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# SRBRS Safety System Hardware Manual

For Amazon Fulfillment Services Only

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# Introduction

## MANUAL SCOPE

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This manual addresses the hardware and specifications for the AR SRBRS Safety System models. SRBRS is one component of an AR Mobile-Robotic Fulfillment System™ (MFS) and does not operate independently of an AR MFS installation. The reader is advised to become familiar with the basics of the AR MFS prior to reading this manual.

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**Note:** Operational and Maintenance procedures are not covered in this document.

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## INTENDED AUDIENCE

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Information in this document is intended for trained Amazon employees.

## DOCUMENT CONVENTIONS

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The following typographical conventions and icons are used in Amazon Robotics documentation:



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.






















Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.





Indicates a statement of company policy directly or indirectly related to the safety of personnel or protection of property.

	This image corresponds with an entrapment hazard for your torso.		This image corresponds with a crushing hazard for your leg.		This image corresponds with a crushing hazard for your arm.
	This image corresponds with an electrical hazard.		This image corresponds with a tip or overbalance hazard.		This image corresponds with a crushing or pinching hazard for your fingers.
	This image corresponds with a hand entanglement / rotating gears hazard.		This image corresponds with a fall hazard.		This image corresponds with a crushing hazard for your hand.



	This image corresponds with a burn hazard / hot surface.		This image corresponds with a tripping hazard.		This image corresponds with Laser aperture.
	This image corresponds with electrostatic sensitive components.		This image corresponds with a lifting hazard.		This image corresponds with a risk of fire. Sections marked with this symbol require a "C" rated fire extinguisher to be present.
	This image corresponds with an arc flash hazard.		This image corresponds with a sharp point.		This image corresponds with using gloves to perform the specified task.
	This image corresponds with wearing a dust mask to perform the specified task.		This image corresponds with wearing head protection to perform the specified task.		This image corresponds with unplugging before servicing.
	This image corresponds with wearing hearing protection to perform the specified task.		This image corresponds with reading the technical manual to perform the specified task.		This image corresponds with consulting the Operators Manual to perform the specified task.
	This image corresponds with wearing safety glasses to perform the specified task.		This image corresponds to wearing a high visibility safety vest.		This image corresponds with Two person lift (Required on items over 45 lbs, 20kg)
	This image corresponds with proper disposal and recycling of component				

# Safety Information

 <b>WARNING</b>	
<ul style="list-style-type: none"><li>• Never perform tasks that you have not been trained to execute. Performing maintenance or repair tasks can result in serious injury or death and may cause damage to the equipment. Please contact AR Support for assistance with the tasks outlined in this manual.</li><li>• Floor maintenance tasks using the SRBRS Safety System should only be performed by trained and qualified operators.</li><li>• Never stand on or in any way ride on a drive unit at any time.</li><li>• Never walk on an Active AR Floor if you have not been trained to do so. Only maintenance personnel trained to enter the Active AR Floor may enter the Active AR Floor.</li><li>• Proper lockout/tagout (LOTO) procedures must be followed when performing service to a AR system. Failure to do so can result in unexpected machine motion or release of electrical energy.</li><li>• Potentially hazardous conditions exist under the drive unit fairing. Only trained and qualified technicians may remove the drive unit fairing.</li><li>• Proper Personal Protection Equipment (PPE) should be worn at all times when servicing drive units.</li><li>• Always read the appropriate technical manual before performing maintenance tasks.</li></ul>	

## LITHIUM ION BATTERY SAFETY WARNINGS

### Lithium-Ion Batteries:

	 <b>DANGER</b> <b>Electrical hazard.</b> Do not place the battery in fire or heat the battery. Do not puncture battery. Do not expose battery to water.
<p>Misusing the battery may cause the battery to get hot, rupture or ignite and cause serious injury. Be sure to follow the safety rules listed below:</p> <ul style="list-style-type: none"><li>▶ Do not place the battery in fire or heat the battery</li><li>▶ Do not carry or store the batteries together with necklaces, hairpins or other metal objects</li></ul>	

- ▶ Do not pierce the battery with nails, strike the battery with a hammer, step on the battery or otherwise subject it to strong impacts or shocks
- ▶ Do not solder directly onto the battery
- ▶ Do not expose the battery to water or salt water, or allow the battery to get wet

Do not disassemble or modify the battery. The battery contains safety and protection devices that, if damaged, may cause the battery to generate heat, rupture or ignite.

Do not place the battery on or near fires, stoves, or other high-temperature locations. Do not place the battery in direct sunshine, or use or store the battery inside cars in hot weather. Doing so may cause the battery to generate heat, rupture or ignite. Using the battery in this manner may also result in a loss of performance and a shortened life expectancy.

## CAUTION

When the battery is worn out, insulate the terminals with adhesive tape or similar materials before disposal.

Immediately discontinue use of the battery if, while using, charging or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape or appears abnormal in any other way.

In the event that the battery leaks and the fluid gets into one's eye, do not rub the eye. Rinse well with water and immediately seek medical care. If left untreated the battery fluid could cause damage to the eye.

## RADIO MODULE FACEPLATE INFORMATION

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Informational faceplates are located on the back of each SRBRS Safety System radio module. These faceplate contain the following information:

- **Manufacturer:** *Amazon Robotics*
- **Supplier's Name and Contact Information**
- **Rated Voltage:** *15v*
- **Battery Level LED:** *Green – 60%-100%, Yellow – 40%-59%, Red1 – 20%-39%, Red2 – Less than 20%.*
- **Slow Radio LED:** *Green light – Working as expecting, Red light – Diagnostics have failed.*
- **Stop Radio LED:** *Green light – Working as expecting, Red light – Diagnostics have failed.*
- **System LED:** *Green (solid on): Master mode, Green (blinking slow): Slave mode, Green (blinking fast): Stand-Alone mode, Red: Systems diagnostics failure.*
- **Part Number**
- **Serial Number**

## POWER REQUIREMENT

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Rechargeable Batteries	15V Lithium Ion (x1)
Required Recharging Equipment	RRE Charging Dock

## ENVIRONMENTAL SPECIFICATIONS

<b>Indoor/Outdoor Usage</b>	Indoor usage only. Refer to: 900-00442 – AMAZON ROBOTICS FLOOR, MEZZANINE, AND ENVIRONMENTAL REQUIREMENTS
<b>Floor Condition</b>	Refer to: 900-00442 – AMAZON ROBOTICS FLOOR, MEZZANINE, AND ENVIRONMENTAL REQUIREMENTS
<b>Operating Ambient Temperature</b>	0°C to 40°C
<b>Storage Temperature</b>	-40°C to 70°C
<b>Humidity</b>	10-95% relative humidity (non-condensing)
<b>Dust</b>	The SRBRS radio module shall be sealed to IP54 (dust protected; splashing of water).
<b>Altitude</b>	-100m to 2000m (with respect to sea level)

## LIFECYCLE

SRBRS Safety Systems are designed for 72,600 hours of active service or ten years, whichever occurs first. Active service is defined as the time the SRBRS Safety System is either in use or otherwise in the process of executing a mission but temporarily id.

## OPERATOR CONTROLS

### Powering on the SRBRS Safety System

1. Fit the assembled SRBRS Safety System to your body, attaching all buckles and ensuring that the vest is secure.
2. Press the pushbutton once to power on the SRBRS Safety System. The LED will begin slowly blinking, and an audio chirping will inform you that the system has been turned on. The blinking LED indicates that the SRBRS Safety System is still inactive.

### Activating the SRBRS Safety System

1. When ready, enable the SRBRS by pushing and holding the toggle switch on the vest cable for at least 1 second.

**Note**The LED on the pushbutton will begin to blink after 1 second.

2. Release the toggle switch when the LED on the pushbutton lights up, and you hear three audible chirps from the radio modules.

**Note**

Enabling the SRBRS floor safety system may take up to 5 seconds.

3. When the LED light on the pushbutton is **solid**, the SRBRS Safety Vest is activated.

## Powering off the SRBRS Safety System

Verify that the SRBRS Safety System has been completely deactivated, with its LED on the pushbutton blinking.

### Power Off the Safety Vest

1. Leave the active floor before rebooting the safety vest.
2. Pull the toggle switch down, and move to the on position.
3. Press the pushbutton 3 times to turn the safety vest off.

**Note**

These actions must be performed under 3 seconds otherwise you will activate the SRBRS Safety System.

- The LED light will turn off to show the safety vest is off.
- You have successfully powered off the SRBRS Safety Vest.



# Regulatory Compliance

## North America

### United States

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### Note

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

#### Warning

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

This device is restricted to indoor use when operated in the 5.15 to 5.25 GHz frequency range.

#### Important

**FCC Radiation Exposure Statement:** This equipment complies with FCC radiation exposure limits set forth per 447498 D01 General RF Exposure Guidance v06.

This device contains transmitter module FCC ID : XF6-RS9113DB (Wi-Fi 5GHz)

#### ***"WARNING!"***

#### ***FCC and IC Radiation Exposure Statement:***

*This portable equipment with its antenna complies with FCC's and IC's RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance follow the instructions below:*

- 1. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.*
- 2. Avoid direct contact to the antenna, or keep contact to a minimum while using this equipment.*

3. To maintain the 25mm separation, this device must be worn with the safety toolbelt that holds the device in its pouch.

### Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

**The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems;**

**High power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices.**

This radio transmitter (IC: 8407A-RS9113DB) has been approved by Industry Canada to operate with the integrated antenna. Modifications to the transmitter module without the manufacturer's approval is prohibited.

#### Important

##### IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment.

CAN ICES-3 (A)/NMB-3(A)

This device contains transmitter module IC : 8407A-RS9113DB (Wi-Fi 5GHz)