▶ Verify the outlet is operational. ▶ Verify the backup battery is installed and is not depleted. Install or replace the battery if necessary.
	Power supply is faulty.	▶ Replace the power supply.
	Lamps are faulty.	▶ Replace the circuit board.
	Circuit board is faulty.	▶ Replace the circuit board.
A Zone Alarm lamp is illuminated but there are no active alarms on any device connected to the zone.	A connection is loose between the monitoring system and the device.	▶ Check the connections on the device and the monitoring system.
	Wrong terminals are connected.	▶ Check that connections are correct for the configuration (NO or NC).
	Internal jumper for the zone is set incorrectly.	▶ Check that internal jumper settings are correct for the configuration (NO or NC).
	Circuit board is faulty.	▶ Replace the circuit board.
A Zone Alarm lamp is illuminated but there is no audible alarm.	Audible alarm is muted.	▶ Activate an alarm on a connected device. Verify the alarm sounds on the remote alarm monitoring system.
	Buzzer for the zone alarms is faulty.	▶ Replace the alarm buzzer.
	Circuit board is faulty.	▶ Replace the circuit board.
The Low Battery lamp is illuminated but there is no audible alarm.	Buzzer for the low battery alarm is faulty.	▶ Replace the circuit board.
	Circuit board is faulty.	▶ Replace the circuit board.
The audible alarm sounds, but no Zone Alarm lamps are illuminated.	Battery charge is low.	▶ Check that the Low Battery lamp is illuminated. Replace the battery if necessary.
	Zone alarm lamps are faulty.	▶ Replace the circuit board.
	Buzzer for the zone alarms is faulty.	▶ Replace the alarm buzzer.
	Buzzer for the low battery alarm is faulty.	▶ Replace the circuit board.
	Circuit board is faulty.	▶ Replace the circuit board.

17 **Parts**

17.1 **External Parts**



Power supply (circled) with adapters.

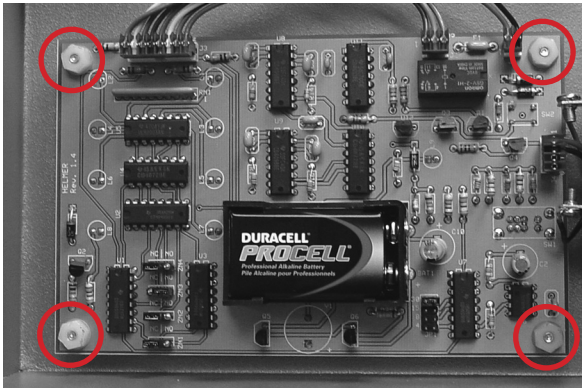
Description	Part Number	Schematic Label
Power supply	120508	-
Adapters for power supply	120517	-
Foot	220441	-
Mounting kit	230350	-
Zone input and output terminal strip	120506	A
Remote alarm interface terminal strip	120404	B
Zone identification label	715111 (sheet of 36)	-
External jumper	230351	-

17.2 Internal Parts

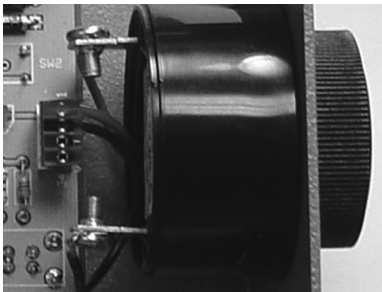
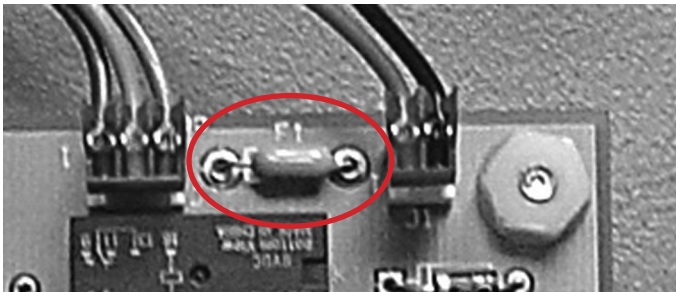


CAUTION

Before removing the cover, disconnect the power to the remote alarm monitoring system to eliminate the potential of electric shock.



Circuit board and nuts (circled).

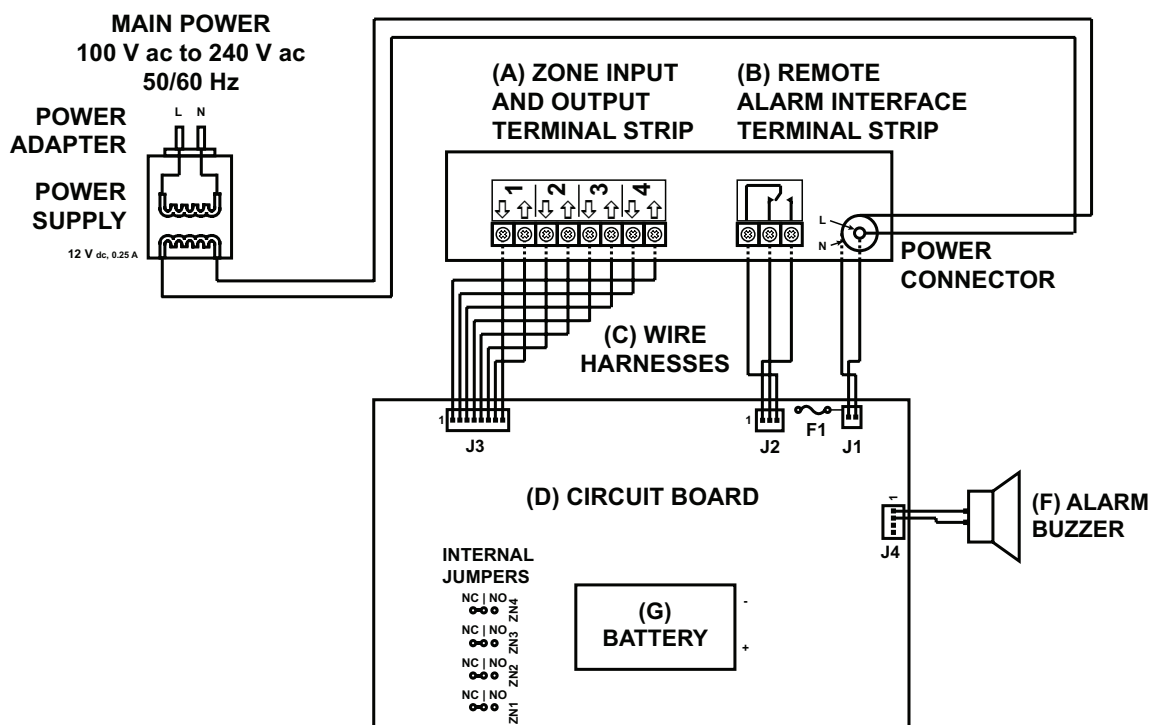


Left: Fuse (circled). Right: Alarm buzzer.

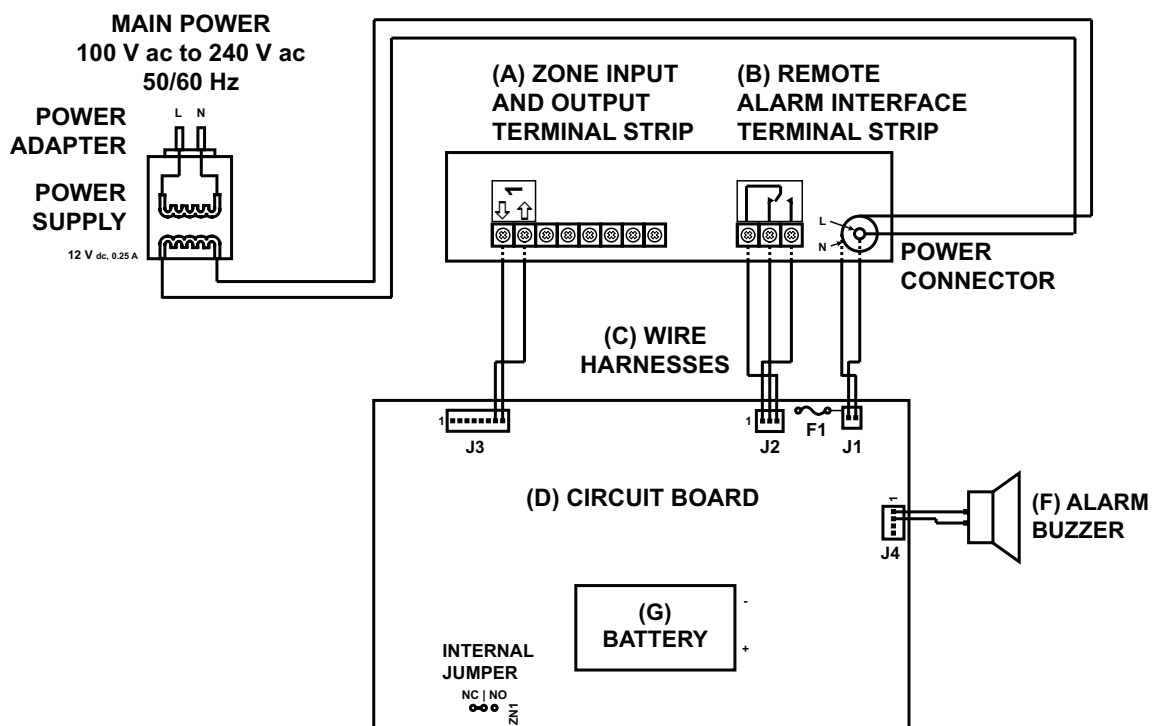
Description	Part Number	Schematic Label
Wire harness kit	RA4: 400664-2 RA1: 400664-1	C
Circuit board	RA4: 400653-1 RA1: 400653-2	D
Fuse (0.375 A)	120501	E
Alarm buzzer	120160	F
Backup battery (9 V alkaline, non-rechargeable)	120218	G

18 Schematics

18.1 RA4



18.2 RA1



END OF MANUAL

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