

EM2100

Installation Guide



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Revision History

Revision code	Date	Revised Content
01	June, 2019	Original release
02	October, 2019	Changes for new mounting rail sizes.
03	January, 2020	Changes for the release of the Fleet Simulator.
04	March, 2020	Update for SetNetGo changes.

Chapter 1: Introduction

This chapter provides an introduction to the EM2100 appliance. It includes the following topics.

1.1 Description of the EM2100	7
1.2 Items Supplied with the EM2100	7
1.3 How to Get Help	8

1.1 Description of the EM2100

The EM2100 is a computing appliance with a processor capable of running the Fleet Operations Workspace Core suite.

The EM2100 appliance can be configured for the following operating modes.

- Standalone Fleet Manager
This has the ability to connect to, communicate with, and control the AMR fleet.
- Paired: Primary Fleet Manager
This is similar to the Standalone Fleet Manager, but also communicates with a Secondary Fleet Manager, which serves as a backup if the Primary ever fails.
- Paired: Secondary Fleet Manager
This functions as a backup appliance for the Primary.
- Fleet Simulator
This can simulate up to ten AMRs divided between up to three fleets.

The installation of the EM2100 appliance is the same regardless of which operating mode the appliance will be used for.

Additional Information: Details for the use and configuration of the functions above can be found in the *Fleet Operations Workspace Core User's Guide* and the *Fleet Simulator User's Guide*.

NOTE: The EM2100 appliance can support legacy AMR fleet management. To configure the EM2100 for use with legacy fleets, refer to the *Fleet Operations Workspace Migration Guide*.

1.2 Items Supplied with the EM2100

The EM2100 appliance is supplied with the following items.

- Rack-mount rail kit for a **four-post data center rack**
- Power cable set, including cables for use in various locales world-wide

Additional Equipment used with the EM2100

The following equipment is used during the normal operation of the EM2100.

- An uninterruptible power supply (UPS) is recommended (refer to Power Requirements on page 47 for more information). If your manufacturing execution system or enterprise resource planning system is maintained by a UPS, including this for the EM2100 will help ensure that the integrity of these systems is maintained through any brief power outages.
- Network infrastructure necessary for communication and optionally for redundant network communication (if you use a Paired Secondary Fleet Manager).
- OMRON Autonomous Mobile Robots (AMRs).
- Compatible Windows PC clients to run MobilePlanner for remote access to the appliance and AMRs.

1.3 How to Get Help

To obtain support assistance with your software or hardware, visit our website at: <http://www.ia.omron.com>.

Related Manuals

This manual describes the installation and basic operation of the EM2100 appliance. The following manuals provide more information about safety, use, and advanced configurations for the EM2100 and related products.

Table 1-1. Related Manuals

Manual Title	Description
<i>Mobile Robot LD Safety Guide</i>	Describes AMR safety aspects.
<i>Fleet Operations Workspace Core User's Guide</i>	Describes use of the EM2100 and the software that runs on it for managing a fleet of AMRs.
<i>Fleet Simulator User's Guide</i>	Describes use of the EM2100 in the Fleet Simulator operating mode.
<i>Fleet Operations Workspace Core Migration Guide</i>	Describes how to upgrade a system between Legacy and FLOW Core solutions which includes software upgrade processes and tools as well as guidance on any necessary hardware changes.
<i>Integration Toolkit User's Guide</i>	Describes a flexible array of interfaces to control and monitor AMRs with various client applications.
<i>Advanced Robotics Command Language Reference Guide</i>	Describes the Advanced Robotics Command Language (ARCL), which is a simple, text-based server from which you can control our AMRs.
<i>LD Platform OEM User's Guide</i>	Describes the operation and maintenance of the LD-60 and LD-90 AMRs.
<i>LD Platform Cart Transporter User's Guide</i>	Describes the operation and maintenance of the Cart Transporter AMR.

Manual Title	Description
<i>LD-250 Platform User's Guide</i>	Describes the operation and maintenance of the LD-250 AMR.
<i>LD Platform Peripherals Guide</i>	Describes various peripherals available for use with LD-series AMRs.

Chapter 2: Safety

This chapter provides information about product safety. It includes the following topics.

2.1 Alert Levels	11
2.2 Safety Precautions for the EM2100	13
2.3 Disposal	14

2.1 Alert Levels

There are three levels of alert notation used in our manuals. In descending order of importance, they are:



DANGER: Identifies an imminently hazardous situation which, if not avoided, is likely to result in serious injury, and might result in fatality or severe property damage.



DANGER: Identifie une situation dangereuse imminente qui, si elle n'est pas évitée, est susceptible d'avoir comme résultat une blessure grave et pourrait provoquer le décès ou des dommages matériels importants.



WARNING: Identifies a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, and might result in serious injury, fatality, or significant property damage.



AVERTISSMANT: Identifie une situation dangereuse potentielle qui, si elle n'est pas évitée, aura comme résultat une blessure mineure ou modérée et pourrait provoquer une blessure grave, le décès, ou des dommages matériels significatifs.










CAUTION: Identifies a potentially hazardous situation which, if not avoided, might result in minor injury, moderate injury, or property damage.



ATTENTION: Identifie une situation dangereuse potentielle qui, si elle n'est pas évitée, pourrait avoir comme résultat une blessure mineure ou des dommages matériels.

Alert Icons

The icon that starts each alert can be used to indicate the type of hazard. These will be used with the appropriate signal word - Danger, Warning, or Caution - to indicate the severity of the hazard. The text following the signal word will specify what the risk is, and how to avoid it.

Icon	Meaning	Icon	Meaning
	This is a generic alert icon. Any specifics on the risk will be in the text following the signal word. Ceci est un symbole générique d'alerte. Toute spécificité concernant le risque sera décrite dans le texte après le mot de signalement.		This identifies a hazardous entanglement situation. Ceci identifie une situation dangereuse d'enchevêtrement.
	This identifies a hazardous electrical situation. Ceci identifie une situation dangereuse électrique.		This identifies a fire risk. Ceci identifie un risque d'incendie.
	This identifies a hazardous burn-related situation. Ceci identifie une situation dangereuse de brûlure.		This identifies a laser emitter eye damage situation. Ceci identifie une situation dangereuse liée aux lésions oculaires provoquées par un émetteur laser.
	This identifies a hazardous ESD situation. Ceci identifie une situation dangereuse ESD (décharges électrostatiques).		

Special Information

There are several types of notation used to call out special information.

IMPORTANT: Information to ensure safe use of the product.

NOTE: Information for more effective use of the product.

Additional Information: Offers helpful tips, recommendations, and best practices.

Version Information: Information on differences in specifications for different versions of hardware or software.

2.2 Safety Precautions for the EM2100

Read the installation and operation instructions before using the appliance.

If you use the supplied rail kit to install the appliance into a 4-post data center rack, make sure you read and follow the safety instructions provided with the rack.

General Hazards



CAUTION: PERSONAL INJURY RISK. Do not begin any tasks in this manual that result in activating an AMR (autonomous mobile robot) until you have read the important safety information in the Mobile Robot LD Safety Guide and in the AMRs' user manuals.



ATTENTION: RISQUE DE BLESSURES PERSONNELLES. Ne pas initialiser une tâche dans ce manuel qui ait comme résultat l'activation d'un AMR (robot mobile autonome) avant de lire les renseignements importants de sécurité dans le Guide de Sécurité LD pour Robots Mobiles et dans les manuels d'utilisation AMR.



CAUTION: PERSONAL INJURY RISK. Observe all safety precautions when installing the appliance in a computer rack. Two persons might be required to safely lift and install the appliance into a tall rack.



ATTENTION: RISQUE DE BLESSURES PERSONNELLES. Respecter toutes les précautions de sécurité lors de l'installation de l'appareil dans un support d'ordinateur. Deux personnes pourraient être nécessaires pour élever et installer l'appareil dans un support haut en toute sécurité.



WARNING: ELECTROCUTION RISK. This appliance uses AC power and presents an electrical shock hazard if used improperly. Do not open the enclosure. No user-serviceable parts are included inside.



AVERTISSMANT: RISQUE D'ÉLECTROCUTION. Cet appareil utilise du courant CA et présente un risque de choc électrique s'il n'est pas utilisé de manière adéquate. Ne pas ouvrir le boîtier. Aucune pièce interne réparable par l'utilisateur.



WARNING: ELECTROCUTION RISK. Failing to properly ground equipment that uses hazardous voltages could lead to injury or death of a person touching the equipment during an electrical fault.



AVERTISSMANT: RISQUE D'ÉLECTROCUTION. Ne pas mettre correctement à la terre un équipement utilisant des tensions dangereuses pourrait avoir comme résultat la blessure grave, même le décès d'une personne qui le toucherait pendant une panne électrique.



WARNING: ELECTROCUTION RISK. AC power installation must be performed by a skilled and instructed person. Ensure compliance with all local and national safety and electrical codes for the installation and operation of the equipment.



AVERTISSMANT: L'installation CA sera effectuée par une personne qualifiée et instruite. Assurer la conformité avec tous les codes de sécurité et électriques locaux et nationaux lors de l'installation et du fonctionnement de l'équipement.

2.3 Disposal



Dispose of in accordance with applicable regulations.

Customers can contribute to resource conservation and protecting the environment by the proper disposal of WEEE (Waste Electronics and Electrical Equipment). All electrical and electronic products should be disposed of separately from the municipal waste system via designated collection facilities. For information about disposal of your old equipment, contact your local OMRON support.

Chapter 3: Hardware Overview

This section describes the EM2100 appliance hardware connections, indicators, and other features. It includes the following topics.

- [3.1 Front Panel Connectors and Features](#) 15
- [3.2 Rear Panel Connectors and Features](#) 16
- [3.3 Display Panel Information](#) 17

3.1 Front Panel Connectors and Features

This section describes the connectors, indicators, and physical characteristics of the EM2100 appliance front panel.

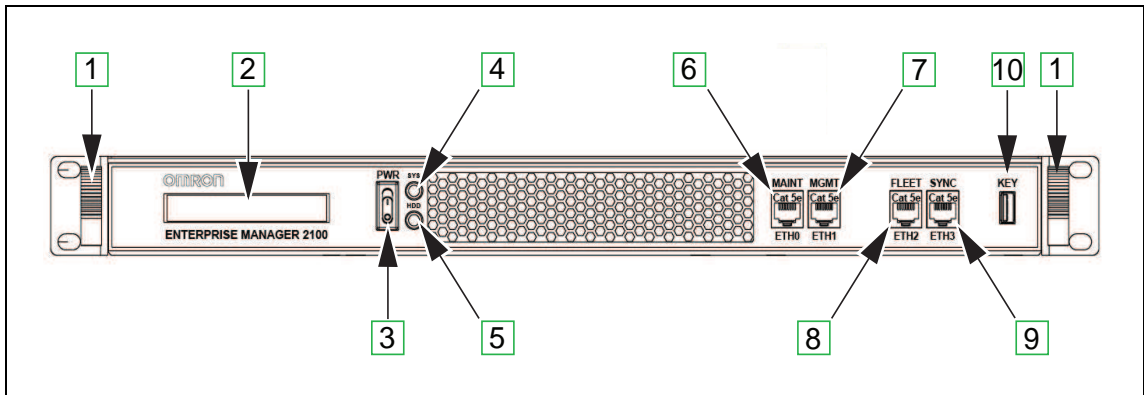


Figure 3-1. EM2100 Appliance Front Panel Features and Connectors.

Table 3-1. EM2100 Front Panel Description

Callout	Label	Port	Description
1	n/a	n/a	Chassis handles Used during installation, removal, or service of the EM2100 appliance to move the chassis on the slider rails.
2	n/a	n/a	Display panel This 40-Character (2x20) LCD display provides status, warning, and error information. See Display Panel Information on page 17.
3	PWR	n/a	Power switch This momentary rocker-type switch controls the power ON and OFF functions of the EM2100. See Turn EM2100 Power ON and OFF on page 35 for more

Callout	Label	Port	Description
			information.
4	SYS	n/a	System status indicator LED Indicates the power state of the EM2100 appliance (lit when the appliance is powered ON).
5	HDD	n/a	Internal storage activity indicator LED Lit while the internal hard drive disk is busy (read / write activity).
6	MAINT	ETH0	Maintenance Ethernet network port The Maintenance port is always enabled and is not password protected. Use this port for initial setup, troubleshooting, and as an alternate method of access. This port has a static IP address of 1.2.3.4.
7	MGMT	ETH1	Management Ethernet network port The SetNetGo access Ethernet port (AMRs cannot access this Ethernet port).
8	FLEET	ETH2	Fleet Ethernet network port The port for AMR and MobilePlanner operational network connections.
9	SYNC	ETH3	Synchronization Ethernet network port Reserved for future use.
10	KEY	n/a	Front USB port Service use or Legacy fleet support dongle.

Additional Information: Contact your system administrator for assistance configuring the EM2100 appliance for your network. Refer to Site Networking Requirements on page 21 for more information.

3.2 Rear Panel Connectors and Features

This section describes the connectors, indicators, and physical characteristics of the EM2100 appliance rear panel.

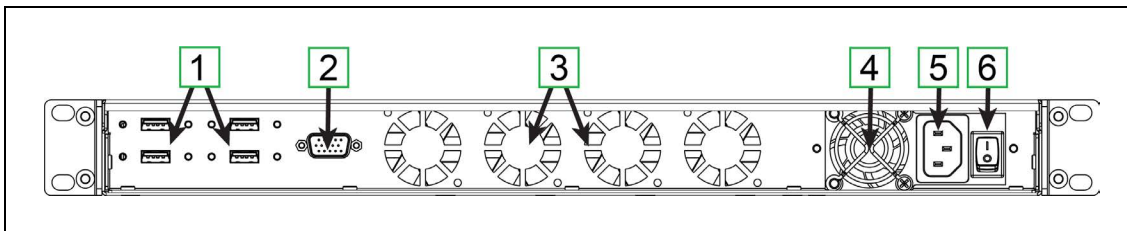


Figure 3-2. EM2100 Rear Panel Connectors and Features.

The EM2100 rear panel connectors and features are described in the following table.

Table 3-2. Description of EM2100 Rear Panel Connectors and Features

Callout	Description
1	Four USB ports Service use or Legacy fleet support dongle.
2	SVGA Video DB15 port Service use only.
3	Four auto-speed motherboard cooling fans Fan speed (and noise volume) varies depending on the CPU load and the ambient temperature.
4	Power supply cooling fan
5	AC power input connector (IEC 60320 C14)
6	Main power input switch Keep this set to ON (I) during normal operation and use the front power switch to control power. Refer to Turn EM2100 Power ON and OFF on page 35 for more information.

3.3 Display Panel Information

The EM2100 includes an LCD display panel that provides status and other information described in the following table.

Table 3-3. EM2100 Status Display Messages

Message	Description
OMRON ROBOTICS AND SAFETY TECHNOLOGIES	Standard splash message during power ON.
EM2100 STARTING	Boot message after power ON.
MODE: <mode>	Configuration mode of the appliance. FLEET MANAGER STANDALONE: Configured as a Standalone Fleet Manager. FLEET MANAGER PAIRED: Configured as a Primary Fleet Manager or a Secondary Fleet Manager. SIMULATOR: Configured as a Fleet Simulator.
ETH0: <state> ETH1:<state> ETH2:<state> ETH3:<state>	Link status of each port. UP: Ethernet link established. DOWN: Ethernet link not established.

Message	Description
ETH1: <###.###.###.###> ETH2: <###.###.###.###>	IPv4 address for the Management Ethernet port and the Fleet Ethernet port.
ASYNC: <mode> STATUS: <status> NOTE: This display will only appear when the appliance MODE is PAIRED, either as Primary Fleet Manager or Secondary Fleet Manager.	Autosync mode and status when an EM2100 appliance is paired, operating as either a Primary Fleet Manager or Secondary Fleet Manager. The mode will be displayed as PRIMARY or SECONDARY. The status will be displayed as STARTUP, ACTIVE, or FAILED. See Autosync Status on page 18 for more information.
UP: <time>	Time elapsed since the last reboot.

Autosync Status

Autosync Status only applies to installations with a Primary Fleet Manager and a Secondary Fleet Manager. The autosync status messages are described below.

- **STARTUP**—Autosync is configured, but the two appliances have not yet communicated successfully.
- **ACTIVE**—The Primary Fleet Manager and Secondary Fleet Manager appliances are communicating.
- **FAILED**—The Primary Fleet Manager and Secondary Fleet Manager appliances were previously communicating, but the connection is lost. The Primary Fleet Manager automatically attempts to re-establish communication with the Secondary Fleet Manager in this state.

Chapter 4: Hardware Installation

This chapter provides information about unpacking, mounting, and applying power to the EM2100 appliance hardware. It includes the following topics.

4.1 Prepare Your Site for the EM2100	19
4.2 Unpack the Shipment	22
4.3 Sliding Rail Kit for Rack Mounting	24
4.4 Connecting Power to the EM2100	33

4.1 Prepare Your Site for the EM2100

Use this information to prepare a site for an EM2100 installation.



WARNING: HAZARDOUS ENVIRONMENTS. OMRON does not intend that you use the EM2100 appliance in hazardous environments (explosive gas, water, dust, oil mist). The appliance has an IP rating of IP20 (NEMA Type 1).



AVERTISSMANT: OMRON n'a pas conçu l'appareil EM2100 pour être utilisé dans des environnements à risque (gaz explosif, eau, poussière, brouillard huileux). L'appareil a un indice IP20 (NEMA Type 1).

For other technical specifications and requirements, see: Technical Specifications on page 47.

Site Rack Requirements

Each EM2100 requires 1U (44.50 mm, 1.75 inches) of space in a standard 19-inch (48.3 cm) 4-post data center rack, installed as follows:

- The appliance requires a minimum of four support points at the sides, or a rack shelf that provides full support for the chassis enclosure.
- You must secure the appliance to the rack with screws. This prevents anyone from attempting to slide the appliance out of the rack.

IMPORTANT: Do not install this appliance in a 2-post rack, or mount it by the chassis bezel brackets (*ears*) alone. If rack mounting is not possible, mount the appliance with a support shelf or support brackets that can bear the entire weight of the unit.

If you are installing a Secondary Fleet Manager, consider installing it in a rack that is remote from the Primary Fleet Manager to improve disaster tolerance.



DANGER: PERSONAL INJURY RISK. When installing equipment in a rack, read and follow all safety instructions in the rack documentation. Follow the instructions for stabilizing the rack before you begin the installation.



DANGER: RISQUE DE BLESSURES PERSONNELLES. Lors de l'installation de l'équipement dans un support, lire et suivre toutes les instructions de sécurité de la documentation du support. Suivre les instructions pour stabiliser le support avant de commencer l'installation.



WARNING: PERSONAL INJURY RISK. Installation might require two people to safely lift and install this equipment in a tall rack.



AVERTISSMANT: RISQUE DE BLESSURES PERSONNELLES. Deux personnes pourraient être nécessaires pour élever et installer l'appareil dans un support haut en toute sécurité.

Site Electrical Power Requirements

The appliance has specific electrical power requirements that should be considered when preparing your site for installation. Refer to Technical Specifications on page 47 and the electrical safety information specified in Safety on page 11.

If using a paired appliance configuration, we recommend that you use an uninterruptible power supply (UPS) for the Primary Fleet Manager and a separate UPS for the Secondary Fleet Manager. If you do not use a UPS and you install two appliances in the same rack, connect each appliance to different power distribution units on separate circuits for power redundancy.

Electrical Wiring

Your EM2100 shipment includes approved power cables for several global locales. If it is necessary to manufacture custom power cables to comply with site-specific or equipment-specific wiring, make sure that the cable rating and capacities comply with the specifications found in Power Requirements on page 47.

Chassis grounding occurs at the screws mounting the appliance to the rack through the supplied rail kit. If wired grounding (or bonding) is a requirement for your site, use an appropriate custom cable according to local electrical regulations.

Before attempting electrical wiring:

- Read and understand the safety recommendations in Chapter 2: Safety.
- Ensure electrical installers are suitably trained and qualified to perform the work.
- Complete any necessary electrical work in accordance with local regulations.
- Ensure that you ground and bond the rack according to local electrical specifications.



DANGER: ELECTROCUTION RISK. Follow all local safety regulations that determine who can install such equipment, and how to install it. Follow all local safety and mechanical regulations governing the installation of rack-mounted computer equipment, including power supplies, connectors, grounding, and wiring.



DANGER: RISQUE D'ÉLECTROCUTION. Respecter toutes les réglementations de sécurité locales qui établissent qui peut installer un tel équipement et la méthode d'installation. Respecter toutes les réglementations locales en matière de sécurité et de mécanique régissant l'installation des équipements informatiques montés sur support, notamment l'alimentation, les connecteurs, la mise à la terre et le câblage.

Site Networking Requirements

The following sections only apply to an EM2100 that is in either Standalone Fleet Manager or Primary Fleet Manager operating mode. These networking requirements do not apply to an EM2100 in either Secondary Fleet Manager or Fleet Simulator operating modes.

Local Area Network (LAN) Requirements

An EM2100 running the Fleet Operations Workspace Core software is typically connected to the following items during normal operation.

- AMR wireless network
- Operator Terminal(s)
- Factory equipment management systems (WMS or MES)

The EM2100 appliance requires two static IP address assignments for the Management and Fleet networks (MGMT ETH1 and FLEET ETH2 ports). Each AMR in the system will also require a static IP address assignment.

A different subnet may be required for the Management and Fleet networks depending on the local infrastructure. Although it is not required, using a different subnet for each network will enable you to isolate fleet data traffic from management traffic for enhanced security.

Wireless Network Requirements

Network resource availability can affect EM2100 performance and the number of AMRs supported.

The *Fleet Operations Workspace Core User's Guide* and the AMR user's guides provide additional information about requirements for wireless networks and network access points. Be aware of the specific requirements for wireless network coverage and bandwidth.

4.2 Unpack the Shipment

Unpack the shipment on a clean, level, electrostatic discharge-safe (ESD-safe) surface that is near the installation location. Make sure that the workspace is large enough to accommodate both the shipping carton and the unpacked appliance.



CAUTION: ESD DAMAGE RISK. Protect the appliance from damage caused by electrostatic discharge (ESD). Wear a grounded wrist-strap or shoe strap before you remove the antistatic cover.



ATTENTION: RISQUE DE DÉCHARGE ÉLECTROSTATIQUE. Protéger l'appareil contre les dommages provoqués par les décharges électrostatiques (ESD). Portez un bracelet antistatique à la poignée ou à la cheville avant de retirer le couvercle antistatique.

Before You Unpack the EM2100

Before you unpack the appliance:

- Orient the carton only as indicated by its labeling (This Way Up).
- Carefully inspect the packaging for evidence of damage during transit. If you find packing damage, request that the carrier's agent be present when you open the packaging.

As the appliance is unpacked:

1. Compare the actual items received (not just the packing slip) with your equipment purchase order.
2. Verify that all items are present and that the shipment is correct. Refer to Items Supplied with the EM2100 on page 7.
3. Inspect each component for external damage as you unpack it. Contact your local OMRON support immediately if you see any damage.

Unpack the EM2100 Shipping Carton

1. Place the shipping carton on a stable, flat surface.
2. Use only a safety box cutter to cut the packing tape. Do not use any other type of knife because you might damage the contents. Open the carton as shown in Figure 4-1.

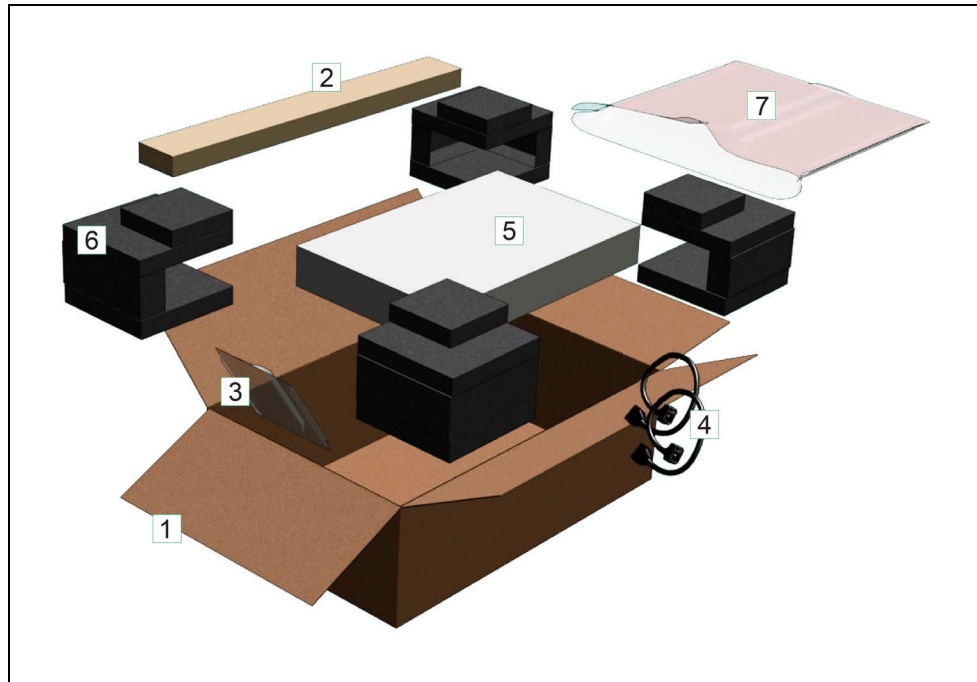


Figure 4-1. EM2100 Shipping Carton Content

3. Verify that the shipping carton contains the items listed in Table 4-1.

Table 4-1. Description of the Shipping Carton Content

Callout	Description
1	Shipping carton
2	Rack-mount rail kit
3	Accessories and documentation bag
4	Power cables
5	EM2100 appliance
6	Shock-absorbing corners
7	Anti-static bag

4. Remove the accessories bag [3], the rail kit box [2] and the power cables [4].
5. Carefully lift out the appliance [5] and remove the four shock absorbing [6] corners and then remove the antistatic bag [7].
6. Put the packaging items back in the shipping carton and retain them for future use. We recommend that you ship or move the appliance only in its original packaging.

4.3 Sliding Rail Kit for Rack Mounting

Your EM2100 shipment includes a universal sliding rail kit compatible with generic data center 4-post rack systems. The rail kit can be attached to a variety of rack post profiles with square or round fastening holes.

You cannot install the EM2100 in a 2-post, Telco-style rack. The bezel brackets (*ears*) are not designed to support the chassis weight. However, you may be able to use other 2-post racks for your appliance with the following considerations.

- The chassis must be supported with a method that prevents flexing. This can be accomplished with a minimum of 4 mounting points at the corners of the chassis.
- Use a rack shelf that fully supports the appliance.

Refer to Physical Characteristics on page 48 to verify proper clearance and fit with your rack system.



WARNING: PERSONAL INJURY RISK. When operating the sliding rail during assembly or normal use, take care that you do not insert your fingers between moving parts.



AVERTISSMANT: RISQUE DE BLESSURES PERSONNELLE. Lors de l'utilisation du rail télescopique pendant le montage ou l'utilisation normale, veiller à ne pas insérer les doigts entre les pièces mobiles.



WARNING: HEAVY COMPONENT. Although one person can lift the appliance, you might require a minimum two person lift if you install the appliance into the upper locations of a tall (183 cm, 72 inch) rack. Take particular care if you use step ladders or step stools.



AVERTISSMANT: COMPOSANT LOURD. Bien qu'une seule personne puisse soulever l'appareil, un nombre minimum de deux personnes pourrait être nécessaire pour installer l'appareil dans un support haut (183 cm, 72 pouces). Prendre un soin particulier lors de l'utilisation d'une échelle ou d'un tabouret-escabeau.



DANGER: TIPPING RISK. If a computer equipment rack is not ganged to other racks, bolted to the floor, or fitted with an extending stabilizer foot, it might tip when equipment is fully extended from the rack. Do not install equipment in a rack unless you are sure that it is stable and safe.



DANGER: RISQUE D'INSTABILITÉ. Si un support d'équipement informatique n'est pas connecté à d'autres supports, boulonné au sol ou équipé d'un pied stabilisateur extensible, il risque de basculer lorsque l'équipement est complètement sorti du support. Ne pas installer d'équipement dans un support à moins d'être certain qu'il est stable et sûr.

Components in the Sliding Rail Kit

The sliding rail kit provided with your EM2100 appliance includes the following items.

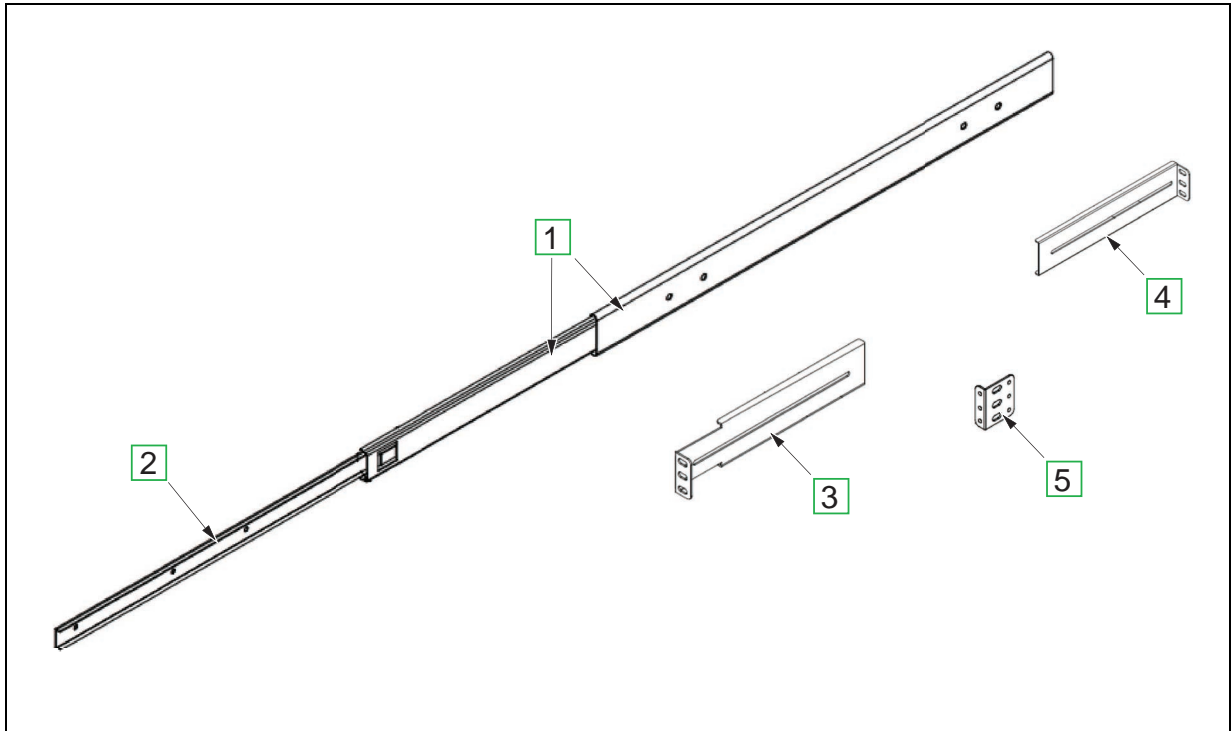


Figure 4-2. Sliding Rail Components (Right Assembly Shown).

- Two sliding tracks [1] that attach to the rack posts with brackets.
- Two sliding rails [2] that attach to the appliance chassis.
- Two front outer L-brackets [3] that attach to the front rack posts.
- Two rear outer L-brackets [4] (approximately 6 inch) that attach to the rear rack posts.
- Two long rear outer L-brackets (11 inch) that attach to the rear rack posts.
Use the longer rear L-brackets (not shown) for rack depths over 24 inches.
- Four inner L-brackets used to secure the sliding tracks to the rack posts [5].
- A variety of fasteners and hardware (described in Table 4-2. below).

Table 4-2. Rail Kit Fasteners

Item	Quantity
M5x15 screw	2
M5x8 screw	10
M4x6 screw	14
M4x5 screw	12
M4x4 screw	10
M4 hex nut	8
M4 washer	10

NOTE: To prevent fasteners from loosening because of vibration, use thread-locking liquid (except where electrical grounding is a requirement).

Additional Information: Extra fasteners are provided for various rack mounting configurations.

Items Required to Install the Sliding Rail Kit

The following items are required to install the Sliding Rail Kit:

- Phillips torque screwdriver with #2 bit.
- Something to mark the rack post mounting positions, such as a permanent marker.
- A clamping device or other means to temporarily hold the rail in position while fastening.
- Thread-locking liquid (Loctite® Blue 242 adhesive or equivalent).

Determine the Mounting Method for the Sliding Rail Kit

The sliding rail kit adapts to different rack post profiles in several ways. Use the supplied L-brackets to determine which fastener holes you will use to attach the sliding rail kit to the rack posts.

Adjust the position of the L-brackets to contact the inner or outer surfaces of the rack post to confirm hole alignment.

NOTE: The front and rear outer L-brackets might attach directly to the post without requiring the inner L-brackets for some rack profile types.

Determine the Sliding Rail Kit Installation Location on the Rack

Determine the installation location as follows.

1. Determine the rack post height (U location) where you want to install the appliance.
2. Mark the installation location on all four rack posts.

Remove the Sliding Rail from the Sliding Track

Remove the sliding rail [1] from the sliding track [2] as follows.

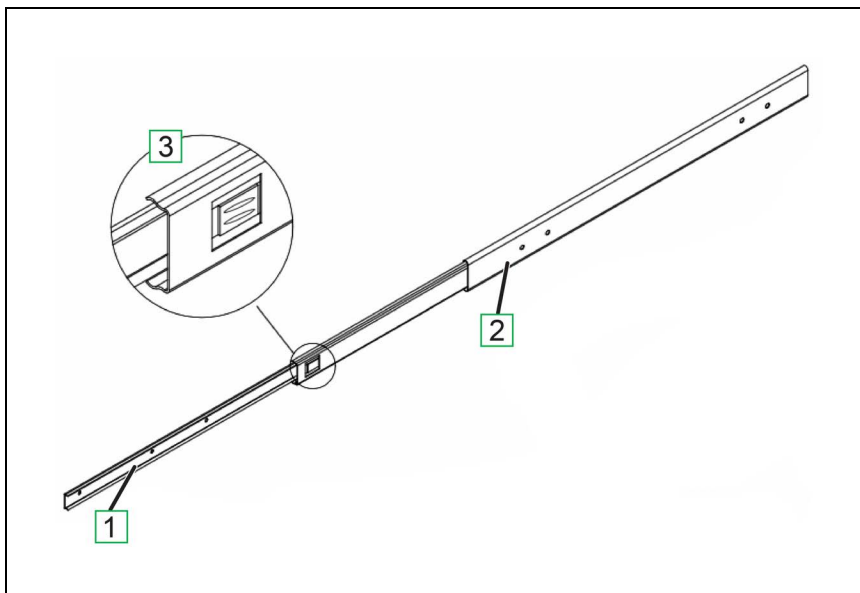


Figure 4-3. Remove the Sliding Rail from the Sliding Track (Right Assembly Shown).

1. Pull the end of the sliding rail [1] until it is fully extended from the sliding track [2], engaging the locking button [3].
2. Press the locking button [3] and continue to pull the sliding rail [1], removing it completely from the track.
3. Repeat Step 1 and Step 2 for the other rail assembly.

Attach the Sliding Rails to the Appliance Chassis

Use the following procedure to attach the sliding rails to the appliance chassis.

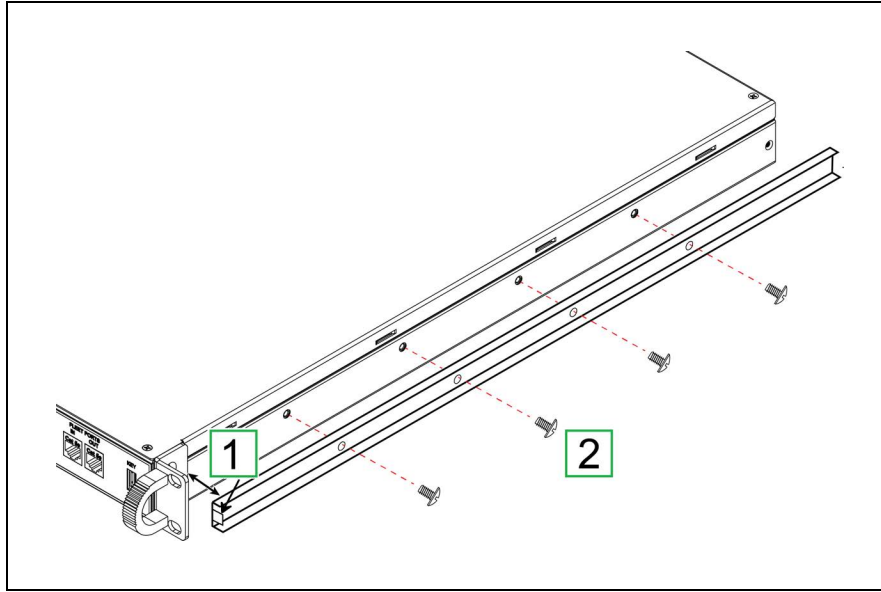


Figure 4-4. Attach the Sliding Rail to the Appliance Chassis (Right Assembly Shown).

1. Locate the tab on the sliding rail [1]. This tab indicates the front of the sliding rail. Align the sliding rail with the appliance chassis.
2. Attach the sliding rail with four M4x6 screws [2]. Torque each screw to 2 ft-lb (3 N·m).
3. Repeat Step 1 and Step 2 for the other sliding rail.

Attach the Outer L-shaped Brackets to the Sliding Track

Attach the front and rear outer L-shaped brackets to the sliding track as follows.

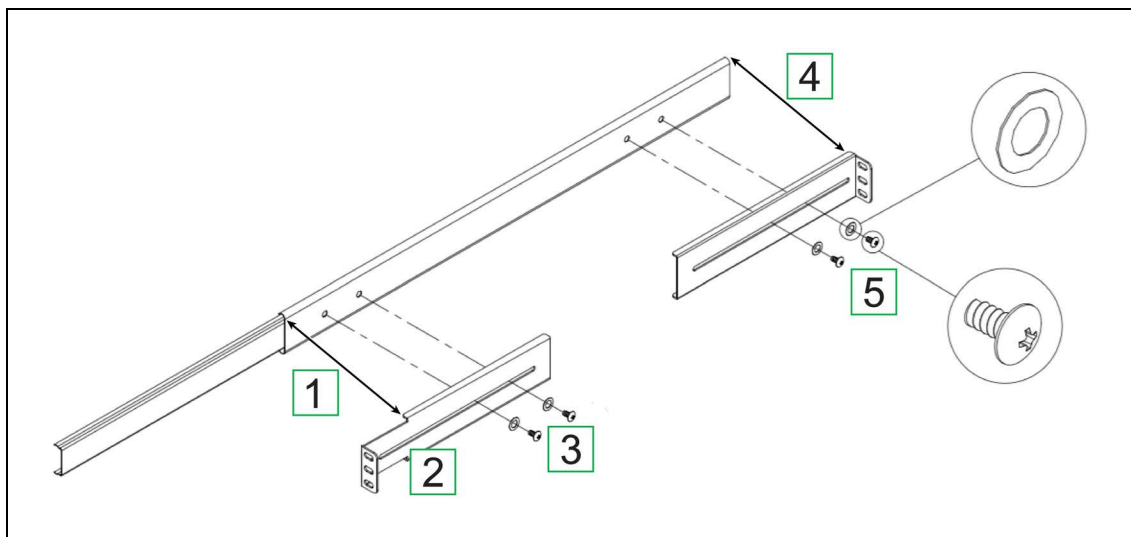


Figure 4-5. Attach the Front and Rear Outer Adjustable L-Brackets to the Track (Right Assembly, Standard-length Rear Bracket Shown).

1. Identify the front and rear outer L-brackets by a letter stamped into the metal ("F" - front and "R" - rear).
2. Align the front outer L-bracket [2] with the front end of the sliding track [1].
3. Attach the front outer L-bracket with two M4x4 screws and M4 washers [3].
Torque each screw to 2 ft-lb (3 N·m).
4. Align the rear outer L-bracket with the rear end of the sliding track [4].
The rear end of the sliding track is a starting position. Adjust as needed.

IMPORTANT: For installations in a rack that is too deep for the standard rear L-bracket to reach, use the longer (11 inch) rear L-brackets instead.

5. Attach the rear outer L-bracket with two M4x4 screws and M4 washers [5].
Do not fully tighten the screws until you are finished adjusting the brackets.
6. Repeat Step 1 through Step 5 for the other brackets and sliding track.

Attach the Sliding Tracks to the Rack Posts

Use the following procedures to adjust and attach the sliding tracks to a typical rack post profile.

Adjust the Sliding Tracks to Span the Rack Posts

Use the following procedure to adjust the sliding tracks before attaching.

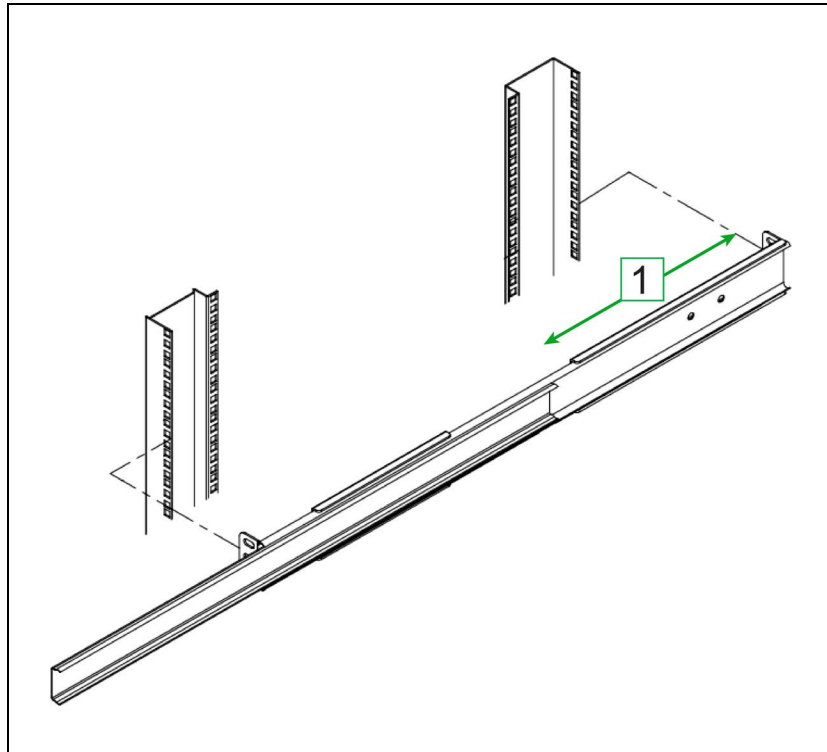


Figure 4-6. Adjusting the Track to the Rack Posts (Left Assembly Shown).

4.3 Sliding Rail Kit for Rack Mounting

1. Extend the rear outer L-bracket to span the distance of the rack posts [1] (front and rear).
2. Position the sliding track so the front and rear outer L-brackets are on the outer faces of the rack posts at the designated rack mounting height.
3. Slide the loose rear outer L-bracket [1] until it fits tightly with the outer face of the rear rack post. Temporarily secure the rear outer L-bracket to the sliding track to prevent it from shifting using a clamping device or other means.
4. Mark all four U-locations on the rack posts.
5. Tighten the two M4x4 screws and M4 washers to secure the position of the rear outer L-bracket to the sliding track. Torque each screw to 2 ft-lb (3 N·m).
6. Repeat Steps 1 through 5 for the other sliding track.

Fasten the Sliding Track to the Rack Posts

Use the following procedure to attach the pre-adjusted sliding tracks to the rack posts.

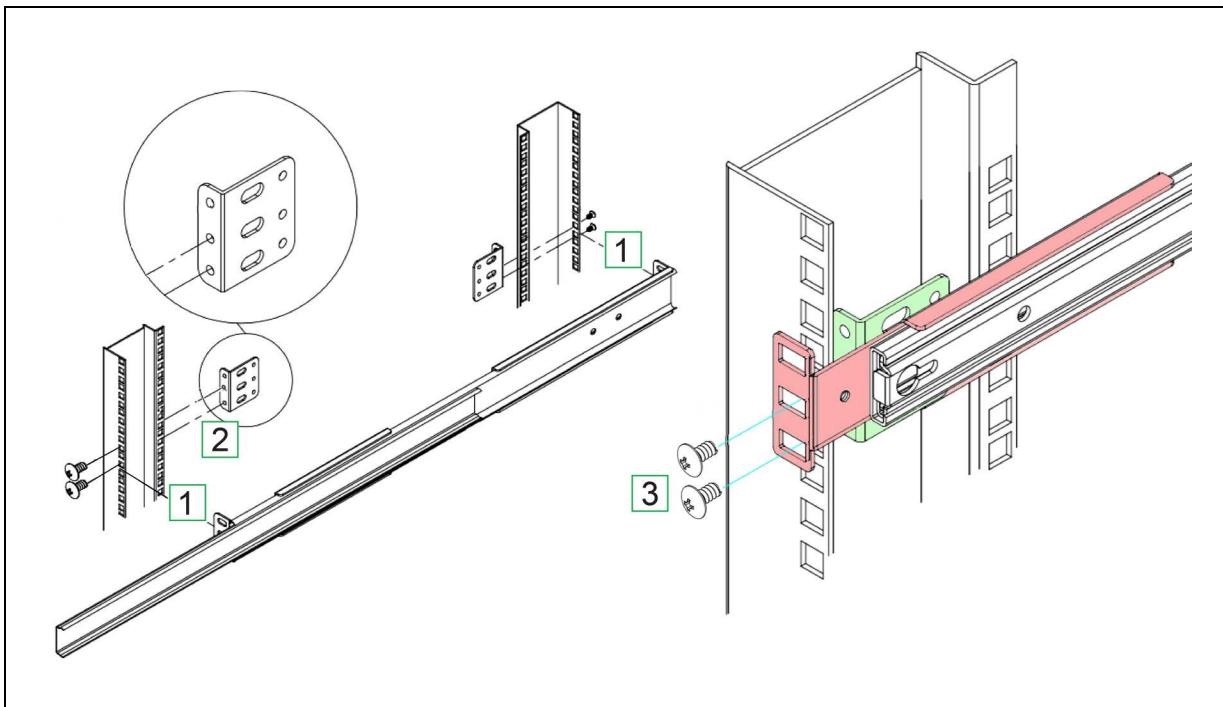


Figure 4-7. Fastening Sliding Tracks to the Rack Posts (Left Assembly Shown).

1. Position the sliding track so the front and rear outer L-brackets are on the outer faces of the front and rear rack posts at the desired mounting location [1]. Temporarily secure the sliding track to the rack post, using a clamping device or other means.
2. Place an inner L-bracket [2] on the inner face of the front rack post.
3. Secure the front outer L-bracket to the front rack post using the inner L-bracket with two M5x8 screws [3], at the middle and bottom holes at the U-location. Torque each screw to 4.5 ft-lb (6 N·m).
4. Repeat Step 2 and 3 for the L-brackets at the rear rack post.

5. Repeat Step 1 through Step 4 for the remaining track.
6. Check that both sliding tracks operate smoothly, do not bind, and are level and straight.

Insert the Appliance Into the Sliding Track

Use the following procedure to insert the appliance into the sliding track.

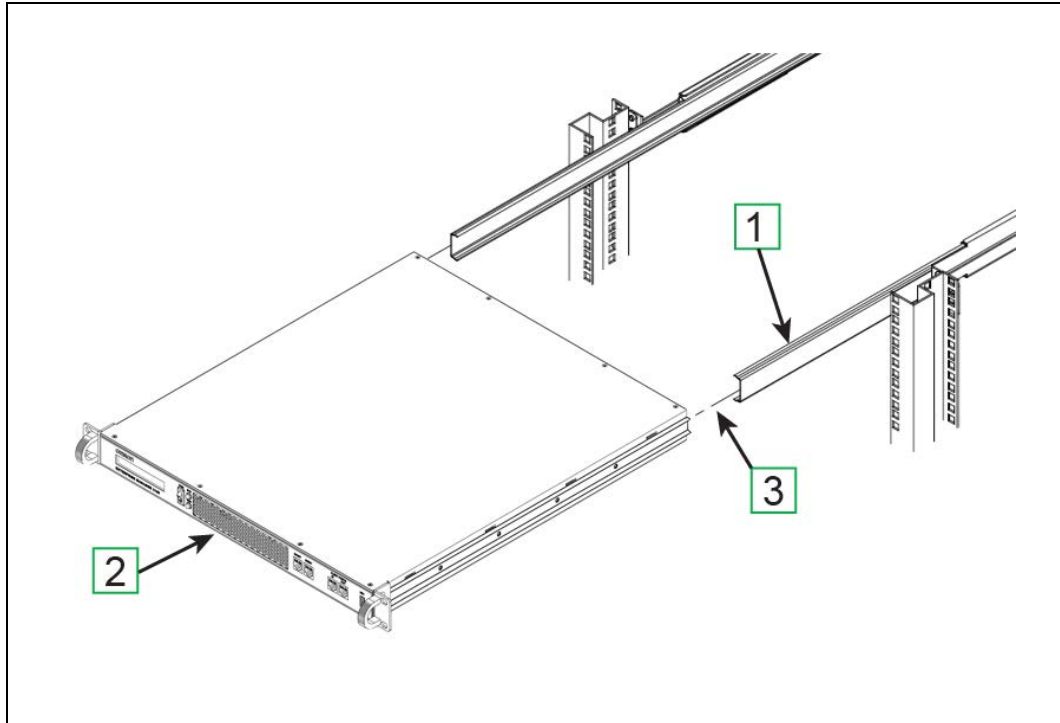


Figure 4-8. Inserting the Chassis Into the Track.

1. Extend the sliding tracks [1] out on each side (about half-way).
2. Hold the chassis [2] level and square with the sliding track [1].
3. Insert the sliding rails into the sliding tracks [3] and push the chassis [2] all the way in until you hear the sliding rails click and lock.
4. Carefully and slowly pull the chassis out again to full extension, making sure that the rail stops at the lock (See [3] in Figure 4-3.).
5. Push the appliance chassis in completely and secure it to the rack by inserting two M5x15 screws into the top holes on each side as shown below.

These should be finger-tight, no more than 1 ft-lb (1.4 N-m). Do not overtighten the M5x15 securing screws.

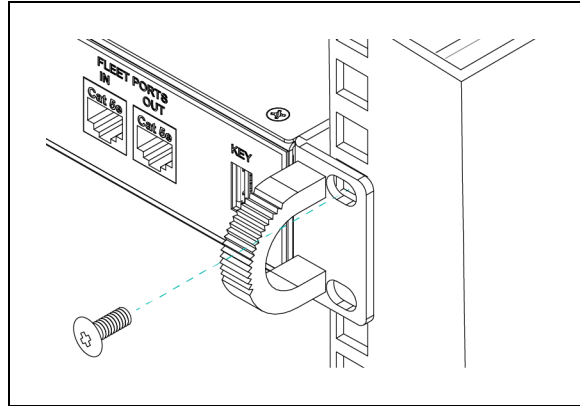


Figure 4-9. Secure Appliance Chassis to Rack (Right Side Shown).

Appliance Removal

If the appliance needs to be removed, use the following procedure.

1. Power OFF the EM2100 appliance using the procedure described in Powering OFF - Soft Shutdown on page 35.
2. Disconnect power and any other cables or devices connected to the EM2100 appliance.
3. Pull the chassis out to full extension.
4. Press the locking buttons and continue to pull the sliding rail out, removing it completely from the sliding track (refer to [3] in Figure 4-3. for locking button locations).

4.4 Connecting Power to the EM2100

The appliance requires a 100 – 240 VAC, 50/60 Hz power supply. We recommend that you use a separate uninterruptible power supply (UPS) circuit for each appliance.



WARNING: ELECTROCUTION RISK. Make sure that all connections and supply equipment are operationally safe and follow all local regulations concerning the electrical installation of computer devices.



AVERTISSMANT: RISQUE D'ÉLECTROCUTION. S'assurer que toutes les connexions et les équipements d'alimentation sont sûrs du point de vue opérationnel et respecter toutes les réglementations locales concernant l'installation électrique des dispositifs informatiques.

1. After the EM2100 appliance has been properly mounted and all necessary electrical and network connections are made, ensure that the power switch (front) and main power input switch (rear) are both OFF.
2. Connect the AC plug on the rear of the appliance to AC power.
3. Set the main power input switch (rear) to ON (I).

Additional Information: Use only the front momentary power switch to control AC power during normal operation.

Chapter 5: Operation

This chapter describes how to operate the EM2100 appliance.

You must complete the steps in Chapter 4: Hardware Installation before you proceed.

5.1 Turn EM2100 Power ON and OFF

The front momentary power switch is used to power the appliance ON and OFF.

Additional Information: The main power input switch should remain ON unless you are uninstalling the appliance. Refer to Rear Panel Connectors and Features on page 16 for more information.

Powering ON

Use the following power ON procedure after a shutdown or for an initial power ON of the appliance. Do not power ON the appliance until you have confirmed that the environment is safe and ready to be powered ON (refer to Considerations for Powering ON After a Shutdown on page 36 for more information).

1. Ensure that the rear power switch is in the ON position.
2. Press and hold the front power switch until the SYS LED illuminates (typically 1-2 seconds).
3. Observe the boot message sequence in the display panel.

Additional Information: If there are no boot errors, the boot sequence can take up to two minutes. It typically takes less time than that.

IMPORTANT: Do not power ON the EM2100 appliance until you have resolved all problems in the work environment. Refer to Considerations for Powering ON After a Shutdown on page 36 for more information.

Powering OFF - Soft Shutdown

The following procedure initiates a soft shutdown (preferred), so the operating system runs through a controlled shutdown procedure. For uncontrolled shutdown, see Powering OFF - Hard Shutdown.

NOTE: For an EM2100 in either Standalone Fleet Manager or Primary Fleet Manager operating mode, a soft shutdown terminates AMR jobs in progress, regardless of their configuration.

NOTE: For an EM2100 in Fleet Simulator operating mode, a soft shutdown shuts down the simulated Fleet Managers.

1. Press and release the front power switch to start the shutdown sequence for the EM2100 appliance (typically less than 1 second). The appliance will beep 3 times to indicate that the power OFF, soft shutdown procedure has begun.
2. Observe the shutdown messages on the control panel.
3. The SYS LED turns OFF when the sequence is complete.

Additional Information: The shutdown may take up to one minute. It typically takes less time.

Powering OFF - Hard Shutdown

The following procedure initiates a hard shutdown (uncontrolled), where the operating system terminates immediately. This procedure has the same effect as an unexpected power loss and is not recommended during normal operation.

NOTE: For an EM2100 in either Standalone Fleet Manager or Primary Fleet Manager operating mode, a hard shutdown terminates AMR jobs in progress, regardless of their configuration.

NOTE: For an EM2100 in Fleet Simulator operating mode, a hard shutdown shuts down the simulated Fleet Managers.

1. Press and hold the front power switch for at least four seconds.
2. The appliance immediately turns OFF.

Considerations for Powering ON After a Shutdown

NOTE: This section only applies to EM2100 appliances in either Standalone Fleet Manager or Primary Fleet Manager operating mode.

If you previously powered OFF an EM2100 appliance, your work environment might be in an indeterminate state and the following considerations should be made before powering ON.

- Make sure that all AMRs have sufficiently charged batteries, are operating with no error or E-stop conditions, and are in the correct locations and properly localized. Refer to the AMR user guide for more information.
- Check for the safe operational status of any site-specific automated machinery (such as conveyors) and any in-transit payloads.

After the items above have been considered, follow the steps described in Powering ON on page 35.

Additional Information: After powering ON after any shutdown, use MobilePlanner to determine the status of jobs-in-progress at the time of the shutdown. You may need to re-queue jobs that were in progress.

5.2 Mixed Laser Support

Robots using the LIDAR (P/N 12172-032) are designed to operate within fleets with other robots using the same model LIDAR. For better navigation performance, we do not recommend using both robots with LIDAR (P/N 12172-000) and robots with LIDAR (P/N 12172-032) as part of the same fleet.

Fleets operating with both of these types of robots will operate safely and within specification. Please contact OMRON support with any questions about compatible robots or when considering mixing fleets of robots with LIDAR (P/N 12172-032) with LIDAR (P/N 12172-000).

5.3 Legacy Fleets

If a customer desires to simulate a fleet running legacy software (Mobile Software Suite 4.9.27-A), an additional physical dongle is required. That dongle will be ordered alongside the Fleet Simulator license and inserted in an external USB port of the EM2100 appliance.

Chapter 6: Connecting to the EM2100

This chapter describes how to connect to the EM2100 after the hardware has been successfully installed and powered ON.

Additional Information: Refer to the *Fleet Operations Workspace Core User's Guide* and the *Fleet Simulator User's Guide* for more information about configuring the EM2100 for specific functionality.

6.1 Set the IP Address on the Client PC's Network Adapter	39
6.2 Access SetNetGo on the EM2100	39

6.1 Set the IP Address on the Client PC's Network Adapter

After connecting an Ethernet cable from the client PC's Ethernet port to the Maintenance port (MAINT ETH0) of the appliance, set the IP address on the client PC as follows.

1. Set the client PC to the static IP address of 1.2.3.X. Do not set the client IP address to 1.2.3.4 because this is the static IP reserved for the EM2100 Maintenance Ethernet port.
2. Enter as the subnet mask: 255.255.255.0.
3. Apply the network adapter changes to the client PC.

Additional Information: The Maintenance Ethernet port can be used for emergency or alternate access to the appliance at IP address 1.2.3.4 (if you lose the password or if there is a network IP address conflict, for example).

IMPORTANT: Before you use the EM2100 in any operating mode, you must set its clock. Refer to the *Fleet Operations Workspace Core User's Guide* for more information.

IMPORTANT: You must assign static IP addresses to the EM2100 appliance. Do not use a DHCP server setting.

6.2 Access SetNetGo on the EM2100

Use SetNetGo to configure and manage EM2100 settings. SetNetGo can be accessed with two methods as described below.

1. Access SetNetGo with a web browser

Use a web browser to access SetNetGo for initial setup, when in Fleet Simulator operating mode, or when MobilePlanner is unavailable.

2. Access SetNetGo with MobilePlanner

Use MobilePlanner to access SetNetGo for initial setup and during normal operation for fleet management.

The sections below describe how to access SetNetGo through the Maintenance port to perform the initial EM2100 configuration.

IMPORTANT: The user interface for SetNetGo on an EM2100 appliance provides a different set of parameters and options compared to SetNetGo on an AMR. Once connected, ensure "EM2100" is present at the top left of the interface to confirm connection with the appliance.

Additional Information: Review the *Fleet Operations Workspace Core User's Guide* for more information about SetNetGo settings and configuration.

Access SetNetGo with a Web Browser

Use the following procedure to access SetNetGo with a web browser.

NOTE: After connecting an Ethernet cable from the client PC to the MAINT ETH0 port on the appliance, use the procedure in Set the IP Address on the Client PC's Network Adapter on page 39 before following the procedure below.

1. Open a web browser and access https://1.2.3.4.
2. If a certificate warning dialog opens, ignore it and close the dialog.
3. The following view should appear, indicating a successful connection.

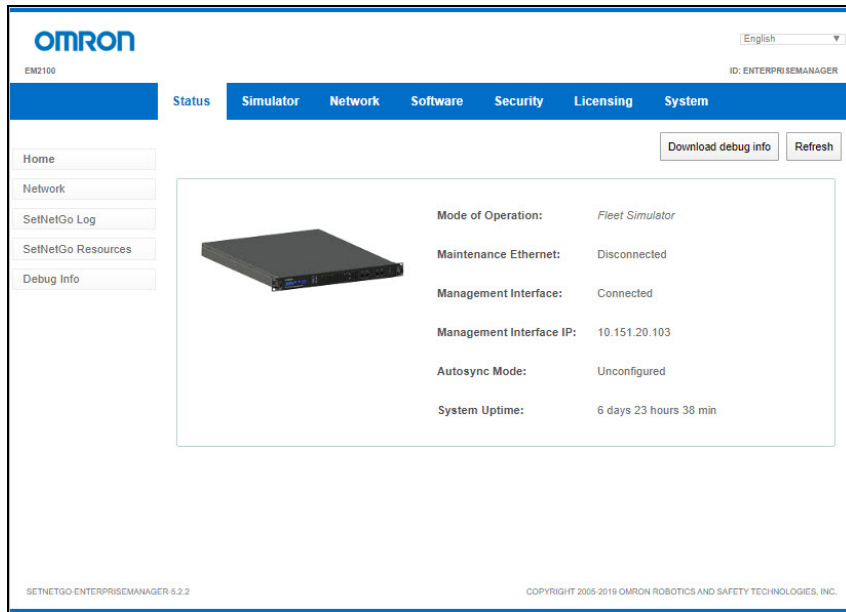


Figure 6-1. Initial SetNetGo Web Browser Display.

Additional Information: After establishing a connection to the EM2100 with the procedure above, the appliance is ready to be configured for operation with an AMR fleet. Refer to the *Fleet Operations Workspace Core User's Guide* for more information.

Access SetNetGo with MobilePlanner

Use the following procedure to access SetNetGo with MobilePlanner.

Additional Information: This process may also be used for the initial EM2100 configuration.

1. Start the MobilePlanner software on your PC.
2. Enter the IP address of the appliance into the area shown below (example IP shown in the figure below may not be the IP assigned to your appliance).

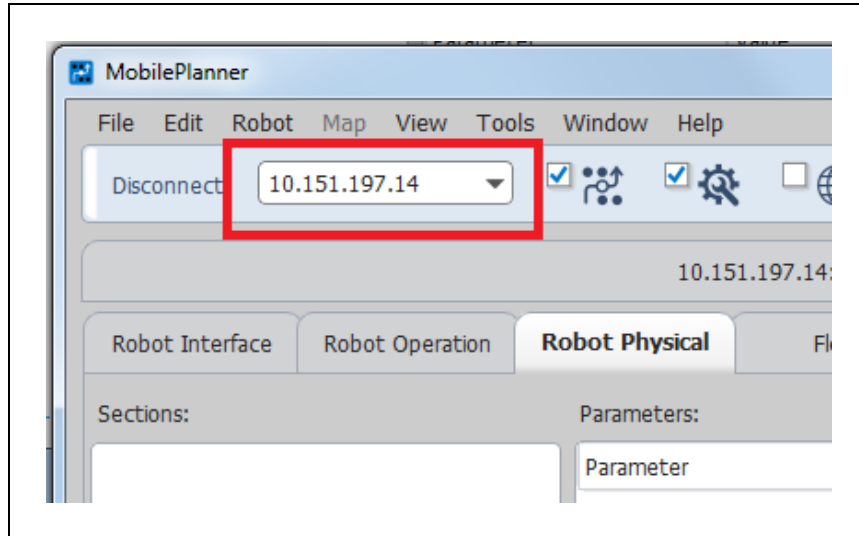


Figure 6-2. Enter the IP Address of the Appliance.

3. Click anywhere in the SetNetGo selection box to access the SetNetGo interface.

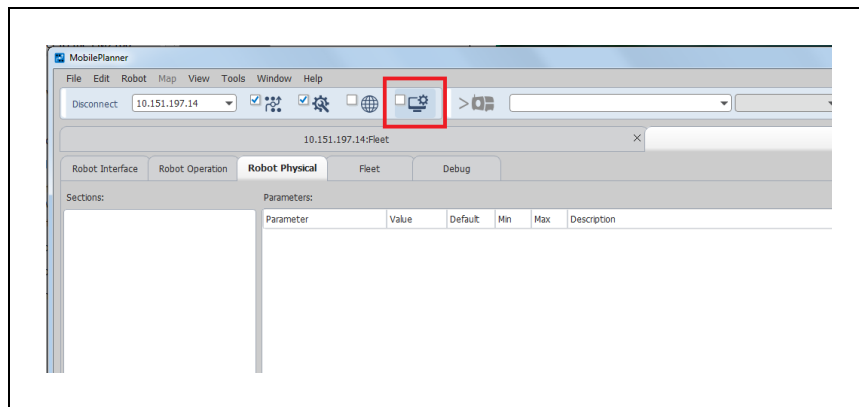


Figure 6-3. Access SetNetGo with MobilePlanner Software.

NOTE: It is not necessary to enable (check) the checkbox within the SetNetGo selection box. The checkbox determines whether SetNetGo starts automatically when you open MobilePlanner.

4. If prompted, enter valid SetNetGo account credentials to access the SetNetGo view (refer to the *Fleet Operations Workspace Core User's Guide* for more information).

Additional Information: After establishing a connection to the EM2100 with the procedure above, the appliance is ready to be configured for operation with an AMR fleet. Refer to the *Fleet Operations Workspace Core User's Guide* for more information.

Chapter 7: Troubleshooting

This chapter includes troubleshooting information for the EM2100 appliance.

7.1 Troubleshooting Methods

If the possible remedies do not resolve the symptoms below, contact your local OMRON support for more information.

If you are requesting help from us, it is very useful to include a debugInfo file. Instructions for doing so can be found in the section Including a debugInfo File with Your Help Request on page 44.

Additional Information: The use of SetNetGo or a command prompt may be required when following the possible remedies in the table below.

NOTE: The information in Table 7-1. Troubleshooting Methods may only apply when using the EM2100 appliance in Standalone Fleet Manager, Primary Fleet Manager, or Secondary Fleet Manager operating mode. Contact your local OMRON support for more information.

Table 7-1. Troubleshooting Methods

Symptom	Possible Causes	Possible Remedies
SYS LED OFF	Power or hardware failure	Verify the power cord is connected to a working power supply. Verify the main power switch on the rear panel is in the ON (I) position.
Maintenance network unavailable	Network failure OS image failure	Ping IP 1.2.3.4 to verify a network connection. Verify the PC network settings. Verify the network cable is connected to the MAINT ETH0 port.
Management network unavailable	LAN configuration error	Ping the IP address assigned to the Management port to verify a network connection. Check the Management Interface settings in SetNetGo. Verify firewall access across network. Verify the network cable is connected from the LAN to the MGMT ETH1 port.
Cannot connect to ARCL port	ARAMCentral configuration error	Verify the ARCL Server is enabled. Verify firewall access.

Symptom	Possible Causes	Possible Remedies
	License error	Verify that a valid license is installed (refer to the Fleet Operations Workspace Core User's Guide for more information).
Can connect with ARCL to Fleet IP address but no AMRs appear in MobilePlanner	Configuration error on AMR WiFi network permissions error Software version mismatch	Verify AMRs are configured with "ConnectToEnterpriseManager" and related parameters. Verify AMRs are set up on WiFi. Verify AMRs have firewall access to the EM2100 appliance from the WiFi network. Verify AMRs are running the same MAJOR.MINOR version of Fleet Operations Workspace Core as the EM2100 appliance. For best results, install the same Fleet Operations Workspace Core version on all EM2100s and AMRs.

7.2 Including a debugInfo File with Your Help Request

Use the following procedure to retrieve the debugInfo file from SetNetGo.

Additional Information: Refer to Connecting to the EM2100 on page 39 for more information about accessing SetNetGo.

1. Connect to SetNetGo with a web browser or with MobilePlanner.
2. Click the **Download debug info** button displayed on the Status - Home page.

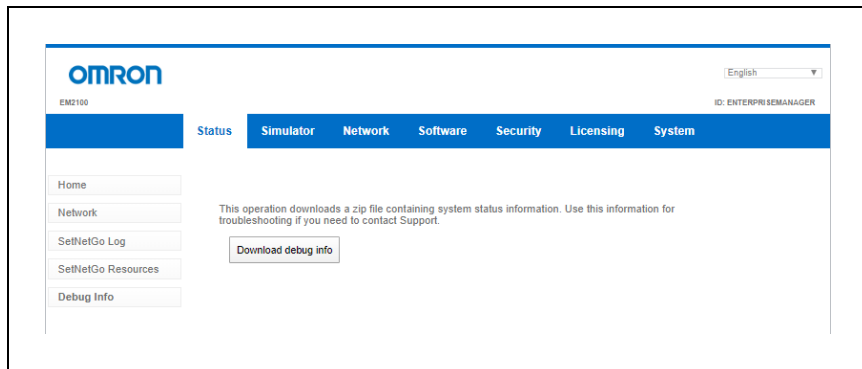


Figure 7-1. Download Debug Information File.

3. Save the file and attach it to your support request.

Additional Information: The **Download debug info** button can also be found in SetNetGo at the Status - Debug Info area.

Chapter 8: Transport and Storage of the EM2100

Ship or store the EM2100 appliance only in its original factory packaging. The packaging prevents damage from typical shipping handling. Protect the package from excessive shock and vibration during shipping or in-house relocation.

For information about the physical characteristics of the appliance, see: Technical Specifications on page 47.

You must ship or store the appliance:

- Within the environmental limits specified in Technical Specifications on page 47 in an area (or vehicle) that is clean, dry, temperature-controlled, with low humidity.
- In accordance with the original package labeling, which describes package orientation and handling requirements.

Chapter 9: Technical Specifications

This chapter provides the technical specifications and physical dimensions of the EM2100 appliance.

9.1 Processing Specifications

Table 9-1. Processing Specifications

CPU	Intel® Xeon® CPU
Memory	32 GB DDR3
Operating System	SetNetGo Embedded LINUX
Data Storage	4 TB

9.2 Environmental Specifications

Table 9-2. Environmental Specifications

Operating temperature	10 to 35°C (50 to 95°F)
Operating humidity range	8 to 90%, non-condensing
Storage and shipment temperature	-25 to +60°C (-13 to +140°F)
Storage and shipment humidity range	5 to 95%, non-condensing
Chassis protection class	IP20 (NEMA Type 1)

9.3 Power Requirements

Table 9-3. Power Specifications

Input Voltage	100 - 240 VAC, 50/60 Hz
Typical Power Consumption	100 W
Maximum Power Consumption	200 W
Appliance power inlet connector	IEC 60320 C14 (Maximum 15 A, 250 V)

9.4 Physical Characteristics

The EM2100 appliance is a standard 1U rackmount with the following dimensions.

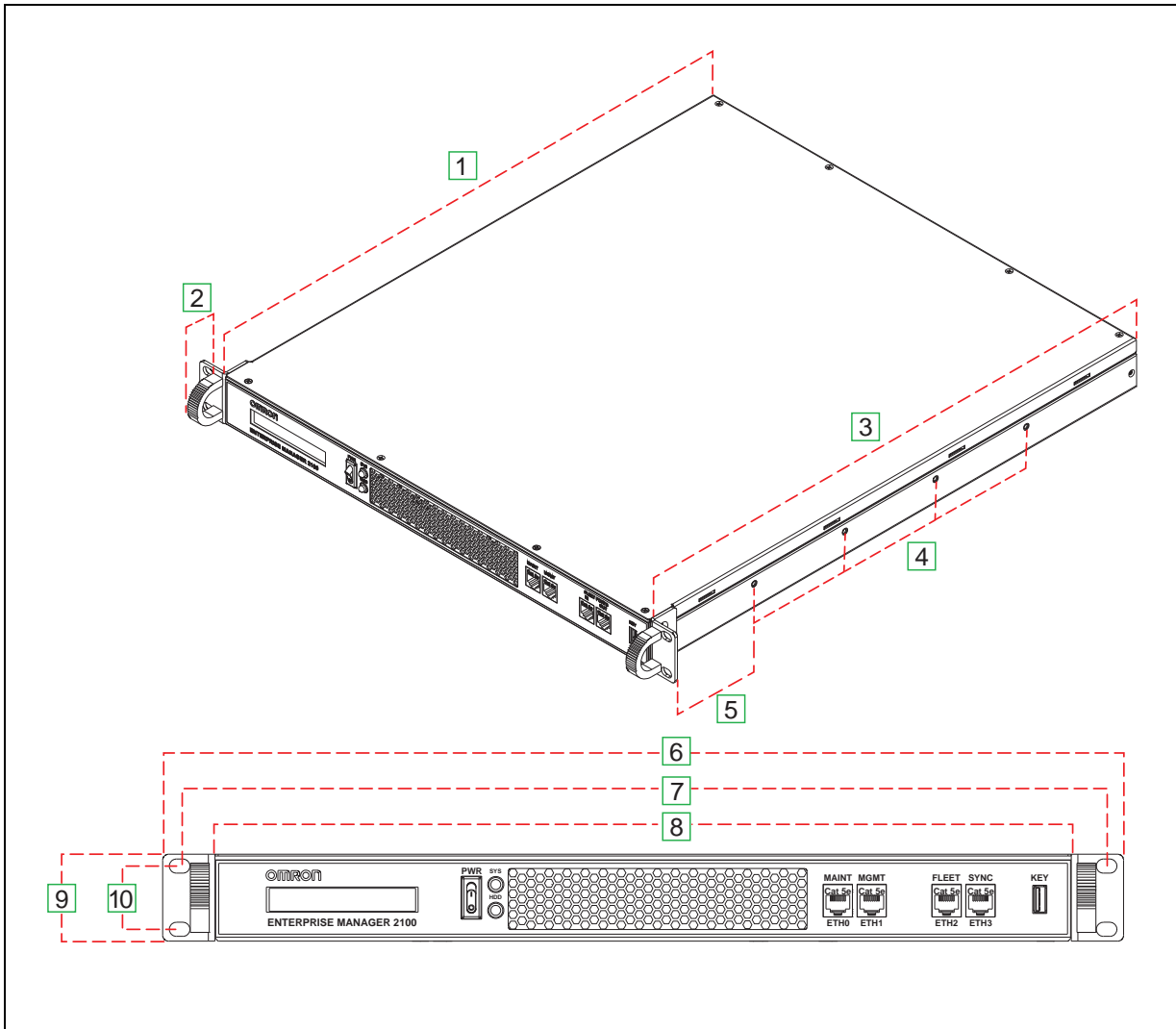


Figure 9-1. Physical Characteristics

Table 9-4. Physical Characteristic Details

Item	Description	Metric	Imperial
1	Chassis enclosure depth	49.27 cm	19.40 inches
2	Chassis handle depth	2.92 cm	1.15 inches
3	Chassis and bracket depth	49.53 cm	19.50 inches
4	Rail kit hole spacing	9.22 cm	3.63 inches

Item	Description	Metric	Imperial
5	Rail kit hole offset (from bracket)	10.44 cm	4.11 inches
6	Max system width	48.26 cm	19.00 inches
7	Securing hole spacing	45.55 cm	18.33 inches
8	Chassis enclosure width	43.00 cm	16.93 inches
9	Chassis height (1U)	4.36 cm	1.72 inches
10	Securing hole spacing depth	3.18 cm	1.25 inches
n/a	Appliance weight	13.43 kg	29.6 lbs
n/a	Shipping dimensions	76 x 65.1 x 19.7 (cm)	30 x 25.625 x 7.75 (inches)

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