

Solar Power Supply



Product Manual

*The Essential Guide to
Assembly, Operation,
and Disassembly for
the Safety Team and
Equipment operators.*

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Contents

General Information	1
Warnings and Cautionary Statements	1
Certification	3
Compatibilities	3
Operational Roles	3
Product Information	5
Overview	5
Key Features	5
Versatility	5
Variable output	5
Durability	5
Extensive runtime	5
Portability	6
Connected safety	6
Specifications	7
Hardware Overview	8
Deployment	15
Overview	15
Site considerations	15
Setup supplies	15
Unpack	16
Battery Installation	17
Assembly	18
Operation	21
Maintaining the SPS battery charge	21
Redeploy and Storage	23
Overview	23
Relocation	23
Disassembly	24
Battery Removal	26
Storage	27
Folding and storing the stand	27
Additional storage recommendations	27
Service	27
Warranty	28
Limitation of Liability	28
Appendix	29
Applicable Certification Standards	29
Contact Information	32

Tables and figures

Table 1.1 Solar Power Supply hazardous location certification	3
Table 1.2 Solar Power Supply compatibilities	3
Figure 2.1 Solar Power Supply and Connected Safety	6
Table 2.1 Solar Power Supply specifications	7
Table 2.2 Solar Power Supply output parameters	7
Figure 2.2 SPS Hardware Overview	8
Figure 2.3 Solar Power Supply system diagram	10
Table 2.3 Solar Power Supply parts list	11
Figure 2.4 Insert enclosure diagrams	12
Figure 2.5 Enclosure wiring diagram	13
Table 3.1 SPS standard package contents	16
Figure 3.1 Installing the Battery	17
Figure 3.2 Assembling the SPS	18
Figure 4.1 Disassembling the SPS	24
Figure 4.2 Removing the SPS battery	26
Figure A.1.A Supported equipment and connections	30
Figure A.1.B Supported equipment and connections	31

General Information

Warnings and Cautionary Statements

Certification

Compatibilities

Operational Roles

Warnings and Cautionary Statements

-  **IMPORTANT:** Failure to perform certain procedures or note certain conditions may impair the performance of the product. To ensure safe and proper operation read and follow the procedures and conditions listed below.
-  **WARNING – EXPLOSION HAZARD. DO NOT OPEN THE ENCLOSURE UNLESS THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS.**
AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS OUVRIR LE BOÎTIER À MOINS QUE LA ZONE SOIT EXEMPT DE CONCENTRATIONS IGNITIBLES.
-  **WARNING:** When the Solar Power Supply (SPS) is located in a hazardous-classified area NEVER open the SPS enclosure to install or remove, or to connect or disconnect the SPS battery.
-  **WARNING – EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE FUSE WHEN ENERGIZED.**
AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS ENLEVER OU REMPLACER LE FUSIBLE LORSQU'IL EST ÉNERGÉTIQUE.
-  **WARNING:** Substitution of components may impair intrinsic safety and may cause an unsafe condition.
AVERTISSEMENT: La Substitution de composant peut améliorer la Sécurité Intrinsèque et peut entraîner un condition non susception.
-  **CAUTION:** Never connect or disconnect intrinsically safe (IS) cables for any SPS-compatible device when the SPS power switch is set to on (energized). This can damage the SPS IS barriers.
-  **IMPORTANT:** There are no user serviceable parts contained inside.
-  **IMPORTANT:** Always set the SPS power switch to off before connecting or disconnecting the SPS battery.
-  **IMPORTANT:** When a compatible Industrial Scientific product powered by the SPS is placed in a hazardous-classified location, ensure that any unused ports are capped.
-  **IMPORTANT:** Read and understand this manual before operating the equipment.
-  **IMPORTANT:** 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. The instrument complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation



IMPORTANT: Enclosure must be connected to a suitable ground electrode per the National Electrical Code, ANSI/NFPA 70, Article 504. For Canada, this is CSA 22.1-12 (CEC) section 18 and appendix F. The resistance of the ground path must be less than 1 ohm. A suitable ground electrode is considered a metal underground water pipe, the metal frame of a building or structure, or concrete encased electrode per the National Electrical Code, ANSI/NFPA 70, Article 250.52. Use 18 AWG minimum with a proper 1/4 20-ring wire lug at the enclosure and an appropriate connection method at the ground end.



IMPORTANT: 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.



IMPORTANT: Refer to Control Drawing 18109634-200 for approved Industrial Scientific accessories for hazardous location installation parameters.

IMPORTANT: Reportez-vous au dessin de contrôle pour les accessoires scientifiques industriels approuvés pour les paramètres d'installation de localisation dangereuse.



CAUTION: For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing.

ATTENTION: Pour des raisons de sécurité, cet équipement doit être utilisé, entretenu et réparé uniquement par un personnel qualifié. Étudier le manuel d'instructions en entier avant d'utiliser, d'entretenir ou de réparer l'équipement.



If it appears that the SPS or a device powered by the SPS is not working correctly, contact Industrial Scientific.



IMPORTANT: Only clean using a damp cloth.



The Magnet Mount Kit for use with the RGX Gateway and individual kit items can cause injury. To avoid injury, Industrial Scientific recommends the following.

- Persons with a pacemaker or implantable cardio defibrillator (ICD) should maintain a minimum separation distance of 90 cm (36 ") between the pacemaker or ICD and the magnet. Please consult your physician or pacemaker or ICD manufacturer for additional guidance and recommendations.
- Neodymium magnets have a strong attractive force. Each can attract quickly when in close proximity to another magnet or metal surface and cause injury. The magnet material is brittle; it can crack or splinter on impact to cause injury and potentially become a flying hazard. Use protective gloves and eyewear to avoid a potentially severe pinch injury, cut, or splinter.
- Keep magnets away from electronic devices, identification cards, and credit cards that use microchips, magnets, or magnetic fields.



Fully charge the batteries of compatible Industrial Scientific products before the first use of such products with the SPS.

Certification

Table 1.1 Solar Power Supply hazardous location certification

Certifying Body	Classification ^a	Approved temperature range
cCSAus ^a	Class I, Division 2, Groups A, B, C, and D; T4 (with IS output for Division 1).	-15 °C to +45 °C (5 °F to +113 °F)

^aTo determine the hazardous-classified areas for which a unit is certified, refer to its label.

Compatibilities

The Solar Power Supply (SPS) is compatible with the Industrial Scientific products and resources listed below. Refer to each product manual for safety and usage guidelines and other related information.

Table 1.2 Solar Power Supply compatibilities

Industrial Scientific products	Related resources	Part number
Radius® BZ1 Area Monitor	Radius BZ1 Area Monitor Product Manual	17155915
	Standard 1.52 m (5 ') Intrinsically safe (IS) cable	17159898
	Extended length 50 m (54 yd) IS cable	17156261
RGX® Gateway	RGX Gateway Product Manual	17158071
	Standard 0.61 m (2 ') IS cable	17159904
	Extended length 35 m (38 yd) IS cable	17159948

The SPS can support one Radius BZ1 or RGX Gateway or any *one* of the following combinations:

- one Radius BZ1 and one RGX Gateway simultaneously
- two Radius BZ1 instruments simultaneously
- two RGX Gateway units simultaneously

The SPS insert assembly supports the mounting of *one* compatible device of *each* type. When *two* compatible devices of the *same* type are supported, one can be mounted on the SPS and one can be placed elsewhere. While two RGX units powered by a single SPS may be an unlikely combination, this configuration is fully supported and serves a specific application, e.g. supporting two separate, but adjacent LENS networks in a remote location that lacks other power sources.

Important: The SPS was designed for use with these compatible products from Industrial Scientific, do not attempt to power other products using the SPS.

Operational Roles

To ensure the safe operation of the Solar Power Supply and compatible devices from Industrial Scientific, this manual recognizes the following roles related to operating the equipment.

SPS operators include onsite personnel or users of the SPS who can operate, relocate, and partially disassemble the SPS for relocation or storage. Operators should never need to open the enclosure.

The *safety team* consists of qualified onsite personnel who can set up the SPS including installation and removal of the battery and connecting and disconnecting the battery within the enclosure in nonhazardous locations only. Safety team members can also operate the equipment.

Service technicians are qualified personnel at an authorized Industrial Scientific service center who perform service and repair procedures on the SPS or compatible products beyond those authorized for operators or the safety team.

Product Information

Overview

Key Features

Specifications

Hardware Overview

Overview

The Solar Power Supply (SPS) is a stand-alone power supply that uses solar input to generate power for the operation of compatible Industrial Scientific products. The SPS can operate in specific hazardous-classified areas for which it is certified, supports applications such as fence lines, pipelines, and tank farms, and can be used in locations where electrical power sources are limited or nonexistent. The SPS is portable, easy to setup, and disassemble and is suitable for applications that require its ready relocation.

Key Features

Versatility

The SPS enables compatible products from Industrial Scientific to operate in areas lacking electrical power or where these resources are limited. The SPS supports different compatible device configurations based on a customer's portable power needs. The stand's telescoping legs and adjustable feet allow deployment of the SPS across a variety of terrain types including uneven surfaces, hard surfaces, soil, and sand.

Variable output

Both SPS output connections can safely support either the Radius® BZ1 or RGX® Gateway. Each product will function properly regardless of which connection is used.

Durability

The SPS can tolerate extreme environmental conditions and remain operational. It can withstand exposure to fungus and salt fog (up to 96 hours of salt fog). Unanchored, the SPS can withstand up to 60 mph side or headwinds.

Extensive runtime

Compatible Industrial Scientific products can run *indefinitely* when powered by the SPS as long as its battery remains charged. Industrial Scientific recommends a *daily minimum* of four (4) hours of direct sunlight to maintain the battery's level of charge.

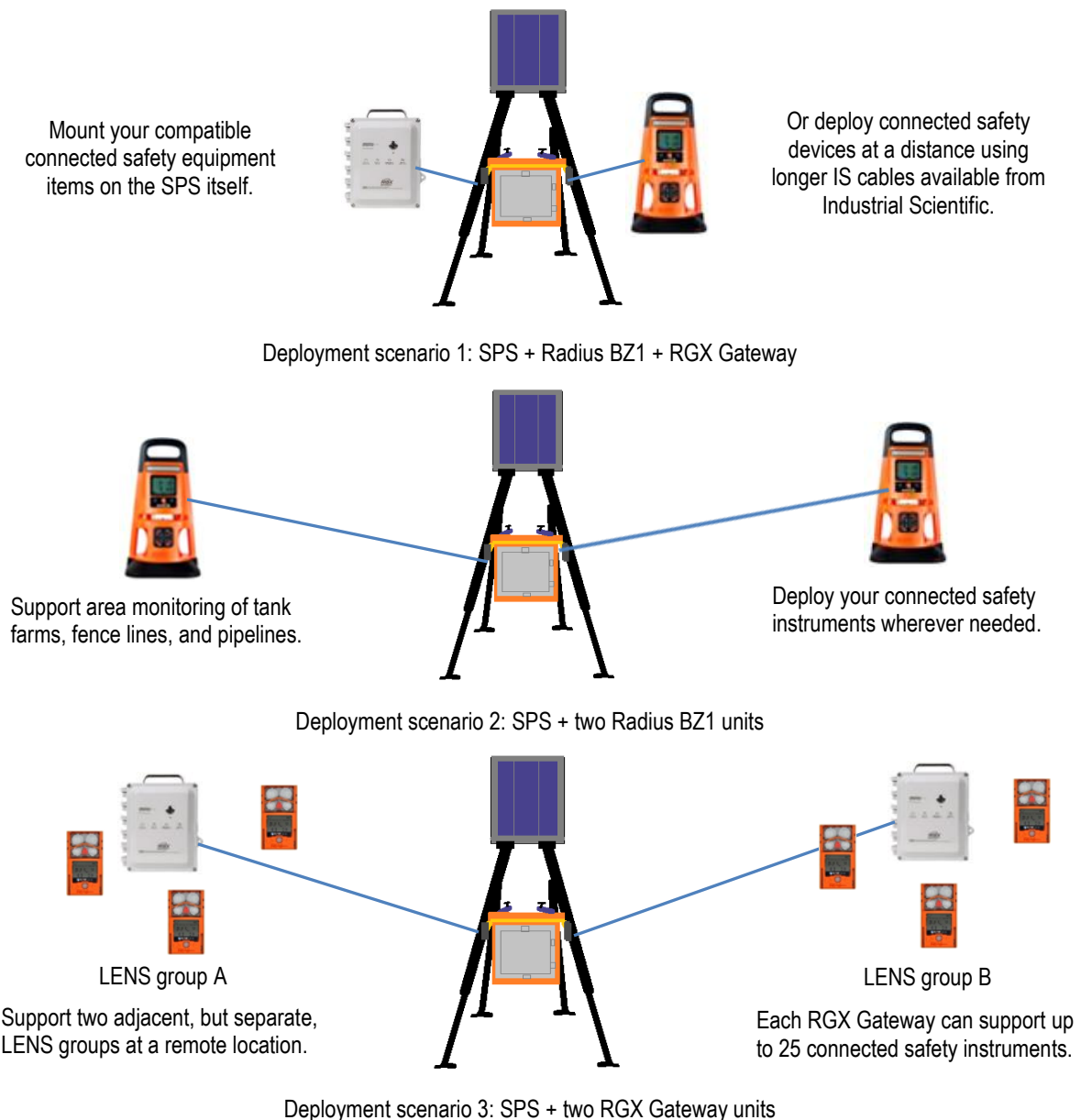
Portability

The modular design of the Solar Power Supply (SPS) enables its rapid disassembly for repositioning, storage, or redeployment in another location. Once the SPS is unpacked and assembled, operators can reposition or move the unit a short distance, as needed. The solar panel can be reoriented (360° rotation) to improve solar exposure.

Connected safety

The SPS supports the Industrial Scientific connected safety system by enabling compatible connected safety equipment items to operate in locations where electrical power sources are limited or nonexistent.

Figure 2.1 Solar Power Supply and Connected Safety



Specifications

The data supplied in tables 2.1 and 2.2 and figure 2.2 are provided to support the successful setup and operation of the Solar Power Supply (SPS).

Table 2.1 Solar Power Supply specifications

Item	Description
Size (height x width x depth)	Approximately 0.84 x 1.22 x 1.07 m (33 x 48 x 42 ") when packaged, prior to assembly.
Weight	63.27 kg (139.48 lb) ^a
Materials	Aluminum stand and bracket assembly with stainless steel enclosure.
Performance	
Ingress protection	NEMA 4X (enclosure) for outdoor usage
Power cables	
Input (1)	Cable from solar panel to enclosure.
Outputs (2)	Intrinsically safe (IS) cables supplying DC power from enclosure to compatible devices.
Buttons or switches	One (power on and off)
Indicators	None – A compatible product will indicate that it is receiving power from the SPS.
Operating conditions	
Ambient temperature	-15 °C to +45 °C (5 °F to +113 °F)
EMC	Meets requirements for Electromagnetic Compatibility (EMC) for Class A equipment and meets EMC requirements while connected as a system to a Radius BZ1 instrument.
Humidity	20-90% relative humidity (RH) noncondensing
Storage ^b temperature	-40 °C to +75 °C (-40 °F to +167 °F)

^aFor ease of handling, no subassembly (solar panel assembly, stand, battery, insert assembly, etc.) weighs more than 27.21 kg (60 lb).

Table 2.2 Solar Power Supply output parameters

Item	Value range
Output ^a parameters	
U _o	14.7 VDC
I _o	300 mA
Co ^b	0.58 pF
L0 ^b	0.32 mH

Notes:

^aFor corresponding input parameters, see the product manual for each compatible Industrial Scientific product.

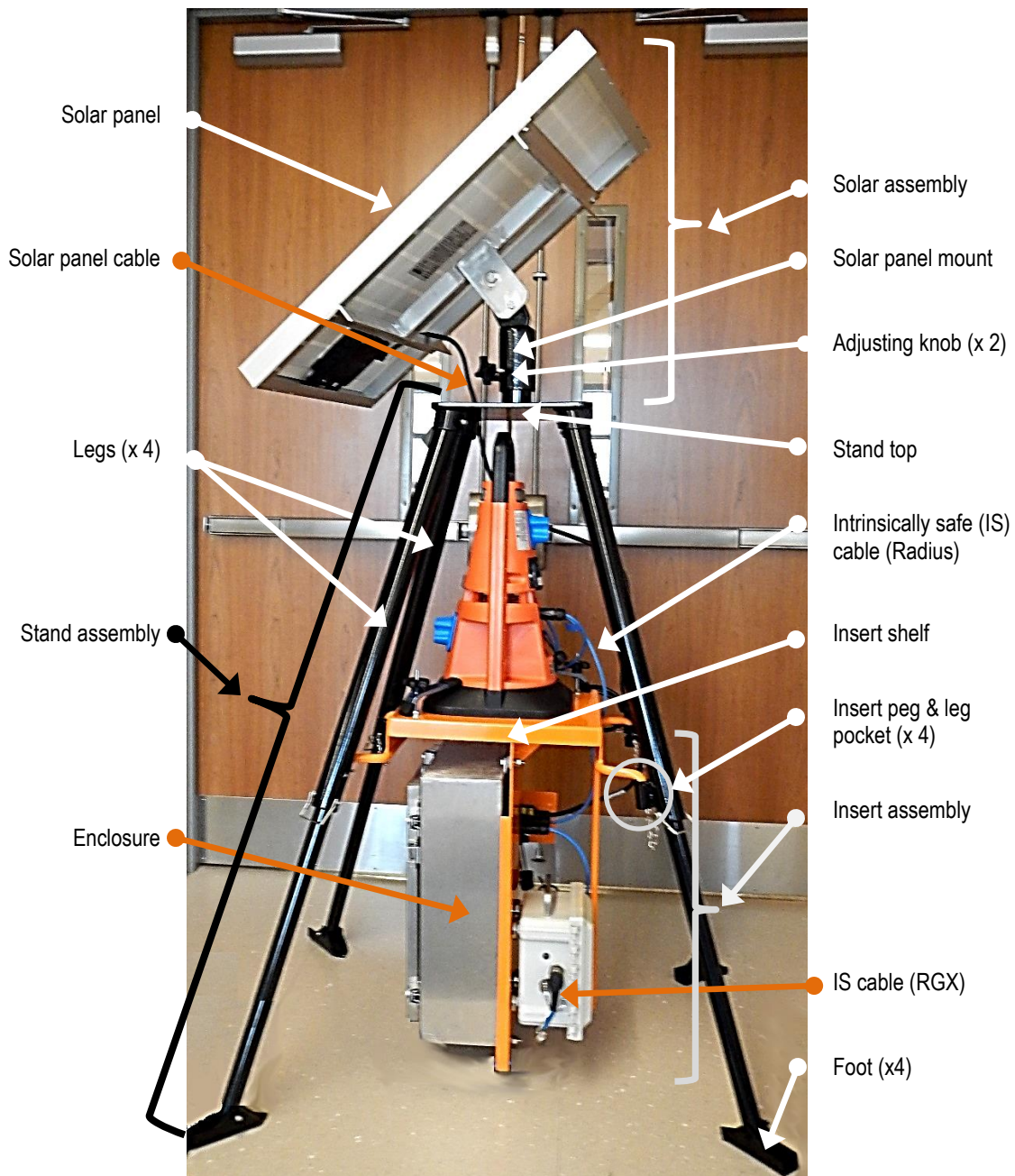
^bWhen added together, the Li and Ci entity parameters of the Industrial Scientific Solar Power Supply *plus* the total from the IS Cable must not exceed the power supply entity parameters for L0 and Co. Refer to control drawing 17159827-350 referenced in Figure 2.6.

The SPS output connections provide the appropriate output entity parameter ratings to support the compatible Industrial Scientific products listed in [Table 1.2 Solar Power Supply compatibilities](#).

Hardware Overview

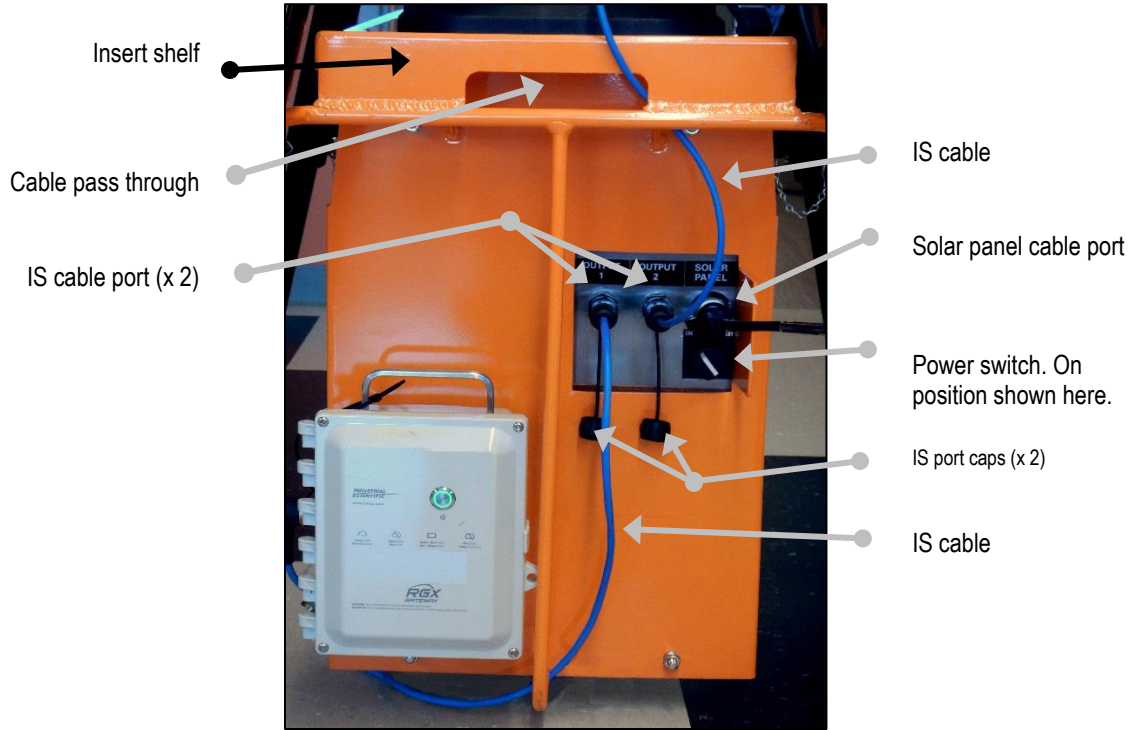
The main components of the SPS are shown below and referred to throughout this manual.

Figure 2.2 SPS Hardware Overview

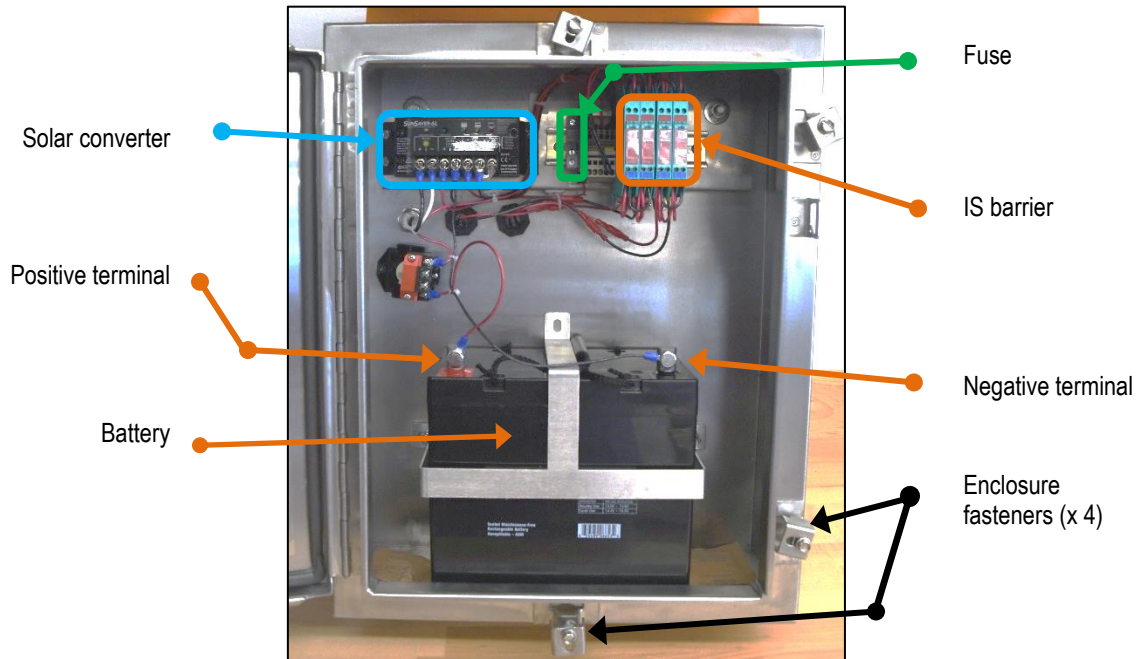


(Right side view; shown with Radius BZ1 and RGX Gateway)

Figure 2.2 SPS Hardware Overview



(Rear view, insert assembly; shown with RGX Gateway)



(Close-up view, inside enclosure)

Note: There are no user serviceable parts inside the enclosure; all components for Industrial Scientific use only.

Figure 2.3 Solar Power Supply system diagram

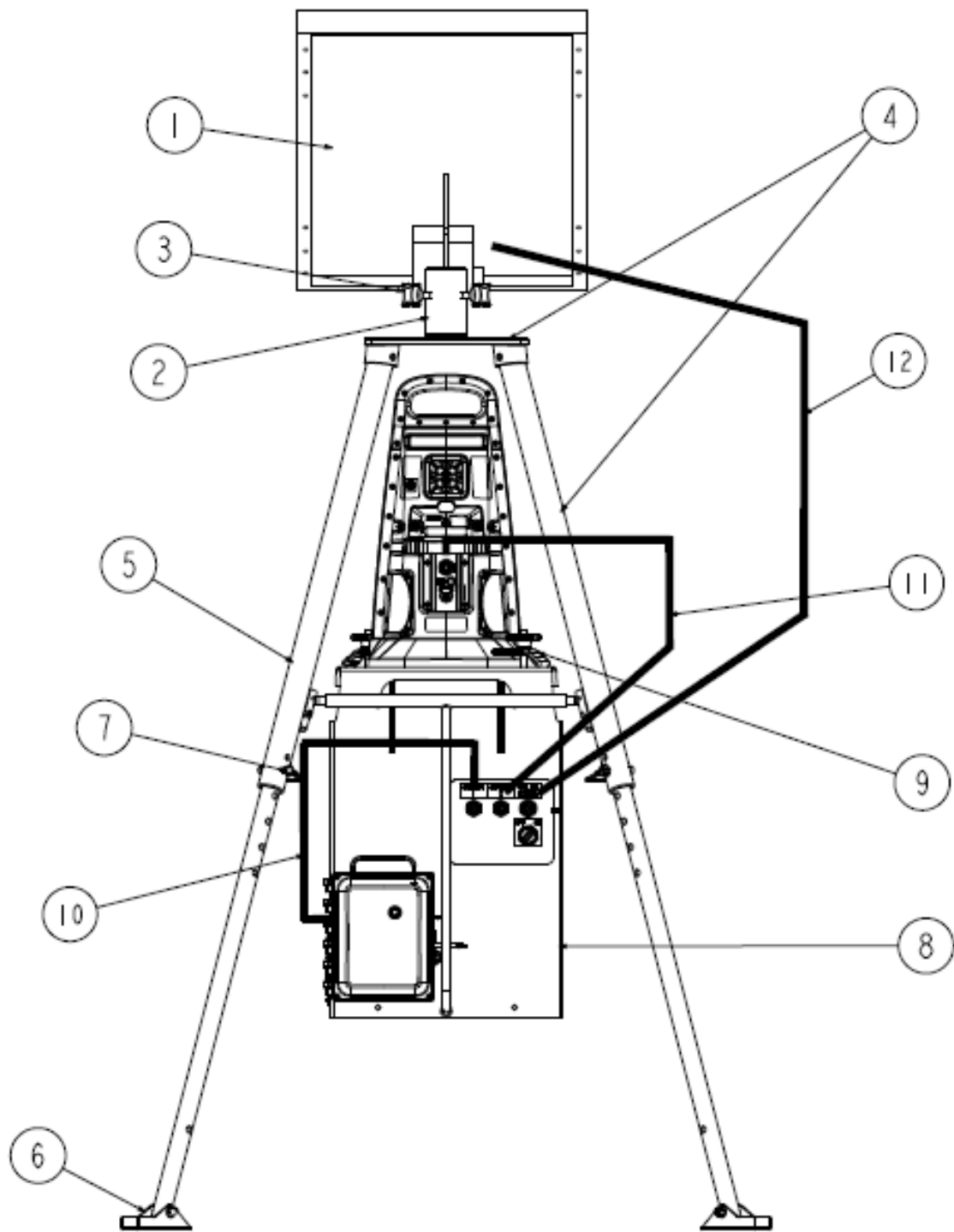


Table 2.3 Solar Power Supply parts list

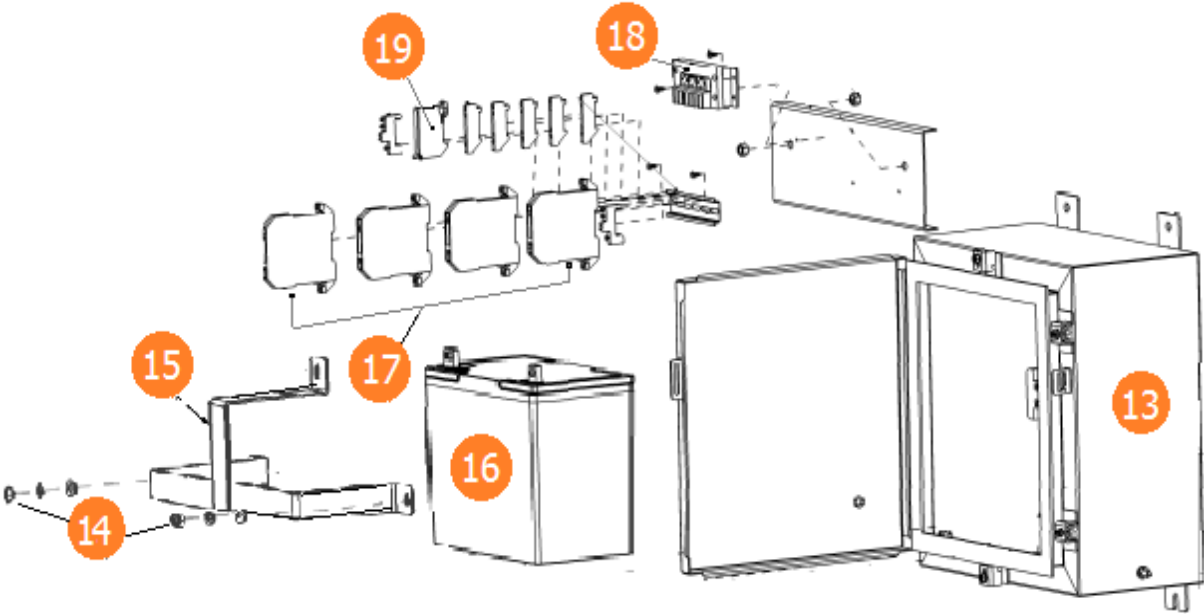
Item	SPS component	Qty	Orderable P/N	Description
1	50 W solar panel	1	17159602	Photovoltaic module, 83.56 x 53.59 x 5 cm (32.9 x 21.1 x 2 "), harvests sunlight for conversion to DC electrical power.
2	2 " Solar panel mount	1	—	Connects solar panel to stand, allows 360° rotation of panel.
3	Adjusting knob	2	17159897	Secures solar panel mount to stand, hand tighten.
4	Stand assembly	1	—	—
5	Leg unit	4	17159607	Adjustable length with a pocket to hold an insert assembly peg.
—	Upper leg	4	17159604	Upper portion of leg, bolted to top of stand.
—	Lower leg	4	17159925	Lower, telescoping section of leg, attached to foot.
6	Adjustable foot	4	17159926	Flat or pointed configuration, toolless adjustment.
7	Pin with clip	4	17159933	Sets length of adjustable, telescoping legs on stand.
8	Insert assembly	1	—	Support structure that holds Radius BZ1, RGX, and enclosure.
9	Radius clamp	2	17159890	Corner clamp, hand tightened with screw knob to secure Radius.
10	IS power cable ^a	1	17159904	Supplies DC power for RGX Gateway, 0.61 m (2 ') shown.
11	IS power cable ^a	1	17159898	Supplies DC power for Radius BZ1, 1.52 m (5 ') shown.
12	Solar panel cable	1	17159911	Connects solar panel to enclosure, 3.70 m (12 ').
13	Enclosure, stainless steel	1	17159606	Enclosure with door; 50.80 x 40.64 x 15.24 cm (20 x 16 x 6 "); Prewired and mounted to insert assembly at factory.
14	Hex nut (7/16 ")	2	17159934	Secures battery holder inside enclosure.
15	Battery holder	1	—	Bracket that secures SPS battery within the enclosure.
16	Battery, 12 volt	1	17159850	55 amp hour, sealed, lead-acid battery charged by solar panel.
17	IS barrier	1	—	IS buffer prevents incoming or outgoing current overload.
18	Solar converter	1	—	Converts harvested solar input into usable DC output.
19	Fuse	1	—	Provides overcurrent protection of the electrical circuits.
20	IS cable ports	2	—	IS connection - supplies DC power from battery.
21	IS cable port caps	2	17159532	Plastic caps with built-in tethers for output ports.
22	Solar panel cable port	1	—	Input connection from solar panel to enclosure.
23	Solar cable port cap	1	17159842	Tethered metal cap for solar panel cable port.
24	Power switch	1	—	Controls flow of power from battery to Radius and RGX units.
—	Magnet mount kit for RGX ^b	1	18109564	Attaches to the back of the RGX to allow mounting on the SPS.
—	J-hook Stakes ^b	4	17159992	Anchors the SPS feet to the ground, 30.48 x 1.59 cm (12 x 5/8 ").

Notes:

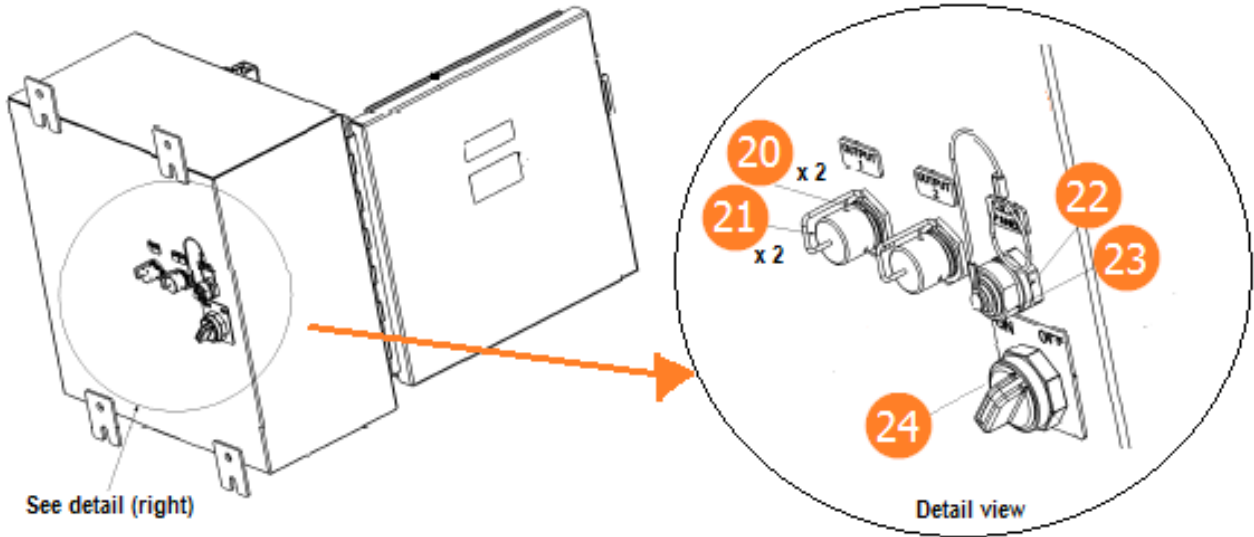
^aThe following cables are also compatible with the SPS: Part number 17156261 – 50 m (54 yd) IS cable for Radius BZ1 and part number 17159948 – 35 m (38 yd) IS cable for RGX Gateway.

^bThese items are included with every SPS but not depicted in figures 2.3, 2.4, or 2.5.

Figure 2.4 Insert enclosure diagrams



3-D diagram of Insert enclosure internal components



Insert enclosure (back) with connection details

Deployment

Overview

Unpack

Battery Installation

Assembly

Operation

Overview

The Solar Power Supply (SPS) is designed for ease of setup including unpacking, assembly, deployment, and the mounting of compatible Industrial Scientific products. Set up should be completed by a member of the safety team, all other deployment steps can be completed by an operator.

Site considerations

Prior to unpacking and assembling the SPS, give careful consideration to site selection. Ensure that the site selected for deployment achieves the following:

- Supports the assembly and connection instructions provided below in Figure 3.2.
- Meets all [Specifications](#) such as operating temperature and relative humidity.
- Allows the SPS solar panel to be properly oriented to harvest available solar energy.
- Location, terrain, and ground surface considerations:
 - Place the SPS in an open, outdoor location with abundant sunshine.
 - Avoid natural or man-made obstacles (e.g. trees or nearby buildings) that might block access to sunlight for a significant portion of the day.
 - Avoid flood plains or areas subject to frequent flooding to reduce the risk of exposing the SPS internal electrical components to water.
 - On uneven terrain, the length of the telescoping legs can be adjusted to level the stand.
 - The configuration of the stand feet (flat or pointed) can be changed for different site surfaces (hard surface, soil, sand, etc.). The pointed feet can also be planted in certain surface types.
 - The legs of the SPS stand can also be anchored to the ground with the included j-hook stakes.

Setup supplies

For unpacking and assembly

- Utility knife
- Compass or compass app on smartphone
- Level (optional)
- Mallet for driving stakes (optional)

For battery installation or removal

- Flathead screwdriver
- Adjustable wrench
- Socket set with 6 " extension
- Volt meter

Unpack

The Solar Power Supply (SPS) is shipped partially assembled in two corrugated cardboard boxes strapped to a 1.22 m x 1.07 m (48 " x 42 ") fiber pallet. The total height of the assembled pallet and boxes is 0.84 m (33 "). The combined weight of the pallet and both boxes is 81 kg (178.5 lb). For transportation, the pallet will fit into the back of most pickup trucks or the boxes can be removed from the pallet.

Box one is labelled "Legs": This box contains only the four stand legs bolted to the stand top. Box two, labelled "All other equipment", contains the remaining standard components: the solar assembly (panel, mount, and cable), insert assembly with enclosure, battery, and a set of four J-hook stakes.



Every SPS will ship with the standard IS cables for the Radius BZ1 and RGX Gateway and the Magnetic mount kit for the RGX. Additional items, including Radius BZ1, RGX Gateway, and extended length IS cables can be ordered separately.

Each item below should be accounted for during the unpacking process. Industrial Scientific recommends unpacking the shipping boxes prior to onsite assembly. If any item is missing or appears damaged, contact Industrial Scientific (see back cover) or an authorized distributor of Industrial Scientific products.

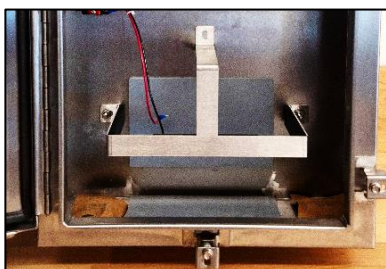
Table 3.1 SPS standard package contents

Quantity	Item	Description
1	Stand assembly	
	Stand top	Flat, square, top plate with connector for solar panel mount, sockets for legs.
	4 telescoping legs	Adjustable aluminum legs, each bolted to stand top, terminating in a foot.
1	Insert assembly	
	Bracket assembly	Aluminum bracket structure with shelf for Radius, steel discs to mount RGX.
	Enclosure	Stainless steel enclosure with door; contains all wiring, electronics and battery.
1	Solar panel assembly	
	Solar panel	Harvests sunlight to charge the SPS battery.
	Solar panel mount	Connects solar panel to stand and permits 360° rotation of panel.
	Solar panel cable	3.66 m (12 ') cable providing solar panel input to enclosure.
1	Battery	Sealed, lead acid battery charged by solar panel.
4	J-hook stakes	Steel stakes used for anchoring SPS feet to the ground.
1	Setup Guide	<i>Solar Power Supply Set-up / Quick Guide</i>

Battery Installation

IMPORTANT: This procedure is to be performed by a member of the safety team *prior to deploying the SPS*. In a nonhazardous (or declassified) area **ONLY** install the battery in the enclosure and complete the battery connections. **NEVER** open the enclosure in a hazardous-classified area.

Figure 3.1 Installing the Battery



Free the boxes from the pallet

1. Use a utility knife to cut the straps and free the boxes from the pallet.
2. Open the box marked "All Other Equipment".

Locate the SPS battery and insert assembly

1. Locate the SPS battery in the open box and set aside.
2. Locate the insert assembly and remove from the open box.
3. On the back of the enclosure, *check that the SPS switch is set to OFF*.
4. Place the insert assembly on a table or other work surface where you can access the enclosure door.

Install the battery in the enclosure

1. Use a screwdriver, adjustable wrench, or 3/8 " socket to loosen the fasteners securing the enclosure door. Take care not to apply too much force to the fasteners!
2. Open the enclosure door.
3. Use the included cord to remove the battery from its box.
4. Install the battery in the enclosure:
 - Loosen and remove the 7/16 " nuts securing battery holder.
 - Remove battery holder and place battery in position in enclosure.
 - Replace and tighten nuts to secure battery holder.
5. Using the volt meter, check the battery voltage^a to ensure that the battery is fully charged (about 12 volts DC).
6. Use the included battery hardware (nuts, bolts, and washers) to complete the battery terminal connections in this order:
 - red wire to positive
 - black wire to negative
7. Close the insert enclosure door and secure^b the fasteners:
 - Tighten the fasteners gradually, partially tightening each one in turn.
 - Take care not to apply too much force to the fasteners!
 - Industrial Scientific recommends 4.5 N m (40 lb in) of torque.
 - **CAUTION!** Exceeding 5.6 N m (50 lb in) of torque can damage the fasteners, preventing the enclosure door from sealing.
 - As you tighten each fastener, stop and back off if the built-in spring begins to bulge outwards.
 - Complete the tightening of each fastener to secure the enclosure door.

Notes:

^aThe battery should be fully charged, out of the box. See

Operation section for information about maintaining the battery's charge.

^bWhen properly secured, you can still push down on the door slightly.

Assembly

The Solar Power Supply (SPS) is designed for easy assembly. Equipment operators should follow the instructions in Figure 3.2 to assemble and deploy the SPS. All steps below can be safely performed in a hazardous-classified area. Before continuing, relocate all SPS components to the deployment site^a.

^aSee [Site considerations](#) for guidance related to site and terrain selection.

Figure 3.2 Assembling the SPS



Setting up the stand

1. Open the box marked "Legs":
 - Turn this box on its side, it consists of two parts that nest together.
 - Using a utility knife, carefully cut the packaging tape that secures the two parts of this box on all four sides.
 - Lift off the "outer" section of the box to reveal the stand assembly: The stand top bolted to four adjustable legs with telescoping lower sections.
2. Lift the stand out of the box and set upright; remove bubble wrap and packaging.
3. Spread the legs apart slightly to improve stability.
4. Check that the label "Front" affixed on the stand top is facing you.
5. Position the insert assembly inside the stand legs, aligning its "Front" label with that on stand.
6. Insert each peg on the insert into a "pocket" affixed at the midpoint of each leg.
7. Optionally, secure the insert assembly in the stand with locking cotter pins in two insert shelf pegs.

Adjusting the stand legs

Set the length of the stand legs:



Telescoping leg



Adjustment pin and clip

1. Determine length needed for each leg based on deployment location (type of ground surface, nearby obstructions, potential flooding, etc.).
2. Each leg can be set to a different length, as needed, to compensate for uneven terrain at the deployment location.
3. Adjust each telescoping leg using the adjustment pin: A clip is attached to one side of the pin and the other side of the clip slips over to lock it in place:
 - Open the pin's clip and rotate it to the side, out of the way.
 - Remove the adjustment pin from the leg.
 - Slide the bottom part of the leg up or down to achieve the desired length.
 - Align the holes for the selected position on both parts of the leg,
 - Insert the pin into the desired position and lock the pin with the clip.
 - Repeat, as needed, for each leg.
4. After adjusting legs, check that the insert shelf is level

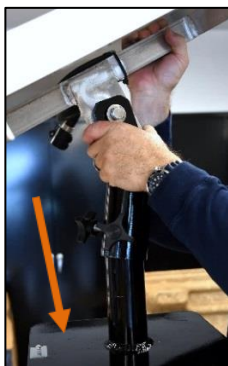


Foot – flat or pointed



Adjusting the foot position

1. The stand feet have two configuration options: Flat or pointed.
 - The flat option works well on hard surfaces (e.g. concrete or packed soil).
 - The pointed option works well on sand, gravel, loose soil, or similar surfaces.
2. When deploying on a surface that supports this, rotate the feet into the pointed configuration and plant the pointed feet in the ground surface.
3. The feet or legs can also be anchored using the included J-hook stakes.



Solar panel installation

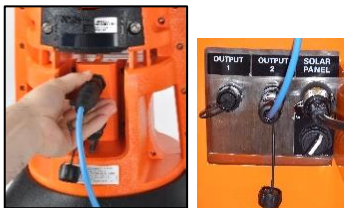
The solar panel mount and solar cable come out of the box attached to the solar panel, ready for use. Locate and remove the solar assembly.

1. Place the solar panel assembly over the connector on top of the stand.
2. The solar panel mount allows for 360 degree rotation of the panel. Using a compass, or compass app, orient the solar panel to due south (northern hemisphere) or due north (southern hemisphere). This orientation supports the harvesting of solar energy by the solar panel.
3. Hand tighten the adjustment knobs at the bottom of mount to secure the solar assembly to the stand.
4. On the back of the insert enclosure, uncap the solar panel cable port:
 - Check that the SPS power switch is set to OFF.
 - Turn the port cap counterclockwise to expose the port for use.
 - Leave the cap tethered to the SPS to help prevent its loss.
5. Connect the solar cable to the solar panel cable port:
 - Align the mini-prongs in the cable with the holes in the port.
 - Push in slightly, then turn clockwise to hand tighten the cable fitting.
 - Snap closed the minilock around the cable port on the back of the insert enclosure to secure it.



Mounting a Radius BZ1 on the SPS

1. Place the Radius BZ1 on top of the insert shelf, oriented with the Radius LCD screen and control buttons facing out on the front side of the stand.
2. Position each clamp over the edge of the Radius boot and hand tighten its knob to secure the Radius on top of the insert shelf.
3. On back of the Radius, uncap the Intrinsically Safe (IS) power input port:
 - Turn the port cap counterclockwise to expose the port for use.
 - Leave the cap tethered to the Radius to help prevent its loss.
4. Connect the Radius IS cable to the Radius IS power input port:
 - Turn the swivel connector clockwise (about 45°) until it clicks closed.
 - Ensure that the other power input port on the Radius is capped.



5. Connect the other end of the Radius IS cable to either IS cable port on the back of the SPS enclosure:
 - Turn the port cap counterclockwise to expose the port for use.
 - Leave the cap tethered to the enclosure to help prevent its loss.
 - Turn the cable's swivel connector clockwise (about 45°) until it clicks.

Note: Industrial Scientific recommends that the batteries of compatible devices be fully charged prior to connecting those devices to the SPS.

Mounting an RGX Gateway on the SPS

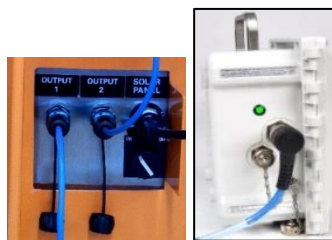


1. Install the magnetic mounts^a on the back of the RGX Gateway. A minimum of two magnetic mounts, positioned diagonally, are required. Industrial Scientific recommends using all four magnetic mounts.
2. On the side of the RGX, uncap the IS power input port:
 - Turn the port cap counterclockwise to expose the port for use.
 - Leave the cap tethered to the RGX to help prevent its loss.
3. Connect the RGX IS cable to the RGX IS input port:
 - Turn the swivel connector clockwise (about 45°) until it clicks closed.
 - Ensure that the other power input port on the RGX is capped.
4. Connect the other end of the RGX IS cable to an available IS cable port on the back of the SPS enclosure:
 - Turn the port cap counterclockwise to expose the port for use.
 - Leave the cap tethered to the enclosure to help prevent its loss.
 - Turn the cable's swivel connector clockwise (about 45°) until it clicks.
5. Using the magnetic mounts, attach the RGX to the steel discs on the left side at the back of the SPS insert assembly.

^a*Note:* See the RGX Gateway Product Manual for more information about the magnetic mounts, including important safety warnings.



Power on the SPS and any connected devices



1. Power on the SPS (Turn the switch on the back of the enclosure to ON).
2. Power on any connected devices (Radius BZ1, RGX Gateway, or both).
3. On each connected Radius, the power-supply symbol (⚡) displays on its LCD screen to indicate that the instrument is receiving power.
4. On each connected RGX, the indicator light on the side of the RGX should turn on (solid green) to indicate that the unit is charging.

Operation

The *Solar Power Supply* (SPS) can be operated in nonhazardous areas or in classified hazardous locations as specified in [Table 1.1 Solar Power Supply hazardous location certification](#).

Ensure that the use of this product and any compatible products powered by it meets any restrictions imposed by local, state, or national codes, regulations, standards, permits, or other requirements.

Maintaining the SPS battery charge

The sealed, lead acid battery that ships with the SPS should be fully charged, out of the box. The DC electrical current supplied by the solar panel and converter helps to maintain the battery's level of charge, "topping off" or trickle-charging the battery as its level of charge is depleted by the compatible products it is powering. Factors that could contribute to depleting the battery's charge:

- delays during shipping of the SPS
- lack of sunlight due to weather or other conditions
- placing the SPS into storage^a

Industrial Scientific recommends starting with a fully charged battery in each compatible product and, when any of the factors listed above applies, charging the SPS battery for a minimum of 4 hours *prior* to attempting to power any compatible product using the SPS.

^a*Note:* While the SPS battery will retain some level of charge during shipment and storage, if the SPS is delayed or stored for more than 30 consecutive days, charge its battery using the solar panel before attempting to power compatible products with the unit.

The SPS power switch must be set to on to power compatible products from Industrial Scientific.

When used with the Radius BZ1, the following apply.

- Periodically check the instrument display screen for the presence of the power-supply symbol (⚡).
- The instrument's low-battery indicator () will display when it has between two and five hours of remaining operating time.

When used with the RGX Gateway, the following applies.

- The RGX's charging status indicator light will remain on while the SPS is connected and turned on.

Periodically inspect the SPS, the IS and Solar panel cables to detect possible physical damage. If any damage is observed, replace the damaged cable or component.

Redeploy and Storage

Overview

Relocation

Disassembly

Battery Removal

Storage

Service

Warranty

Overview

The Solar Power Supply (SPS) is designed for ease of setup, disassembly, and storage. The SPS can also be easily relocated a short distance when deployed or disassembled for relocation to another site or for storage purposes.

Relocation

BEFORE relocating the SPS to a classified hazardous area:

- Operators should use the power switch to de-energize the product for transportation.
- Members of the safety team should always:
 - Set the SPS switch to off before connecting or disconnecting the SPS battery.
 - Install and connect the battery in the insert assembly – ONLY in a nonhazardous location.

The SPS can be easily relocated a short distance to improve the amount of solar energy harvested or to accommodate the relocation of compatible connected safety products from Industrial Scientific. When relocating the SPS always keep the following in mind:

- Follow all guidance related to [Site considerations](#).
- The SPS can be partially disassembled to make it easier to relocate. See [Figure 4.1 Disassembling the SPS](#) for complete disassembly directions.
- If the SPS is anchored to the ground, remove all anchors prior to relocation.
- If any SPS feet are planted in the ground surface, extract the feet prior to relocation.

Disassembly

The Solar Power Supply (SPS) is designed to be easily disassembled. All the steps below can be safely performed by an operator in a hazardous-classified area. Operators should NEVER open the enclosure.

Follow the instructions below in Figure 4.1 to disassemble and store the Solar Power Supply.

Figure 4.1 Disassembling the SPS



Power off all devices

1. Power off any connected compatible Industrial Scientific products.
2. Power off the SPS using the switch on the back of the insert assembly.



Remove the Solar Panel

1. Open the minilock on the solar cable at the back of the enclosure:
 - While holding the minilock stationary, press your thumb on the tab of the minilock to snap it open or insert a screwdriver into the slot and twist.
2. Turn the solar cable's connector counterclockwise to loosen it, then gently pull it out of the connector on the back of the enclosure.
3. Recap the solar port on the back of the enclosure: push the cap slightly, then turn its swivel connector clockwise (about 45°) until it clicks closed.
4. Loosen the adjusting knobs at the bottom of the solar panel mount, leaving the solar panel attached to the mount.
5. Lift the solar panel, mount, and cable off as a unit and set aside.

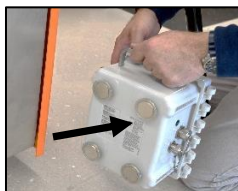
Tip: Leave the mount and cable attached to the solar panel to simplify later reassembly.



Disconnect IS cables from powered devices

1. Turn the swivel connectors counterclockwise (about 45°).
2. Recap the intrinsically safe (IS) port on each device: push the cap slightly, then turn its swivel connector clockwise (about 45°) until it clicks closed.

Note: IS power cables can be safely connected to and disconnected from compatible Industrial Scientific products in hazardous-classified areas if the SPS is de-energized.



Unmounting an RGX Gateway

1. Attached with the magnetic mounts, the RGX should slide right off.
2. Set the RGX aside.

Note: Skip these steps if not supporting an RGX Gateway with the SPS.



Unmounting a Radius BZ1

1. Unscrew the knobs to loosen the clamps on the Radius boot.
2. Tilt the top of Radius unit back (away from you) while holding boot to pull unit off top of insert shelf and out of stand.
3. Set the Radius aside.

Note: Skip these steps if not supporting a Radius BZ1 with the SPS.



Disconnect the IS cables at the back of the enclosure

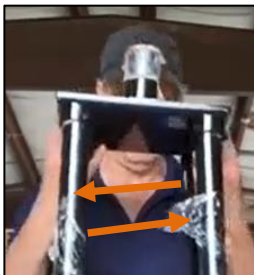
1. Turn the swivel connectors counterclockwise (about 45°).
2. Recap the intrinsically safe (IS) port on each device: push the cap slightly, then turn its swivel connector clockwise (about 45°) until it clicks closed.

Note: IS power cables can be safely disconnected from compatible Industrial Scientific products in hazardous-classified areas if the SPS is de-energized.



Remove insert assembly

1. If locking cotter pins are inserted through any insert shelf pegs, remove these pins; set aside.
2. Lift insert assembly with attached enclosure up and off the stand.
3. Set insert assembly aside.



Folding the stand (optional)

1. With the insert removed, lift the stand up slightly and the legs will fold in (shown, left).
2. The telescoping legs can also be shortened to reduce the stand height.

Note: See [Adjusting the stand legs](#) for detailed directions.

Once the SPS has been relocated, see [Figure 3.2 Assembling the SPS](#) for complete reassembly directions.

Battery Removal

This procedure is to be performed by a member of the safety team. Before removing the SPS battery, the insert enclosure **MUST** be situated in a nonhazardous or declassified location. **NEVER** open the enclosure in a hazardous-classified area.

Figure 4.2 Removing the SPS battery



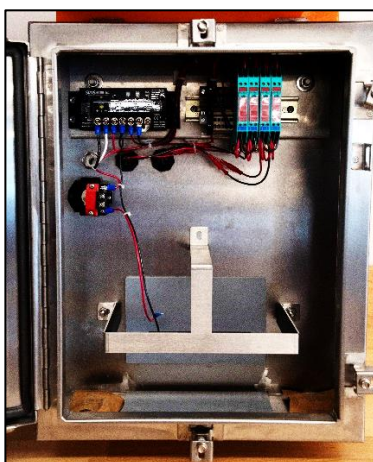
Accessing the battery

1. On the back of the enclosure, *check that the SPS switch is set to OFF.*
2. Use a screwdriver, adjustable wrench, or 3/8 " socket to loosen the enclosure door fasteners. Take care not to apply too much force to the fasteners!
3. Open the enclosure door to access the battery.

Disconnecting and removing the battery

1. Loosen and remove the battery connection hardware, disconnecting the wires from the battery terminals in this order:
 - black wire from negative terminal
 - red wire from positive terminal
2. Replace the battery connection hardware on the battery terminals.
3. Loosen and remove the nuts securing the battery holder.
4. Remove the battery holder and use the built-in handle to lift the battery out of the enclosure and set it aside.
5. Replace battery holder and hardware and tighten nuts to secure empty battery holder in enclosure.
6. Close and secure the enclosure door:
 - Tighten the fasteners gradually, partially tightening each one in turn.
 - Take care not to apply too much force to the fasteners!
 - Industrial Scientific recommends 4.5 N m (40 lb in) of torque.
 - **CAUTION!** Exceeding 5.6 N m (50 lb in) of torque can damage the fasteners, preventing the enclosure door from sealing.
 - As you tighten each fastener, stop and back off if the built-in spring begins to bulge outwards.
 - Complete the tightening of each fastener to secure the enclosure door.

Note: When properly secured, you can still push down on the door slightly.



Storage

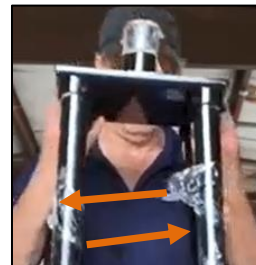
Once the SPS has been disassembled, as described in detail above, its component parts can be easily relocated and stored until needed again.

Folding and storing the stand

If the feet of the stand are anchored to or planted in the ground surface, remove any anchoring stakes or extract the feet from the ground.

With the insert removed and feet extracted, lift the stand up slightly and the legs will fold in for more compact storage^a (shown, right). The telescoping legs can also be shortened to reduce the stand height when storing the stand.

^aNote: When reassembling the SPS stand, spread its legs apart to stabilize the stand. Adjust leg length and foot positions as needed.



Additional storage recommendations

- The storage location should meet any conditions listed in [Table 2.1 Solar Power Supply specifications](#) that would apply to storage (storage temperature, humidity, etc.).
- Disconnect all cables (IS and solar) and cap all ports.
- In a nonhazardous area ONLY, a member of the safety team can remove the SPS battery. Storing the battery separately also serves to lighten the insert assembly for relocation during storage.
 - Operators should use the power switch to **de-energize the product for transportation or storage**.
 - The safety team should always set the SPS switch to off before connecting or disconnecting the SPS battery.

Service

Service tasks that can be completed by the safety team are listed below. These tasks should NEVER be performed in a hazardous-classified area:

- opening the insert enclosure
- installing or removing the SPS battery
- connecting or disconnecting the SPS battery

Additionally, operators should regularly inspect the solar panel. The panel can be cleaned by wiping with a soft, clean cloth. Moisten the cloth only with water; never use solvents or other chemicals to clean it.

All other service tasks should be performed only by Industrial Scientific or an authorized service center.

Warranty

Industrial Scientific Corporation's Solar Power Supply is warranted to be free from defects in material and workmanship for a period of two years after purchase.

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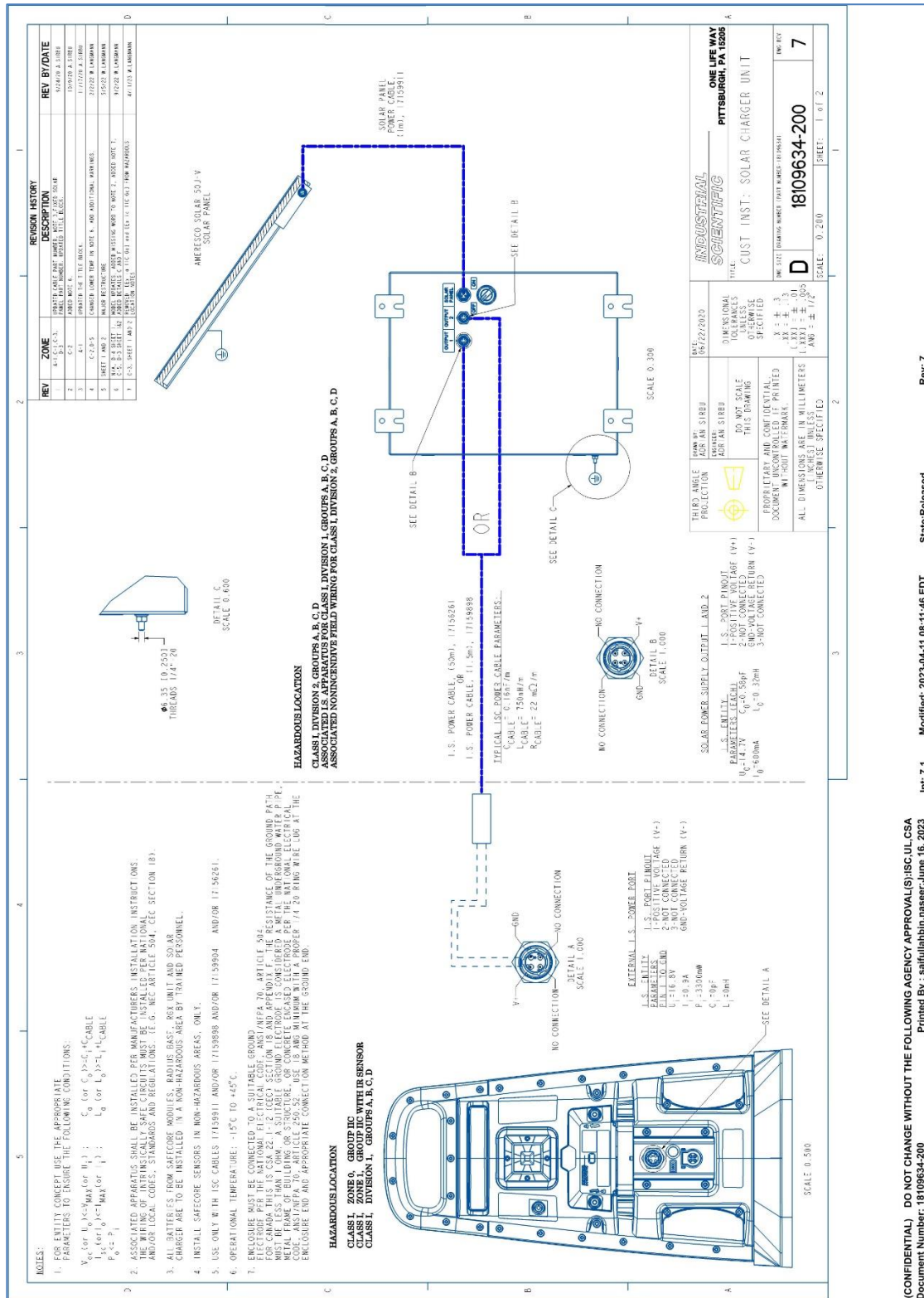
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Appendix

Applicable Certification Standards

- ASTM G21 – Fungus exposure.
- CAN / CSA C22.2 NO. 61010-1-12 (R2017) Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General Requirements.
- CSA C22-2 No. 213-17 / UL 12.12.01: 2017 Nonincendive electrical equipment for use in Class I and II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations.
- EN 50270 while connected as a system to a Radius BZ1 instrument.
- EN 61326-1:2013, section 6.2, Table 2, for Electromagnetic Compatibility (EMC). Class A equipment (non-residential) per CISPR 11.
- ICES-003 / FCC Part 15, Subpart B – Radiated / Conducted Emissions
- MIL-STD-810 – Salt Fog exposure.
- UL 508, 698, 1604, & 2279. UL file #:E157436 (Guide NOIV, NOIV2, NOIV7), E68568 (Guide NKCR).
- UL-61010-1 3rd Edition Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements.

Figure A.1.A Supported equipment and connections



Control drawing 18109634-200.



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