

Installation Guide

Remote Spectrum Monitors

MS27101A, MS27102A, MS27103A
9 kHz to 6 GHz

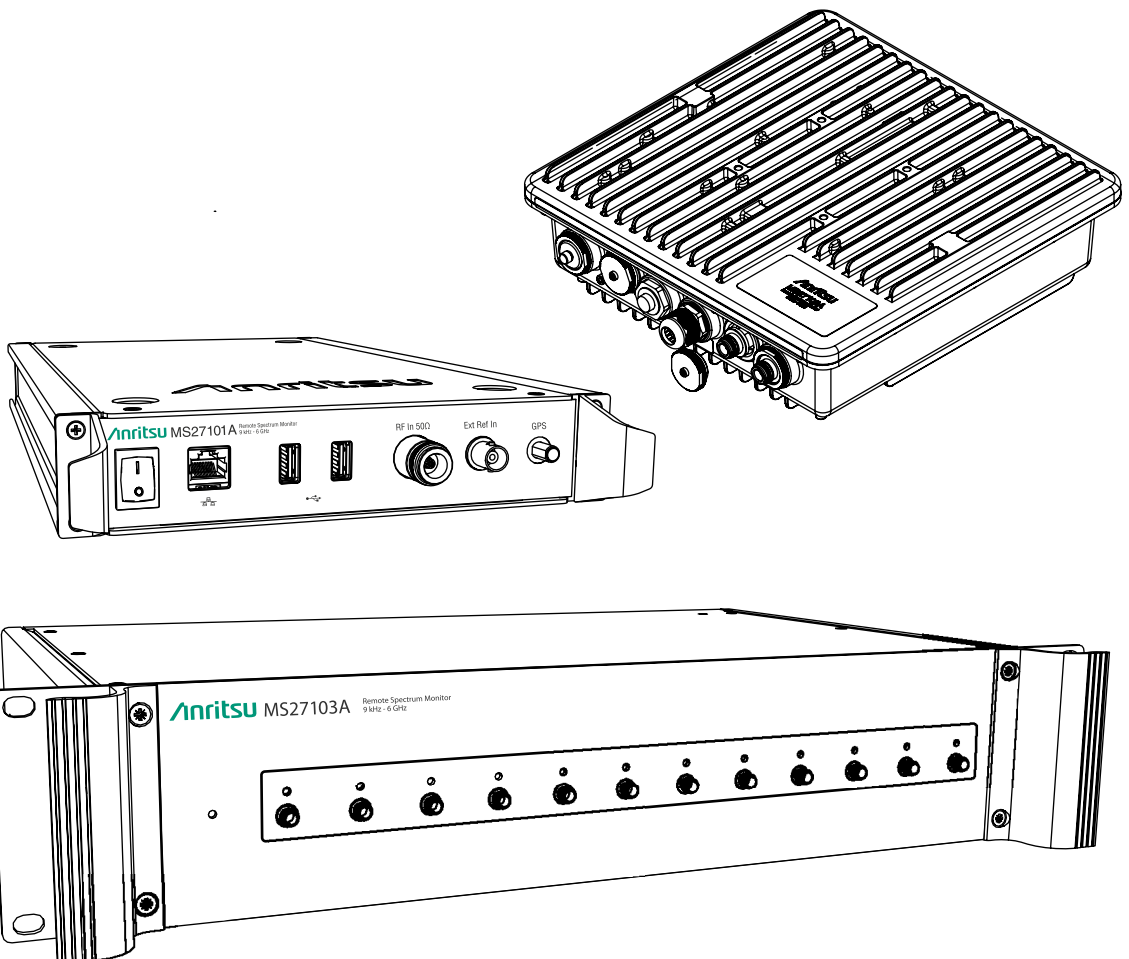


Table of Contents

Chapter 1—MS27101A Installation

- 1-1 Introduction 1-1
- 1-2 Instrument Overview 1-1
 - Connectors and Chassis 1-2
 - Mounting Hardware 1-2
 - Required Tools 1-2
- 1-3 Single Unit Rack Mounting 1-3
- 1-4 Side-by-Side Unit Rack Mounting 1-4

Chapter 2—MS27102A Installation

- 2-1 Introduction 2-1
- 2-2 Instrument Overview 2-1
 - Connectors and Chassis 2-2
 - Mounting Hardware 2-3
 - Connector Glands 2-4
 - Power Supply 2-4
- 2-3 Surveying the Installation Site 2-5
 - Mounting Considerations 2-5
- 2-4 Required Equipment 2-6
- 2-5 Installing the Mounting Bracket 2-6
- 2-6 Pole and Tower Mounting Instructions 2-7
- 2-7 Wall Mounting Instructions 2-8
- 2-8 Installing the Antenna Cables 2-9
- 2-9 Installing the Ethernet Cable 2-9
- 2-10 Installing the Power Supply Cables 2-10

Chapter 3—MS27103A Installation

- 3-1 Introduction 3-1
- 3-2 Instrument Overview 3-1
 - Power Supply 3-1
 - Connectors and Chassis 3-2
 - Required Tools 3-2
- 3-3 MS27103A Rack Mounting 3-3

Chapter 1 — MS27101A Installation

1-1 Introduction

The MS27101A remote spectrum monitor can be ordered with optional rack mounting hardware that allows it to be mounted into a standard 48 cm equipment rack in either a single unit installation or a side-by-side installation. [Section 1-3](#) describes single unit rack mounting, [Section 1-4](#) describes side-by-side rack mounting.

The MS27101A must be installed by a trained service person who is familiar with RF system integration and local regulatory and compliance requirements for the region in which the instrument is being installed. Read the *MS2710xA Product Information, Compliance, and Safety Guide* (PN: 10100-00064) for important safety, legal, and regulatory notices.

For additional information and literature covering your product, visit the product page of your instrument and select the Library tab:

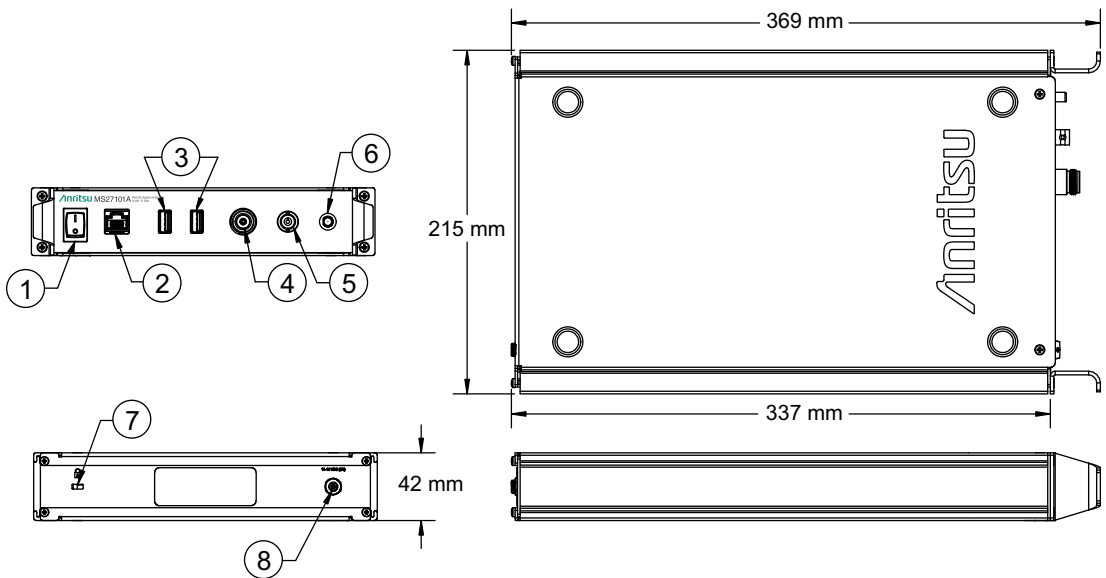
1-2 Instrument Overview

This section provides a brief overview of the instrument and the supplied accessories.

The MS27101A instrument consists of the following main components:

- MS27101A Remote Spectrum Monitor
- Indoor power supply and power cable
- Optional mounting brackets and fasteners (Option 1)

Connectors and Chassis



- | | |
|-------------------|--|
| 1. Power Switch | 5. Reference Input, BNC |
| 2. Ethernet | 6. GPS Antenna, SMA(f) |
| 3. USB Type A (2) | 7. Instrument Lock |
| 4. RF Input, N(f) | 8. DC Power Input, 5.5 mm Barrel Connector |

Figure 1-1. MS27101A Overview

Mounting Hardware

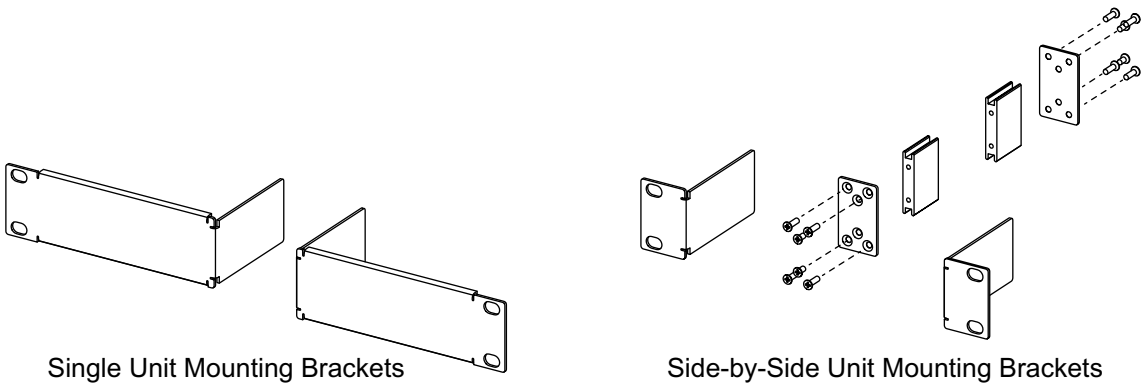


Figure 1-2. MS27101A Optional Rack Mounting Hardware

Required Tools

The installation requires a medium size Phillips screwdriver.

1-3 Single Unit Rack Mounting

This section explains how to fit a single MS27101A monitor into an instrument rack using the two single mounting brackets.

1. Prepare the MS27101A by removing the front panel handles as shown in [Figure 1-3](#). Retain the screws.

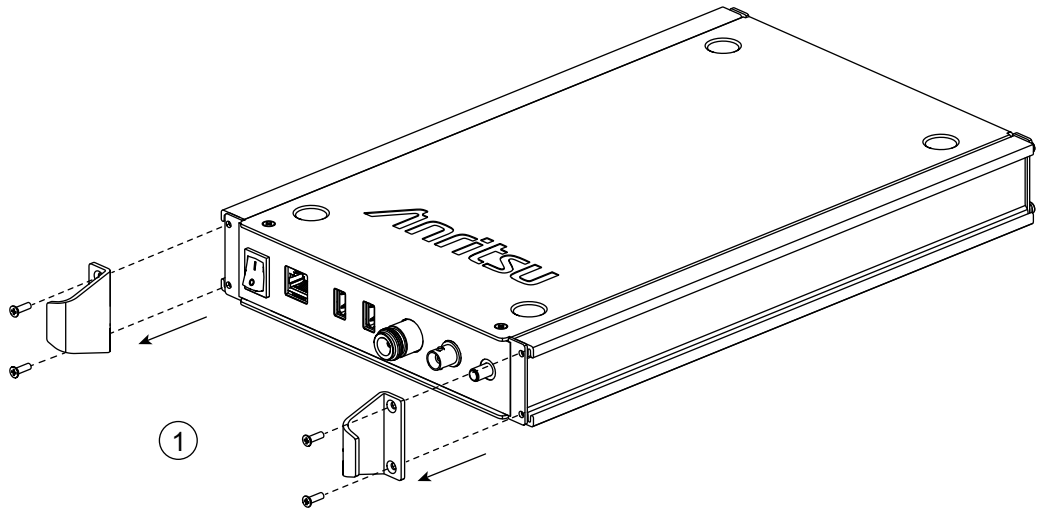


Figure 1-3. Preparing the MS27101A for Single Unit Rack Mounting

2. Slide the two mounting brackets into the aluminum extrusions as shown in [Figure 1-4](#) (1), then reinstall the front panel handles (2 and 3) using the same screws that were removed in [Step 1](#).

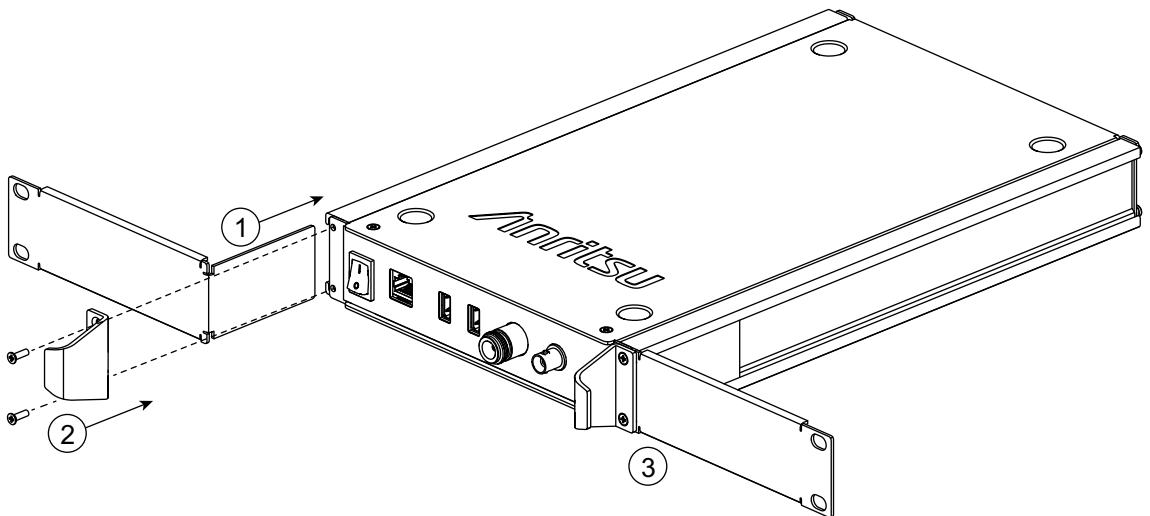


Figure 1-4. Installing the MS27101A Mounting Brackets

3. Install finished assembly into the rack mount per the cabinet manufacturers instructions.

1-4 Side-by-Side Unit Rack Mounting

This section explains how to fit two MS27101A remote spectrum monitors into an instrument rack using the side-by-side mounting brackets.

1. Prepare both MS27101A instruments by removing the front panel handles and inside rear panel screws as shown in [Figure 1-5](#) (1 and 2). Retain the screws.
2. Assemble the inside mounting bracket as shown in [Figure 1-5](#) (3)

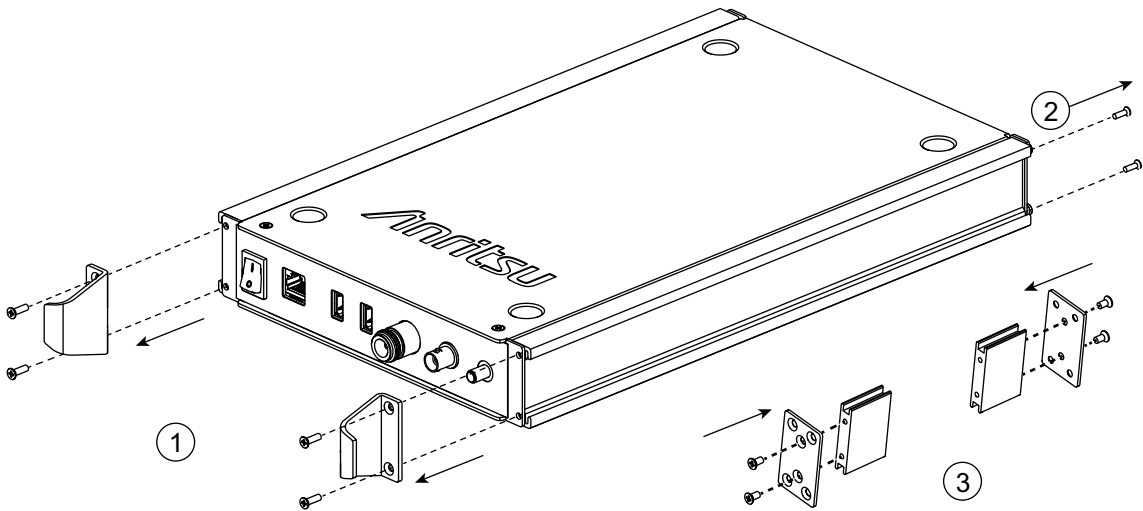


Figure 1-5. Preparing the MS27101A for Side-by-Side Rack Mounting

3. Slide the mounting brackets into the aluminum extrusions as shown in [Figure 1-6](#) (1 and 3), then reinstall the front panel handles (2 and 4) using the same screws that were removed in [Step 1](#).

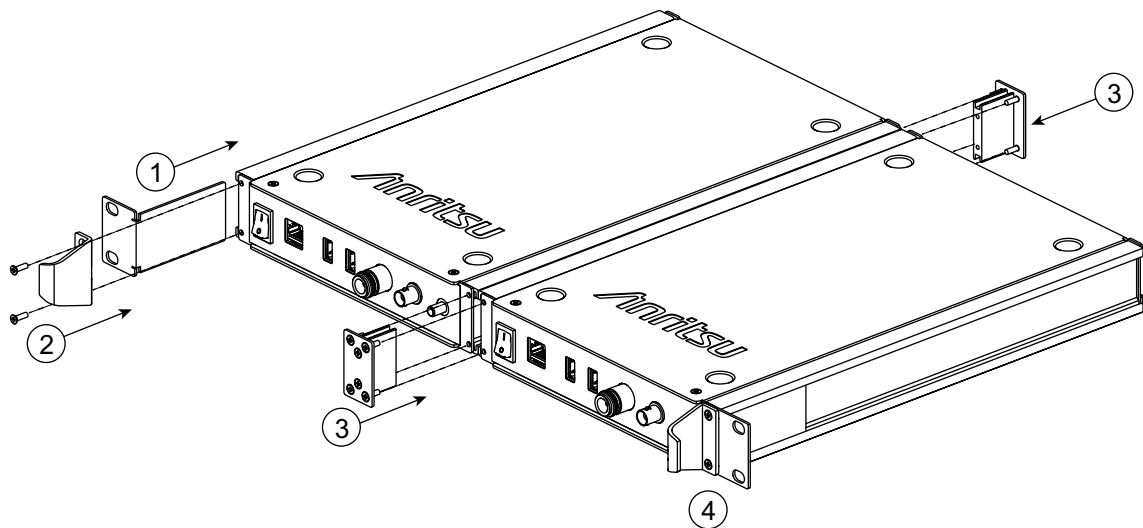


Figure 1-6. Installing the MS27101A Side-by-Side Mounting Brackets

4. Install finished assembly into the rack mount per the cabinet manufacturers instructions.

Chapter 2 — MS27102A Installation

2-1 Introduction

This chapter provides:

- a brief overview of the MS27102A Remote Spectrum Monitor
- installation considerations and required equipment
- considerations when selecting a location to install the remote spectrum monitor
- instructions for installing the instrument to either a pole or wall

The MS27102A must be installed by a trained service person who is familiar with RF system integration and local regulatory and compliance requirements for the region in which the instrument is being installed. Read the *MS2710xA Product Information, Compliance, and Safety Guide* (PN: 10100-00064) for important safety, legal, and regulatory notices.

Caution

Safe and reliable installation must follow the local electrical and building regulations. In the United States, the National Electrical Code (NEC) is the generally adopted standard. Verify that the installation follows the NEC or your local regulations.

For additional information and literature covering your product, visit the product page of your instrument and select the Library tab:

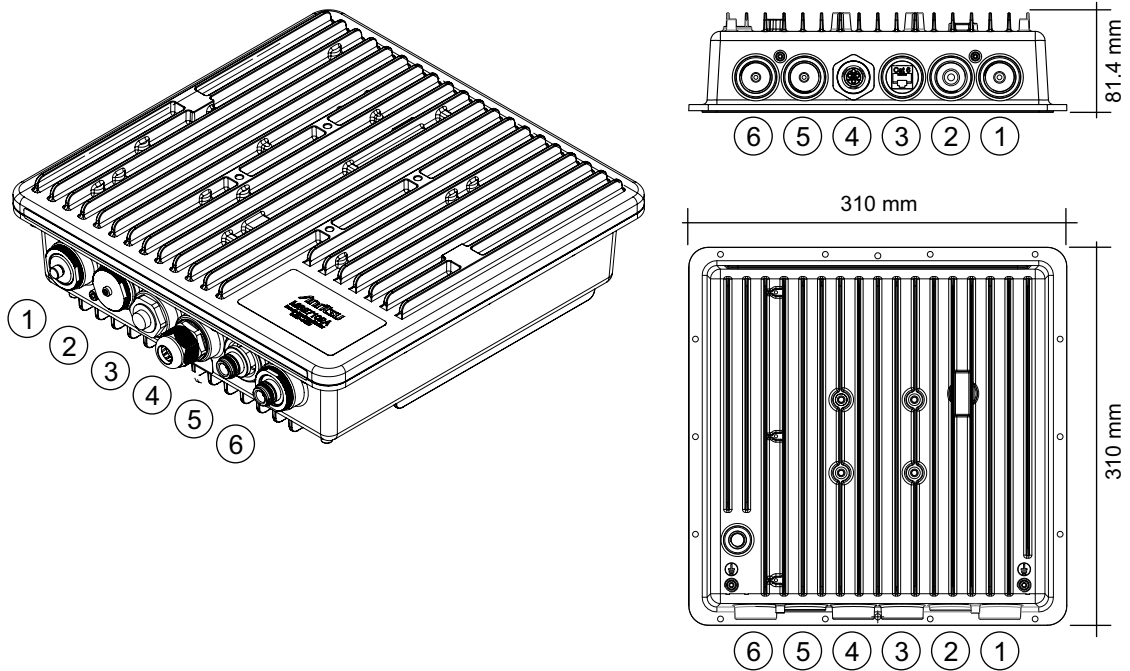
2-2 Instrument Overview

This section provides a brief overview of the instrument and the supplied accessories.

The MS27102A instrument consists of the following main components:

- MS27102A Remote Spectrum Monitor
- Mounting brackets and fasteners
- IP67 Ethernet and power connector glands
- Indoor power supply and power cable with assembled connector gland
- GPS antenna

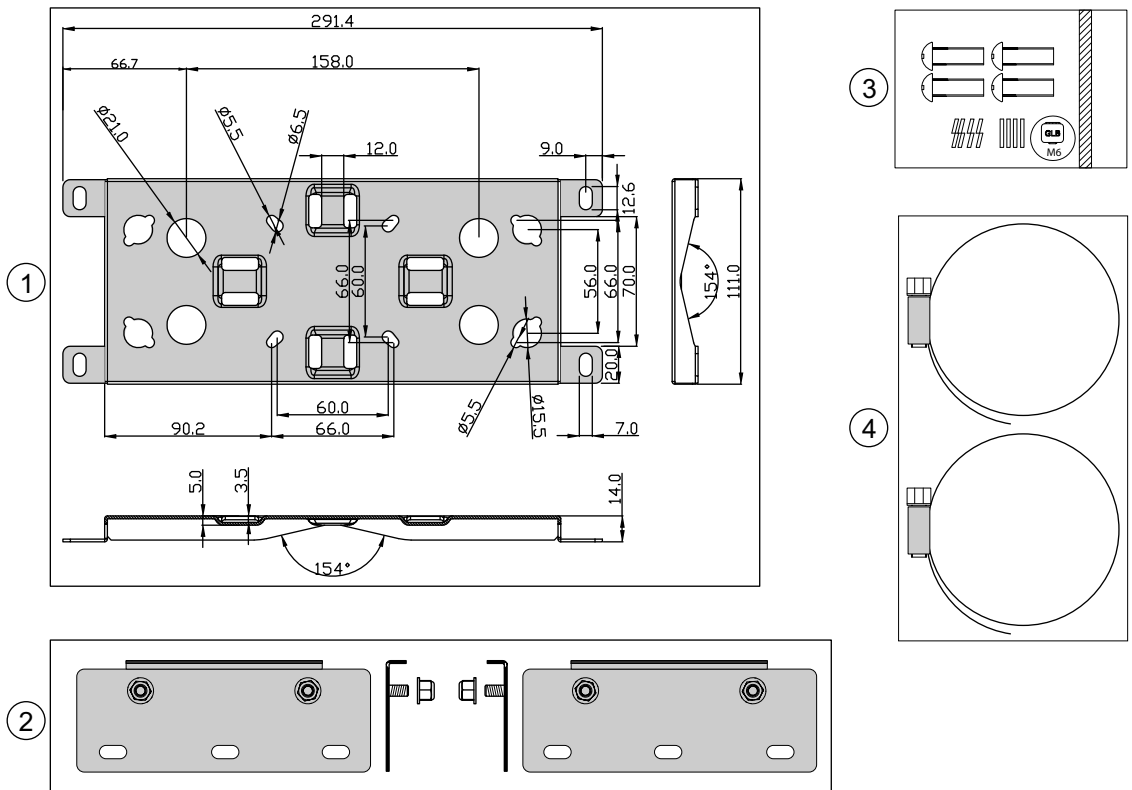
Connectors and Chassis



1. GPS Antenna, SMA(f)
2. No Connection
3. 3-pin Power Input (see [“Power Supply Gland Assembly” on page 2-10](#))
4. Ethernet (see [“Ethernet Gland Assembly” on page 2-9](#))
5. RF Input Port 2, N(f) (optional)
6. RF Input Port 1, N(f)

Figure 2-1. MS27102A Overview

Mounting Hardware

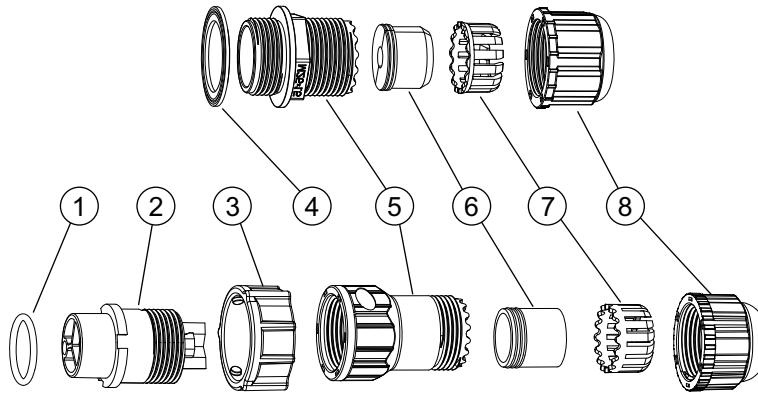


1. Universal mounting bracket detail
2. Mounting bracket extensions and nuts (6 mm hex nuts, 2 each, used for wall mounting only)
3. Stainless machine screw set (10 mm M6 x 0.8, 4 each)
4. Stainless strap clamps (101 mm maximum diameter, 2 each)

Figure 2-2. MS27102A Mounting Hardware

Connector Glands

The figure below illustrates the IP67 rated Ethernet (top) and power connector (bottom) gland assemblies.



- | | |
|--------------------------------|----------------------|
| 1. O-ring | 5. Connector body |
| 2. Housing with connector pins | 6. Seals |
| 3. Lock nut | 7. Inner collet clip |
| 4. Gasket | 8. Sealing nut |

Figure 2-3. Ethernet and Power Connector Gland Assemblies

Power Supply

The MS27102A Remote Spectrum Monitor comes with an indoor AC/DC power converter with a pre-assembled power cable and gland. This is to be used only for indoor applications. For outdoor usage, a DC power supply must be supplied by the user and must meet the following criteria:

- **Voltage rating:** 11 VDC to 24 VDC (supplied at instrument connector)
- **Power dissipation:** 11 W
- **Environmental ratings:** IP67 rating recommended or otherwise suitable outdoor supply, including supply cabling
- **Power cabling:** appropriate weather resistant cabling with adequately sized conductors for the length of run and power demand. The provided connector has screw terminals and will work for wire sizes from 14 AWG to 18 AWG with an outside cable diameter of 5.5 mm to 8.0 mm (0.22 to 0.31 in).

2-3 Surveying the Installation Site

To ensure optimal performance of the MS27102A Remote Spectrum Monitor, conduct a site survey to determine the optimal placement of the instrument for maximum range, coverage, and network integrity. The site must have available utilities (power and network connection). A site survey accounts for the following:

- **Location:** The instrument and antenna must be placed in an area that is accessible for routine inspection and servicing. The antenna must be placed such that obstructions to the radio signal path are minimized and that the antenna is installed in a safe location, away from interfering signals.

Danger	Avoid installation in hazardous locations such as in an area where the antenna could fall on power lines and result in electrocution or damage to the instrument and connected utility systems.
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- **Power:** Ensure that an available AC line power connection is close enough to the instrument's DC power supply.
- **Ethernet:** The Ethernet connection is ruggedized and weatherproof, and supports up to Gbit CAT6 LAN installations. For consistent operation, ensure that the cable run length to the network switch or repeater is less than 100 meters (328 feet).
- **Antenna:** Proper antenna type and placement is essential for maximizing radio coverage and range. Prioritize antenna height over ground, then antenna gain for increasing the coverage area and range. Consider a directional antenna and its orientation when maximum range is required. Consider an omni directional antenna when maximum coverage area is required.

Mounting Considerations

The MA27102A Remote Spectrum Monitor is designed to be IP67 compliant and can be mounted either indoors or outdoors. The instrument should be installed with the connectors facing downward to provide additional protection from water seepage into the instrument chassis. In extremely harsh environments, additional shielding from direct sunlight in hot climates should be considered. The mounting location must also facilitate clearance to all of the connectors, and cabling should be of sufficient length for servicing.

2-4 Required Equipment

The following is required to install the MA27102A Remote Spectrum Monitor:

- #2 Phillips screwdriver (for bracket to chassis and ground fasteners)
- Flat blade screwdriver (for strap clamps)
- 1.5 mm Allen key (for power wire connectors)
- Wall mounting: appropriate fasteners to attach the metal bracket assembly to the specific wall type; 6 mm wrench to attach bracket extensions
- DC Power Supply: see requirements discussed in “[Power Supply](#)” on [page 2-4](#).

2-5 Installing the Mounting Bracket

The mounting bracket can be installed for either vertical or horizontal mounting. This procedure illustrates the vertical orientation.

1. Inspect the installation area and determine the appropriate bracket orientation on the instrument.
2. Ensure that the bracket is oriented with the V-groove facing outward as illustrated in [Figure 2-4](#).
3. Use the M6 mounting screws with both the flat and spring lock washers to secure the bracket to the instrument. The screws are tightened with a #2 Phillips screwdriver.

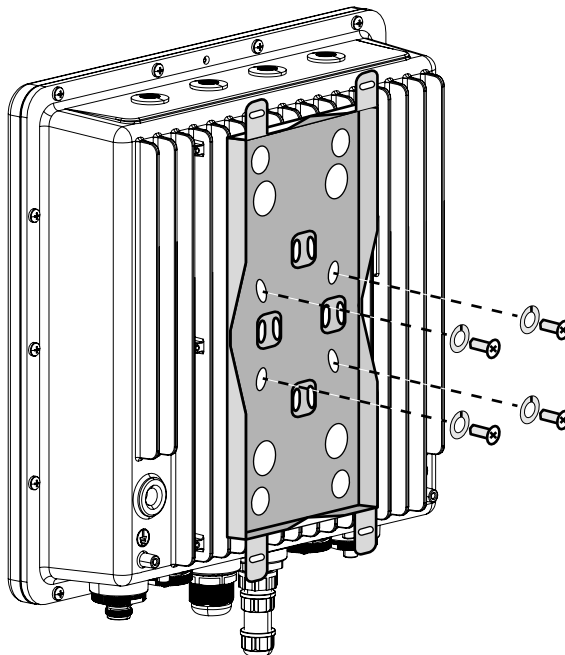


Figure 2-4. MA27102A Vertical Bracket Mounting

Once the bracket is installed onto the instrument, the assembly can then be installed onto a pole.

2-6 Pole and Tower Mounting Instructions

Install the universal mounting bracket as instructed in [Section 2-5](#). The bracket can accommodate mounting to a pipe diameter up to 101 mm (4 in). Refer to [Figure 2-5](#) during this procedure.

Note The illustration shows the instrument being installed to a vertical pipe. For installing onto a horizontal pipe, the universal bracket can be rotated 90 degrees when attaching to the instrument.

1. Thread strap clamps through the raised slots in the mounting bracket.
2. Secure the instrument and bracket assembly to the pole by tightening the strap clamps.

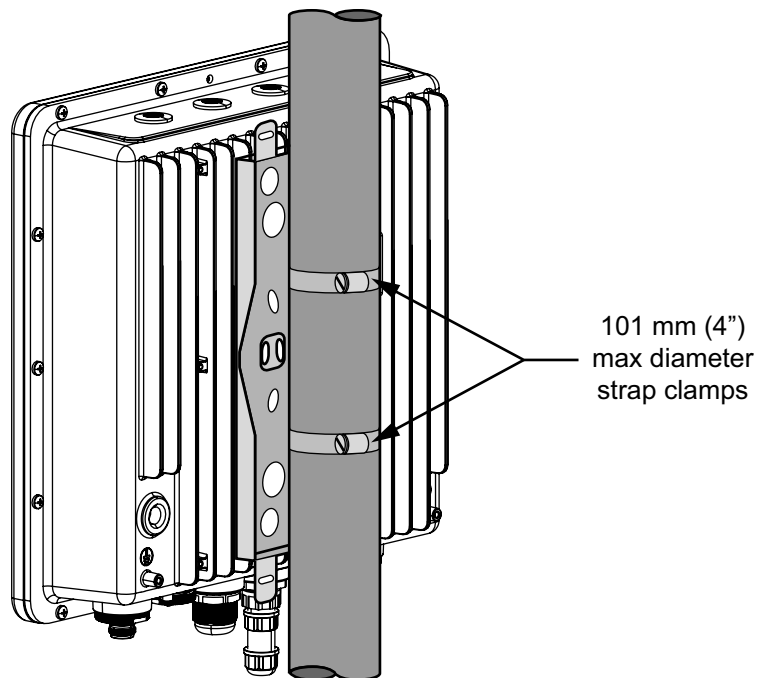


Figure 2-5. MA27102A Vertical Pole Mounting

2-7 Wall Mounting Instructions

The MA27102A universal mounting bracket can accommodate mounting to a variety of wall structures. The user is responsible for selecting the appropriate wall fasteners for the structure of the wall, and the fastening system must be sufficient to carry the load of the instrument and cabling. Refer to [Figure 2-5](#) during this procedure.

Note The illustration shows the instrument being installed vertically. The universal mounting bracket can be rotated 90 degrees and installed horizontally.

1. Install the universal bracket extensions as shown in [Figure 2-5](#) (1).
2. Place the universal mounting bracket assembly against the wall at the desired location and mark the four mounting holes at the extension.
3. Install the universal mounting bracket assembly to the instrument as instructed in [Section 2-5](#).
4. Attach the instrument and bracket assembly to the wall with the appropriate user-supplied wall fasteners ([Figure 2-5](#) (2)). Use all four mounting holes on the universal bracket extensions. These slotted holes accept screws up to 6.3 mm (1/4 inch).

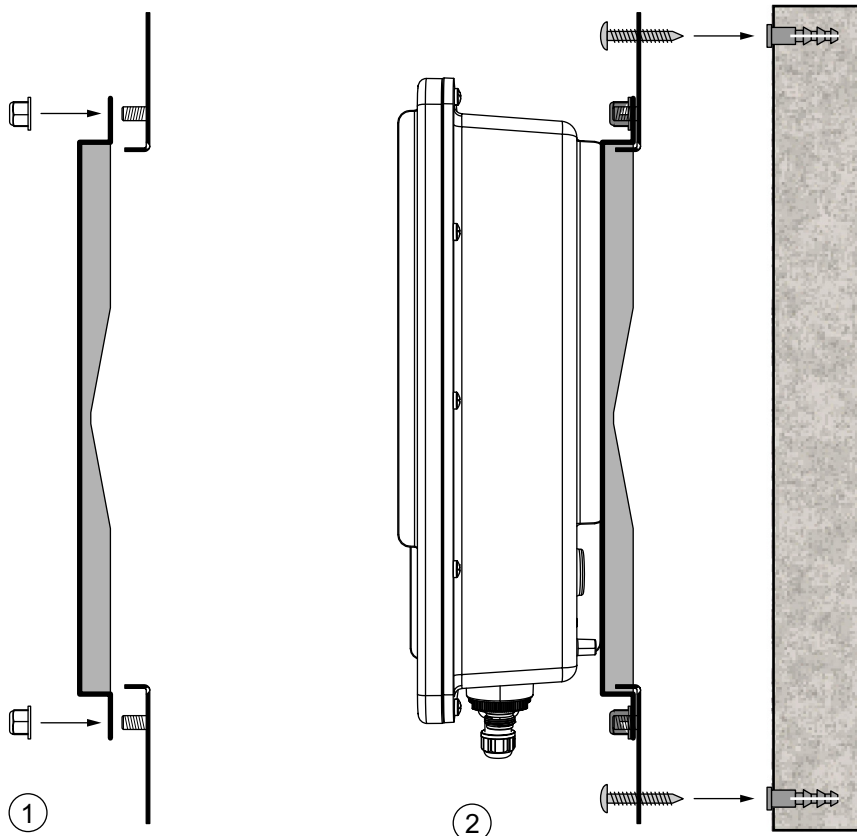


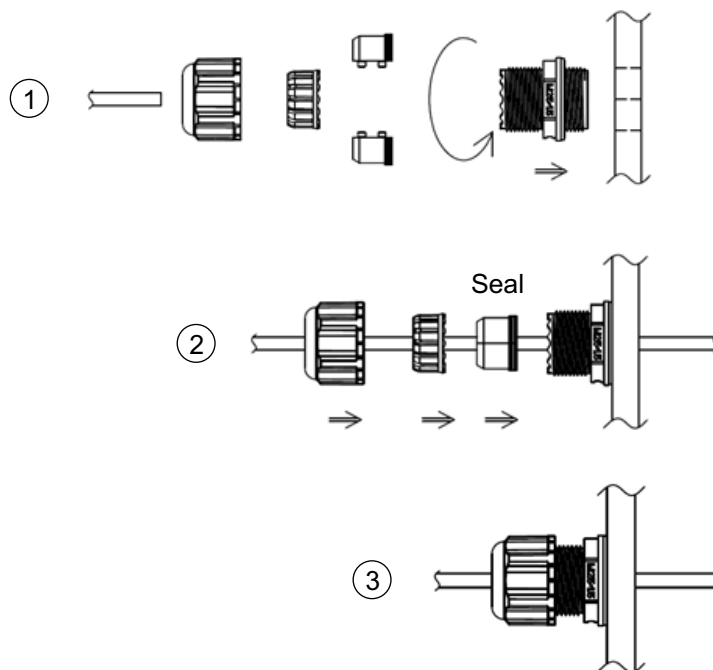
Figure 2-6. MA27102A Wall Mounting

2-8 Installing the Antenna Cables

Always install an antenna in accordance with local regulatory code and with best practices, and follow the mounting and installation instructions that were supplied with your antenna. Ensure that all antenna connections are grounded to the instrument ground terminal.

2-9 Installing the Ethernet Cable

The instrument's Ethernet connector accepts any standard 8P8C (RJ45) plug. However, for the connection to be weatherproof, the weatherproofing gland must be installed around the connector and cable. The following illustration shows how to install the Ethernet connector's weatherproof gland.

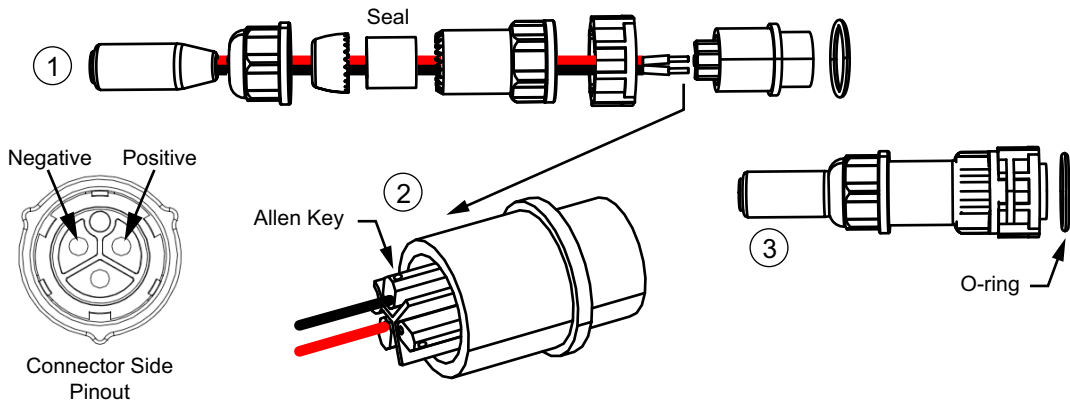


1. Screw gland body to instrument front panel
2. Thread Ethernet cable through the gland's components and secure the seal.
3. Plug the Ethernet cable into the instrument and tighten the sealing nut.

Figure 2-7. Ethernet Gland Assembly

2-10 Installing the Power Supply Cables

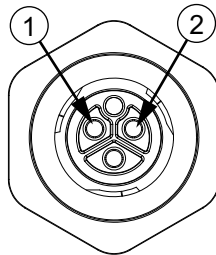
The MS27102A features an IP67 rated power connector. However, for the connection to be weatherproof, the weatherproofing gland must be installed around the connector and cable. The following illustration shows how to install the power connector's weatherproof gland.



1. Thread power conductors through the gland's components and secure the seal.
2. Connect the conductors to the connector and tighten the Allen screw to secure.
3. Install the connector to the instrument with the O-ring as shown.

Figure 2-8. Power Supply Gland Assembly

The following illustration shows the polarity of the power connector as viewed from the front of the instrument casing.



1. Positive DC lead (11 V to 24 V)
2. Negative DC lead (ground)
3. Note: the third pin has no internal connection.

Figure 2-9. Power Connector Pin-out (front of MS27102A connector)

Caution



The MS27102A chassis provides two earth ground connections. Be sure to ground the instrument chassis and any antenna installations in accordance with your local regulatory requirements. Failure to properly ground the equipment may present an electric shock hazard and contribute to static noise interference.

Chapter 3 — MS27103A Installation

3-1 Introduction

The MS27103A remote spectrum monitor is configured with integral front panel handle and rack mounting bracket that allows it to be mounted into a standard 48 cm equipment rack. This chapter illustrates how to fit the monitor into an instrument rack.

The MS27103A must be installed by a trained service person who is familiar with RF system integration and local regulatory and compliance requirements for the region in which the instrument is being installed. Read the *MS2710xA Product Information, Compliance, and Safety Guide* (PN: 10100-00064) for important safety, legal, and regulatory notices.

For additional information and literature covering your product, visit the product page of your instrument and select the Library tab:

3-2 Instrument Overview

This section provides a brief overview of the instrument and the supplied accessories.

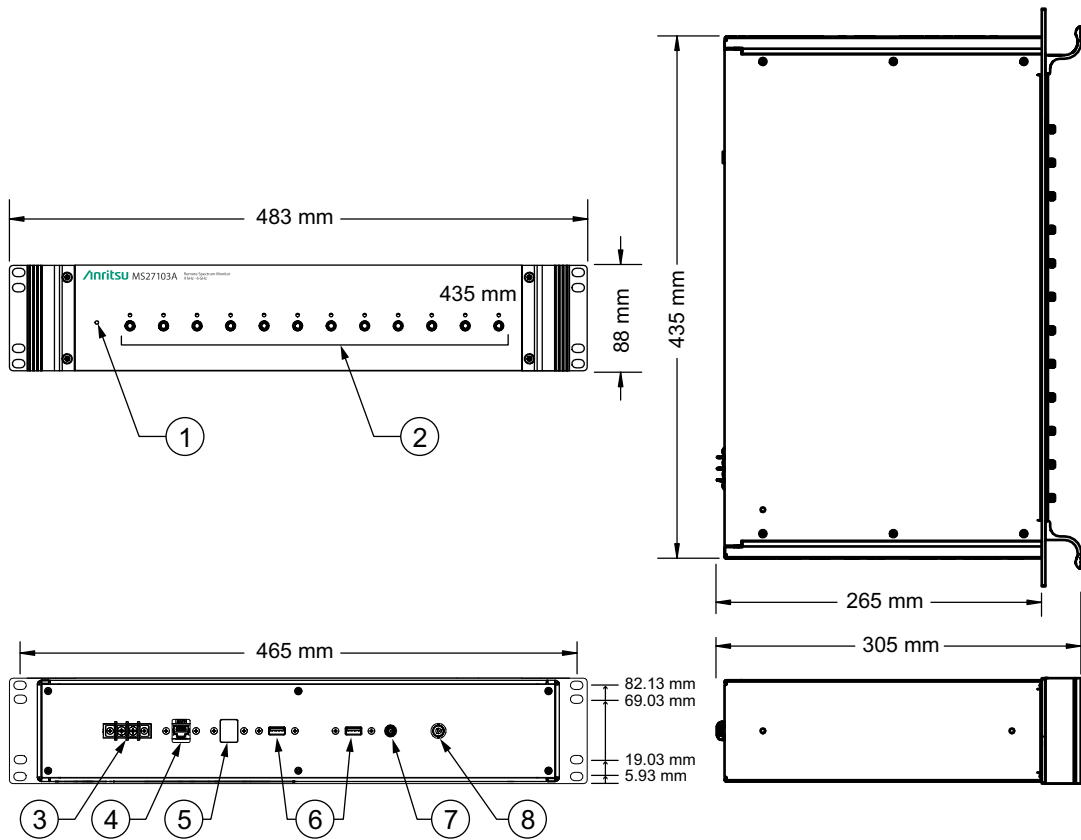
The MS27103A instrument consists of the following main components:

- MS27103A Remote Spectrum Monitor

Power Supply

The standard MS27103A Remote Spectrum Monitor requires a user supplied DC power supply with voltage rating of ± 20 VDC to ± 70 VDC with minimum power output of 11 W. Option 110 replaces the DC connector screw terminal with an internal AC-DC supply with a 3-pin line receptacle.

Connectors and Chassis



- | | |
|--|-------------------------------------|
| 1. Power LED | 5. Ethernet Port (optional) |
| 2. RF Input Ports, 12 or 24 SMA(f) | 6. USB Type A (2) |
| 3. Power Input Screw Terminal
(or 110 VAC line connector with Option 110) | 7. GPS Antenna, SMA(f) |
| 4. Ethernet Port | 8. External Reference Input, BNC(f) |

Figure 3-1. MS27103A Overview

Required Tools

The installation requires a medium size Phillips screwdriver.

3-3 MS27103A Rack Mounting

This section illustrates how to fit a single monitor into an instrument rack.

1. Slide the instrument into the rack and secure with 4 screws as instructed by the cabinet manufacturer.

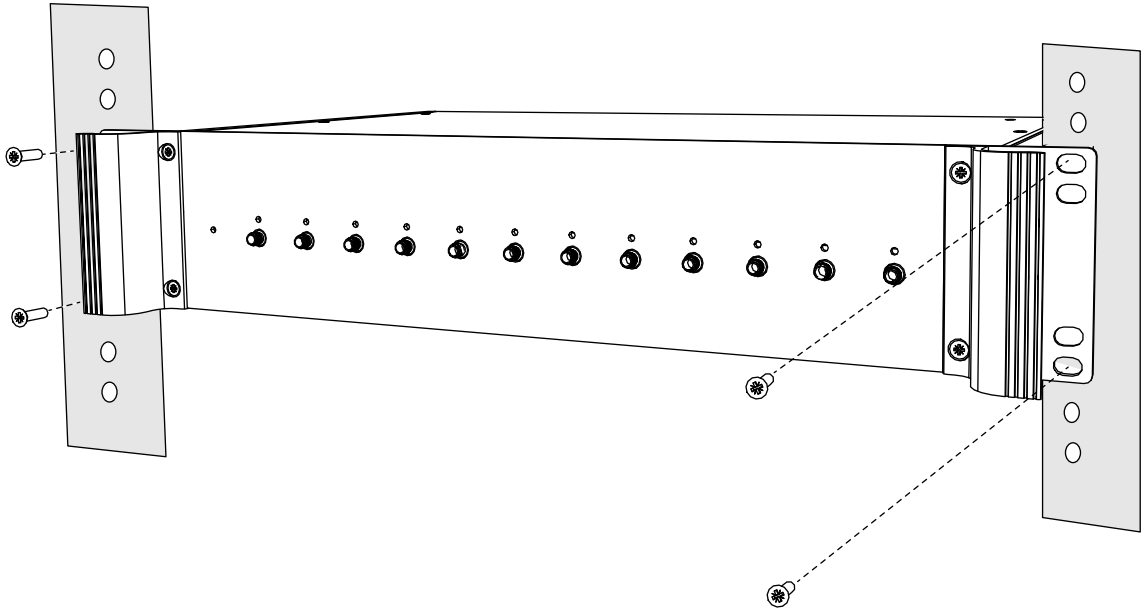


Figure 3-2. MS27103A Rack Mounting