ORBCOMM®

WHERE DATA DRIVES DECISIONS

SC 1000

Installation Guide

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PREFACE

Purpose

This document is as an overview of the installation procedures for the SC 1000.

Notation

Hardware components, labels, and figures in this document might not be exactly as shown and are subject to change without notice.

CAUTION: This safety symbol warns of possible hazards to personnel, equipment, or both. It includes hazards that will or can cause personal injury, property damage, or death if the hazard is not avoided.

Note: A note indicates information with no potential hazard. A note indicates points of interest or provides supplementary information about a feature or task.

Numbered lists indicate a series of steps required to complete a task or function.

Bulleted lists highlight information where order or sequence is not crucial.

Battery Safety Warnings

CAUTION: Always follow local disposal guidelines to properly dispose of the Lithium-ion battery and the device.

CAUTION: DO NOT throw the internal battery or the device into fire.

1 INSTALL THE SC 1000

IMPORTANT

READ ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING. FAILURE TO DO SO MAY CAUSE PERSONAL INJURY OR DAMAGE TO PRODUCT AND/OR PROPERTY.

• Review the product package and contents prior to beginning the installation. Take care when opening the packaging and removing items. If a return is needed, you will want to return the product in its original packaging if possible. • This instruction guide is provided as a GENERAL installation guide; some assets vary dimensionally and may require additional steps. • ORBCOMM has a policy of continuous development and improvements. Therefore, products, guides, and technical information are subject to change without prior notice. • The manufacturer and / or distributors do not accept responsibility for third-party charges, labor, and / or third-party replacement modifications that are not ORBCOMM approved. Some modifications may void the factory warranty. • ORBCOMM does not accept any responsibility for installations performed by installers / third parties not approved and / or authorized by ORBCOMM. Some installations may void the factory warranty.• Exercise due diligence when installing this product. ORBCOMM does not accept any responsibility for asset damage or personal injury resulting from the installation of this product. Careless installation and operation can result in serious injury or equipment damage. • All liability for installation and use rests with the owner / operator. • Always make sure you have a clean, dry, and well-lit work area. • Always ensure products are secure during disassembly and installation. • Always take steps to protect yourself when drilling, cutting, and grinding because this may create flying particles that can cause injury. • Thoroughly inspect the area to be drilled, on both sides of material, prior to modification, and relocate any objects that may become damaged. • Always route electrical cables carefully. Avoid moving parts, parts that may become hot and rough, or sharp edges. • Make sure to fully understand the product, its intended use, and operation prior to use.

CAUTION: While ORBCOMM provides mounting hardware to assist with installations, it is the responsibility of the installer to select the proper mounting hardware for the asset's surface material where an ORBCOMM device or accessory will be mounted.

Environmental Protection

Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your local authority or retailer for recycling advice.

1.1 Wake Up the SC 1000

1. Remove the SC 1000 from the packaging. The device ships in a non-transmitting mode. Exposing the solar panel to light wakes up the device.

   Note: Pairing the SC 1000 with an asset is not possible without waking up the device. Expose the SC 1000 to sunlight at the beginning of the day to ensure it has time to wake up and transmit critical information before you install it.
   Alternatively, you can use another bright light source to wake up the device. Use a light meter or a mobile phone app to find a light source with a minimum 600 Lux light intensity, the higher the Lux value, the better. Position the SC 1000 solar panel directly facing the light source for at least one minute.

   CAUTION: When using a hot light source (for example, halogen or incandescent), ensure that the solar panel does not become hot to the touch.

1.2 Associate the SC 1000 with the Asset

Note: If your devices are supplied by a provider other than ORBCOMM, and your organization does not use the ORBCOMM Field Support Tool (FST) to pair devices with assets, please contact that provider to obtain the serial numbers required for device association and skip to section 1.3 Review the Inclement Weather Guidelines.

1. Use the ORBCOMM Field Support Tool (FST) mobile app to take a picture of the SC 1000, including the serial number label, and then follow the instructions to associate the device with the asset. Refer to the *MA002 Field Support Tool User Guide* for detailed instructions.

FST Android Version (Google Play Store)

FST iOS Version (Apple App Store)

1.3 Review the Inclement Weather Guidelines

The primary means of securing the device to an asset is double-sided table supplemented by rivets. For good tape adhesion, the tape must be kept warm, and the asset surface must be clean and dry.

Mandatory Guidelines for Installation in Wet Weather

The installation surface on the asset must be completely clean and dry for the tape to bond. If it is raining or snowing hard enough that the surface cannot be kept dry, DO NOT proceed with the installation.

Mandatory Guidelines for Installation in Cold Weather

Below 15°C (60°F) the double-sided tape starts becoming firm which makes it more difficult to bond to the asset.

If the guidelines below are followed correctly, the device can be installed at temperatures down to -20°C (-5°F).

- At or below freezing temperatures (0°C or 32°F), both the device and the tape primer* must be kept at room temperature, for example, inside an idling vehicle or a warm building.

  *If tape primer is not provided with the device, the cold temperature installation kit (ORBCOMM p/n ST101505, suitable for up to 25 installs) MUST be used.

Example of Tape Primer

- Keep the primer warm (room temperature) until ready to apply. The primer will not dry quickly at cold temperatures however, in this situation the tape should be applied when the primer is still wet, as it improves initial bond.
- Keep the device warm (room temperature) until it is time to mount it to the asset.
- Press firmly on the entire top surface of the device (7 kg (15 lb) for 15 seconds) to bond the tape to the asset.

Failing to follow these guidelines will compromise the installation.

1.4 Gather the Required Tools and Materials

Ensure you have the following for this installation:

- SC 1000 that includes:
  - Alcohol based cleaner or wipes
  - Scour pad
  - 4.8 mm x 4.8 to 6.4 mm grip range (3/16" diameter x 3/16" - 1/4") stainless rivets
- A 5.0 mm (0.196") drill bit
- Cordless drill and cordless rivet gun
- Tape measure
- To use the Field Support Tool (FST), you require a smartphone with Wi-Fi or cellular connectivity.
- (Optional) Magnet mount kit with tether (p/n ST101687)

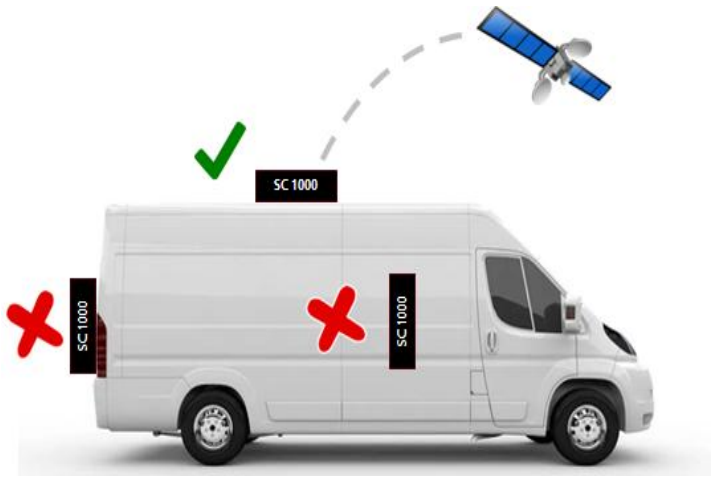
- (Optional) Zip ties

1.5 Prepare the Mounting Location

1. Determine the mounting location for the SC 1000 following the guidelines below:

   CAUTION: Mount the device at least 20 cm (8 in.) away from humans.

   - Mount the device where it has a clear view of the sky / satellite. For a mobile installation, this means that it is preferable to install at the highest point on the asset where it has a clear view of the sky in all directions.
   - Mount the device on the roof of the asset where it has a clear line of sight with the satellite.



- Mount the device on a flat horizontal surface for mobile installations such that the elevation angle does not change with rotation.
- When deployed on roads (especially trailers), check that the installation meets the maximum vehicle height permitted in the country where the device operates. Maximum vehicle height examples (subject to change and the installer's responsibility to verify these values): Europe: 4 to 6 m, United States of America: 13 ft 6 in. to 14 ft., Canada: 4.15 m, and Kenya and South Africa: 4.3 m.
- Mount the device so that the device's line-of-sight with the sky is clear of obstructions.
- Fasten the device securely so that it is not loose and does not move easily.
- Mount the device on a solid, stable surface. If necessary, use a mounting bracket (not supplied) or other suitable support.
- Mount in close proximity to any door sensor.

- Ensure that any paint above the device is non-metallic and non-metallic flake if the installation is under fiberglass or composite wind fairings.
- Mount the device on the driver's side of the vehicle, if possible, when there is a possibility of strikes by overhanging tree branches.
- Mount the device on a surface that does not get hotter than the maximum operating temperature (70°C/158°F). If the surface may get hotter, mount the device with a thermal barrier between it and the mounting surface.
- DO NOT mount the device on stacked assets / containers.

- DO NOT mount the device close to other electrical equipment due to possible radiated and / or conducted electromagnetic interference.
- DO NOT mount the device on or next to any external sources of heating or cooling.
- DO NOT mount the device close to radar or other communications antennas. Use the following guidelines:
  - > 1 m from VHF/UHF antenna
  - > 3 m from loop antenna
  - > 4 m from MF/HF antenna
  - > 5 m from other satellite antennas
  - Not within a radar beam
- DO NOT mount the device where water may build-up or collect.
- DO NOT mount the device close to an exhaust pipe due to the excessive heat and the potential for the exhaust pipe causing satellite blockage.
- DO NOT mount the device close to air horns or any tractor roof hardware (for example, emergency lights) that could interfere with satellite communications.
- DO NOT install the device inside a truck under the roof liner.

2. Mark the location of the corners of the SC 1000 on the asset. This is recommended for accurate prepping the asset surface.

1.6 Prepare the Mounting Surface

1. Prepare the surface of the asset (at the tape locations on the back of the SC 1000) in the following sequence (remember to mount the device in a horizontal position):
   a. Use the provided scour pad to remove debris from the surface.
   b. Clean the surface with an alcohol cleaner and clean lint free cloth or the provided wipes. Allow the cleaned surface to dry completely before proceeding to the next step.

1.7 Determine an Installation Method

1. Determine an installation method:
   - Double-Sided Tape and Rivets (recommended method)
   - Magnets and tether
   - Zip ties (not recommended for a permanent installation)

1.7.1 Install with Double-Sided Tape and Rivets

1. Remove the double-sided tape liner from the back of the SC 1000.

   CAUTION: DO NOT touch the tape.
2. Mount the SC 1000 to the asset in the identified location.
3. Press firmly on the entire top surface of the SC 1000 (**7 kg (15 lb) for 15 seconds**) to bond the tape to the asset.
4. Install a 5.0 mm (0.196") drill bit into the drill. **Note that only a 5.0 mm (0.196") drill bit should be used.**
5. (Recommended) Assemble a drill stop, 10 mm to 20 mm (3/8" to 3/4") from the end of the drill bit.

6. Use the SC 1000 as a guide, and then drill through the two (2) mounting holes with a 5 mm (0.196") drill bit.

7. Assemble two (2) provided rivets through the drilled holes and install them using a rivet gun.

   Note: Installing the rivets seals the drilled holes, so no additional sealant is required. However, sealant over the head of the rivet can be used, if desired.

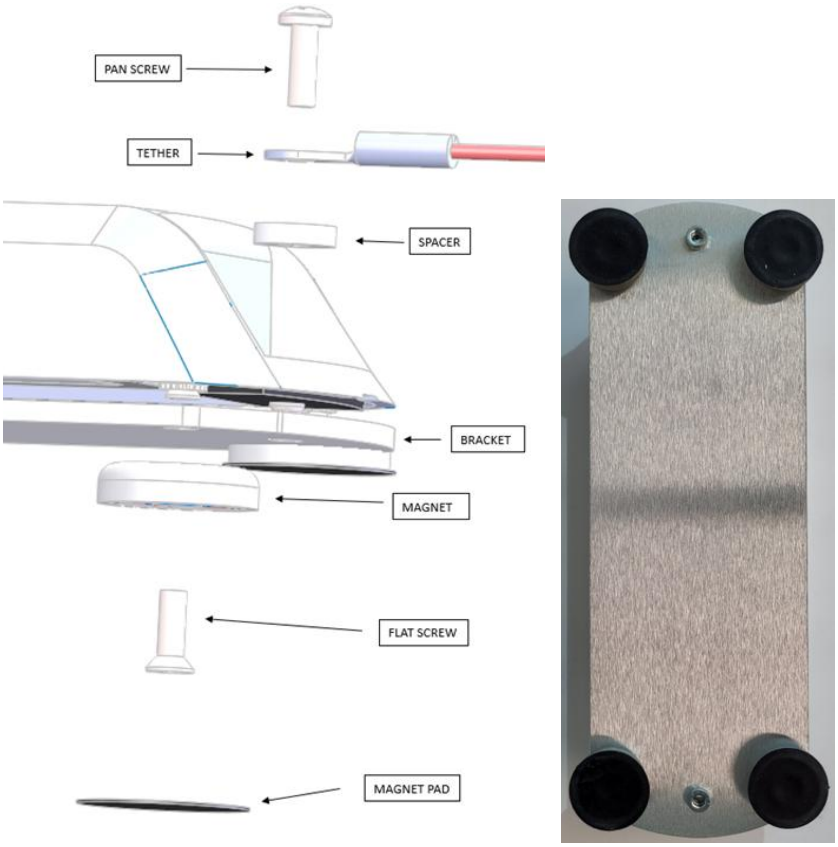
1.7.2 Install with Magnets and a Tether

CAUTION: Remember to keep the magnets away from electronic devices that store information magnetically such as computers and bank cards.

Note: Ensure you clean and dry the mounting surface before applying the magnet pad to the asset surface.

1. Attach the magnets.
    a. Assemble the magnets (in four (4) locations) to the bracket (p/n ST101687) as shown, and then tighten the screws with a hand screwdriver. Peel the liner off of the magnet pad and center the magnet pad on the magnet. Press down gently so that the magnet pad adheres to the magnet

    CAUTION: Ensure the magnet pad completely covers the magnet base to reduce the risk of asset damage due to scratches.



    b. Attach the device to the bracket:

    Note: For a permanent installation to the bracket: remove the double-sided tape liners from the SC 1000, align the SC 1000 with the bracket, and then press firmly on the bracket with 15 lb force for 15 seconds.

    For a temporary installation to the bracket: DO NOT remove the double-sided tape liners. Poke a hole through the tape with a punch or screwdriver, assemble the pan head screws through the SC 1000 mounting holes and into the bracket, and then tighten with a hand screwdriver.

c. Attach the tether to the device using the provided pan screw.

Note: When using the tether, assemble the eyelet of the tether through one of the screws holding the SC 1000 in place. Be sure to place the provided clear spacer between the tether and the SC 1000, so the tether clears the SC 1000 plastic.

2. Place the device on the asset where it has a clear line-of-sight to the sky, and then take the carabiner end of the tether and either wrap it around a secure location / post and clip it back to the tether cable (figure A), or clip it directly to a secure fixture (figure B). Figures are for illustration purposes only, other fixture locations are possible.

A - Clip back to tether

B - Clip to a secure fixture

1.7.3 Install with Zip Ties

CAUTION: Zip ties only are not recommended for permanent installations.

Note: Clean and dry the asset surface before mounting with zip ties.

1. Feed a zip tie through the provided slots on the SC 1000(one zip tie per side).

2. Place the SC 1000 on the asset so it has a clear line-of-sight to the sky with no tall obstructions around so that it can communicate with the satellite.

APPENDIX A MECHANICAL

The device's mechanical dimensions are shown in mm [in.].

Figure 1: Top View

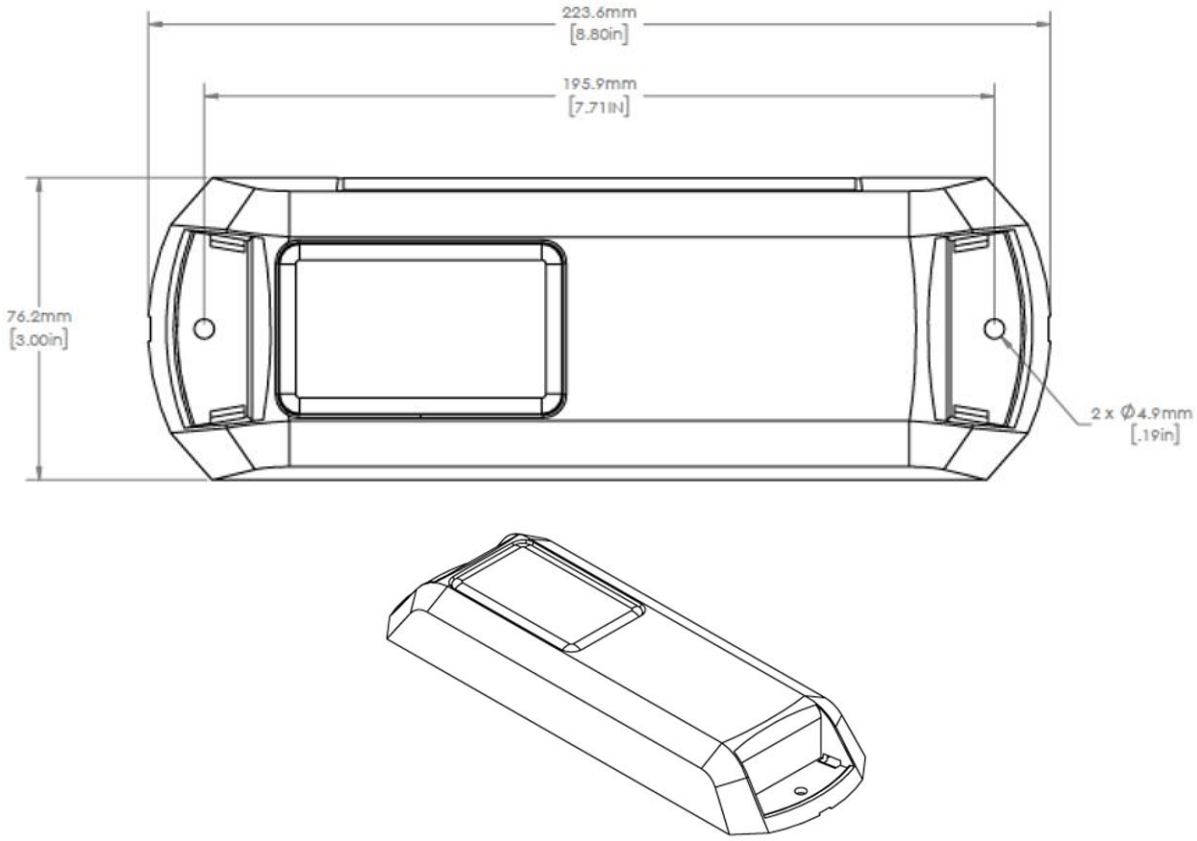
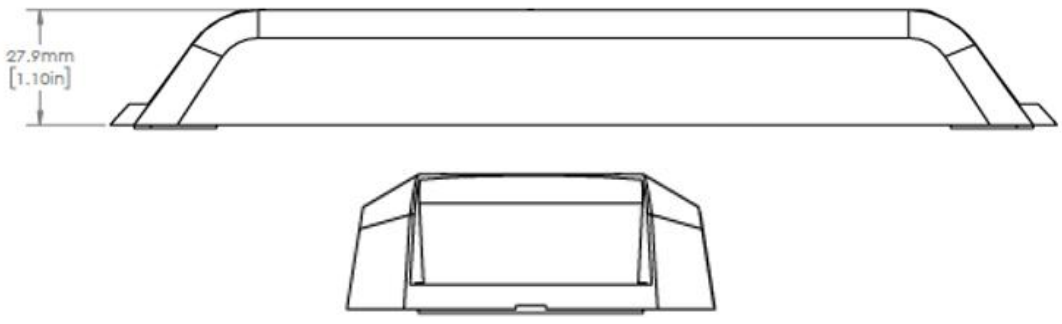


Figure 2: Side View



APPENDIX B TROUBLESHOOTING

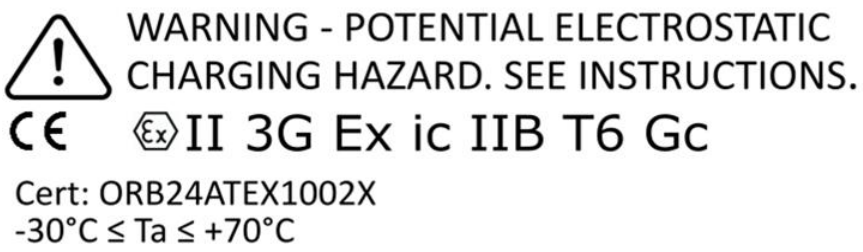
Symptom	Actions	Description
The device does not appear in the Field Support Tool (FST) scan list for nearby devices.	Make sure the device is removed from the box. If there is a sticker that shows "remove to activate", make sure to peel it off. Expose the device to sunlight to start the wake-up process.	The device will not power ON /wake up until the device's solar panel is exposed to sunlight for a specified period.
Unable to connect to the device with the FST.	Check the signal strength on your mobile device to ensure you have at least one bar. Check if another mobile device running the FST is already connected to the SC 1000.	The FST requires internet access for device authentication to check for the last received message.
Unable to authenticate and connect to the device with the FST.	Confirm that the device has been associated with the OTP user account for which the credentials were entered.	FST only allows access to devices that have been associated to a user's account.
The FST shows no last transmitted message.	Check that the SC 1000 is installed horizontally with the solar panel facing the sky. AND Check that objects are not blocking the device's view of the sky (for example, tree, bridge, building).	The device needs a clear line of sight with the satellite for reliable satellite connectivity. Note: When using the send message feature in the FST, the last report being updated is the information confirming proper operation.
Blockage events are generated and / or certain messages are not shown in the ORBCOMM Transportation Platform.	Check that objects are not blocking the device's view of the sky (for example., tree, bridge, building). Check that the device is installed away from radars or other communications antenna with the following guidelines: >1m from VHF/UHF antenna >3m from loop antenna >4m from MF/HF antenna >5m from other satellite antennas Not within radar beams	The device needs a clear line of sight with the satellite for reliable satellite connectivity. Radars or other communication antennas may create interference with the satellite signal.

APPENDIX C ATEX SAFE USE GUIDANCE

This section provides information, specific to the ATEX Category 3G certification, for safe use of the SC 1000 device.

Marking Label Information

The SC 1000 device is provided with marking label information specific to ATEX Category 3G certification:



Applicable Standards

A list of standards with which the equipment is declared to comply:

- Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive (ATEX) 2014/34/EU
    - EN 60079-0:2018, Explosive atmospheres–Part 0: Equipment – General requirements
    - EN 60079-11:2012, Explosive atmospheres–Part 11: Equipment protection by intrinsic safety "i"
- Radio Equipment Directive (RED) 2014/53/EU, EN 62311: 2020, EN 62368-1: 2020+A1:2020
- Radio Equipment Directive (RED) (EMC) 2014/53/EU, EN 301 489-1 V 2.2.3(2019-11), EN 301 489-17 V 3.2.4 (2020-09), EN 301 489-52V 1.1.2(2020-12), EN 55032:2015/A11:2020, EN 55035: :2017/A11:2020
- Radio Equipment Directive (RED) (Radio Spectrum) 2014/53/EU, EN 301 511 V12.5.1, EN 301 908-1 V13.1.1, EN 301 908-2 V13.1.1, EN 301 908-13 V13.1.1, EN 303 413 V1.1.1, EN 300 328 V2.2.2 (1019-07)
- Restriction of Hazardous Substances Directive (RoHS) 2015/863/EU Article 4.1, EN50581:2012

Electrical Parameters

Parameter	Nominal	Units
Voltage	4.2	V
Current	45	mA
Power Dissipation	185	mW
Energy Harvesting	480	mW

Specific Conditions of Use:

There is a risk of potential electrostatic charge build-up on the plastic enclosure. The instructions shall be referenced for safe use and techniques to reduce the potential for electrostatic charge build-up:

In Zone 2 Hazardous Locations, insulating solid materials are allowed to be used if charging processes capable of generating hazardous potentials are unlikely to occur during normal operation including maintenance and cleaning. Synthetic fabrics used in cloths for cleaning or wiping can develop sufficient static electric charge to produce discharges capable of igniting solvent vapors. Typically, charge generation increases with the speed and vigor of the wiping action. The material being cleaned or wiped, if insulating, also can accumulate sufficient charge to produce an incendive discharge. Cotton or synthetic fabric treated with a static dissipative compound may be

required if static electric charge generation needs to be controlled, especially if flammable insulating solvents are being used for cleaning or wiping.

"WARNING – Clean with a damp cloth only and allow to dry naturally"

Special Instructions

The SC 1000 device is meant for fixed installation.

The SC 1000 device does not require any maintenance.

The SC 1000 is not intended to be mounted on or used next to any external sources of heating or cooling.