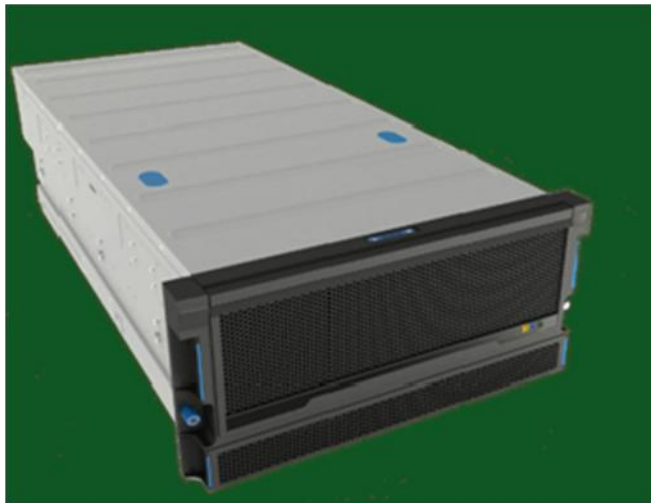**rasilient**
built for surveillance™

PS392e

SAS Expansion Enclosure
Hardware Installation Manual

1st Edition
February 2017

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2

Table of Contents

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4

About This Manual

Conventions

Safety Symbols

Safety Precautions

Regulatory and Integration Information

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5

About This Manual

Conventions

Icon or Format	Instruction
	NOTE: Indicates important information that helps you make better use of your computer
	CAUTION: There is a risk of personal injury and equipment damage. Follow the instructions.
	CAUTION: Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.
	CAUTION: Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.
	WARNING: Indicates a potential for property damage, personal injury, or death.

6

Safety Precautions

Technician Notes

- Only authorized technicians should attempt to repair this equipment.
- Before installing this system, carefully read all the manuals included with the system.
- All repair procedures allow only module replacement. Because of the complexity of the individual boards and sub-assemblies, no one should attempt to make repairs at the component level or make modifications to any printed wiring board. Improper repairs can create a safety hazard.
- To reduce the risk of personal injury from electric shock and hazardous energy levels, do not exceed the level of repairs specified in these procedures.
- The system is designed to be electrically grounded. To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Electrostatic Discharge Precautions

- Electrostatic discharge (ESD) can damage static sensitive devices or micro circuitry. Proper packaging and grounding techniques are required to prevent damage.
- Keep electrostatic-sensitive parts in their containers until they arrive at a static free work area.
- Use a wrist strap connected to the work surface as well as properly grounded tools and equipment
- Keep the area free of nonconductive materials such as ordinary plastic tools and foam packing.
- Avoid touching pins, leads, or circuitry.
- Always place drives with printed circuit board (PCB) assembly-side down.
- Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
- If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.

Rack Warnings

If you plan to rack mount the PS392e, please follow the rack manufacturer's safety instructions.
- Install the enclosure only in a rack that has been properly secured in an area with suitable environmental conditions.
- Have someone assist you during physical installation.
- To properly ventilate the system, you must provide at least 7.6 cm of clearance at the front and back of the system.
- To reduce the risk of personal injury or damage to equipment, always ensure that the rack is adequately stabilized prior to extending a component outside the rack. A rack may become unstable if more than one component is extended. Extend only one at a time.
- Do not stand or step on any components in the rack.

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7

- If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Do not overload the AC power supply branch circuit that provides power to the rack. Observe extension cable and power strip ratings. Ensure that the total ampere rating of all equipment plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.

System Warnings

- Avoid dust, humidity, and extreme temperatures; place the system on a stable surface.
- To reduce the risk of personal injury from hot surfaces, allow the hot-plug disk modules and other system modules to cool before touching them.
- To reduce the risk of electric shock or damage to the equipment, do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Ensure the power cord is inserted into a grounded electrical outlet that is easily accessible at all times. Unplug the power cord from the power supply module to shut off power to the equipment
- Protect the storage system from power fluctuations and temporary power interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system operational during a power failure.
- The storage system must always be operated with all hot plug modules installed or slot covers in place to ensure proper cooling.
- Route power cords so that they will not be walked on or pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

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8

Regulatory and Integration Information

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, this system is assigned a serial number. This system serial number can be found on the product label, along with the required approval markings and information. When requesting certification information for this product, always refer to this serial number. This serial number should not be confused with the marketing name or model number.

Product Regulatory Compliance

Product Safety Compliance

This system complies with the following safety requirements:

IEC	60950-12012 A2-2013
UL	60950-1, 2nd Edition, 2014-10-14
CAN/CSA	C22.2 No. 60950-1-07, 2nd Edition, 2014-10
EN	60950-1/A12:2011 A2: 2013

Product EMC Compliance

This product has been tested and verified to comply with the following electromagnetic compatibility (EMC) regulations:

EN	EN 55022 (2010) , CISPR-22 (2009) Class A
EN	EN 55024:2010
EN	EN 61000-3-2 (2006) +A1:2009 +A2:2009
EN	EN 61000-3-3 (2008)
FCC	FCC 47 CFR Part 15 Class A
VCCI	VCCI V-32014.4 Class A
ICES	ICES-003, Issue-004 Class A

Approvals

CB	
cUL	
FCC	

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9

ICES-003
VCCI
CE

Green compliance

Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)
European Union ROHS directive: 2011/65/EU
SVHC requirements of REACH directive: (EC) No 1907/2006
China RoHS

Regulatory Information

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

⚠ **NOTICE:** This equipment has been tested and found to comply with the limits for a Class A digital device,

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

⚠ **NOTICE:** Any modifications made to this device that are not approved by Rasilient may void the authority

granted to the user by the FCC to operate this equipment.

ICES-003 (Canada)
This Class A digital apparatus complies with Canadian ICES-003.
Cetappareilnumérique de la classe A estconforme à la norme NMB-003 du Canada.
CE (European Community)
This product conforms to the following European Directive(s) and Standard(s): Application of Council Directive: 2014/35/EU, 2014/30/EU, 2011/65/EU.
Standards to which Conformity is declared: EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60950-1. This is a class A product.
In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
Waste Electrical and Electronic Equipment (WEEE)

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10

In accordance with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), the presence of the above symbol on the product or on its packaging indicates that this item must not be disposed of in the normal unsorted municipal waste stream. Instead, it is the user's responsibility todispose of this product by returning it to a collection point designated for the recycling of electrical and electronic equipment waste. Separate collection of this waste helps to optimize the recovery and recycling of any reclaimable materials and also reduces the impact on human health and the environment.

For more information concerning the correct disposal of this product, please contact your local authority or the retailer where this product was purchased.

VCCI (Japan)

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI).

If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラス A 情報技術装置です。

この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

中国环保使用期限标志

此产品环保使用期限是 30 年，在此期限内可安全放心使用，到期后必须进入回收环节。

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11

Chapter 1
Introduction

Audience Assumptions

About This Guide

Packing Checklist

Specifications

System Overview

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12

1 Introduction

1.1 Audience Assumptions

This manual assumes that you are a service technician or network administrator familiar with computer hardware, data storage and network administration terminology and tasks.

1.2 About this Guide

This hardware installation guide provides step by step instructions on how to prepare and install the PS392e SAS expansion enclosure hardware. This guide also includes information on its use and maintenance.   Once the PS392e hardware is ready, you will need to refer to the PS5012 documentation (included with that system) to provision the storage and set up host access. This manual is generally organized as follows:

Introduction	General introduction to the PS392e and its components.
Hardware Installation	Detailed description of each hardware module and instructions for installation and removal.

1.3 Packing Checklist

Make sure you have all the components shipped with your system. If any item is damaged or missing, please contact your sales representative for replacement. The PS392e is shipped with the following:

Chassis	5U rack-mounted chassis
ESM Modules	One or two ESM Modules depending on the configuration
SEM	One or two Secondary Expansion Module depending on the configuration
Power Supplies	One or two Power Supply Modules depending on the configuration.
Fan Modules	Four Fan Modules
Rail Kit	Rail Kit for rack installation.
CMA	Cable Management Assembly
Hard Disk Drives	Up to 92 hot plug 3.5" drive canisters with or without drives depending

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13

	on the configuration.
Cables	Two SAS Cables depending on the configuration
Power Cords	Two power cords

1.4 Specifications

The table below is the technical specification for the PS392e.

Dimensions	Height: 220 mm (8.66in.) Width: 438 mm (17.6 in) Length: 968 mm (38.4 in.)
Weight	Max-weight: 130kg (286 lbs) estimated (92 Drives)
Temperature	Ambient Operating : +5ºC to +35ºC Ambient Non-operating : -30ºC to +60ºC
Humidity	Operating : 8%~80% Non-operating : 8%~80%
AC Input	180-264VAC, 47Hz-63Hz
Power	2400 Watts (max)
Altitude (operating)	950m (support for up to 3000m requires temperature de-rating) [3000m= 28º max] ⚠ **NOTE**: De-rate max operating temperature 1 ºC /300m above 950m altitude.

1.5 System Overview

The PS392e product is a high availability, 5U high density enterprise-class JBOD storage enclosure for up to 92 Drives, which supports 3.5 inch 12Gbps SAS3.0 disk drives that fits within a 1000mm rack including space for cable management.

- Enclosure
  - o 5U rack-mounted storage enclosure with slide rail and cable management assembly.
  - o Dimensions: 5U (H)× 438mm (W)× 968mm (D)
  - o Weight: 5U Assembly with full configuration: 135kg
    fits in 1000mm rack with CMA added.
- Disk Drives:
  - o 92 top loading drives
  - o System supports SAS 2.0/ SAS 3.0 drives.
  - o Up to 13.5W per drive slot.

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14

- ESM Canister
  - o SBB canister modules
  - o Mini-SAS HD IO ports.
  - o Hot-pluggable from rear of chassis.
- Secondary Expansion Module (SEM) Card
  - o Two top loading hot-pluggable SEM cards to provide SAS port fan out for all 92 drives.
  - o Based on 12Gbps SAS Expander.
- Power Supply
  - o 1+1 Redundant 2400w
  - o System input: 180-264VAC, 47Hz-63Hz, via IEC C-20
  - o High efficiency (80Plus Gold Level).
  - o Energy Star® for Storage compliant.
  - o 160A @ 12V /100A @ 5V and 2.5A @ 5Vsb
  - o Hot-pluggable service from front of chassis, AC power cord on the rear of the chassis
  - o 44.45 mm (H)× 200 mm (W) × 340 mm (D)
- Fan module
  - o Four (4) Hot-pluggable Fan Modules in chassis
  - o Each fan module contains two 92mm fans (dual-rotor)

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15

1.6 Product Appearance

Figure 1-1 below, is a trimetric view of the chassis.
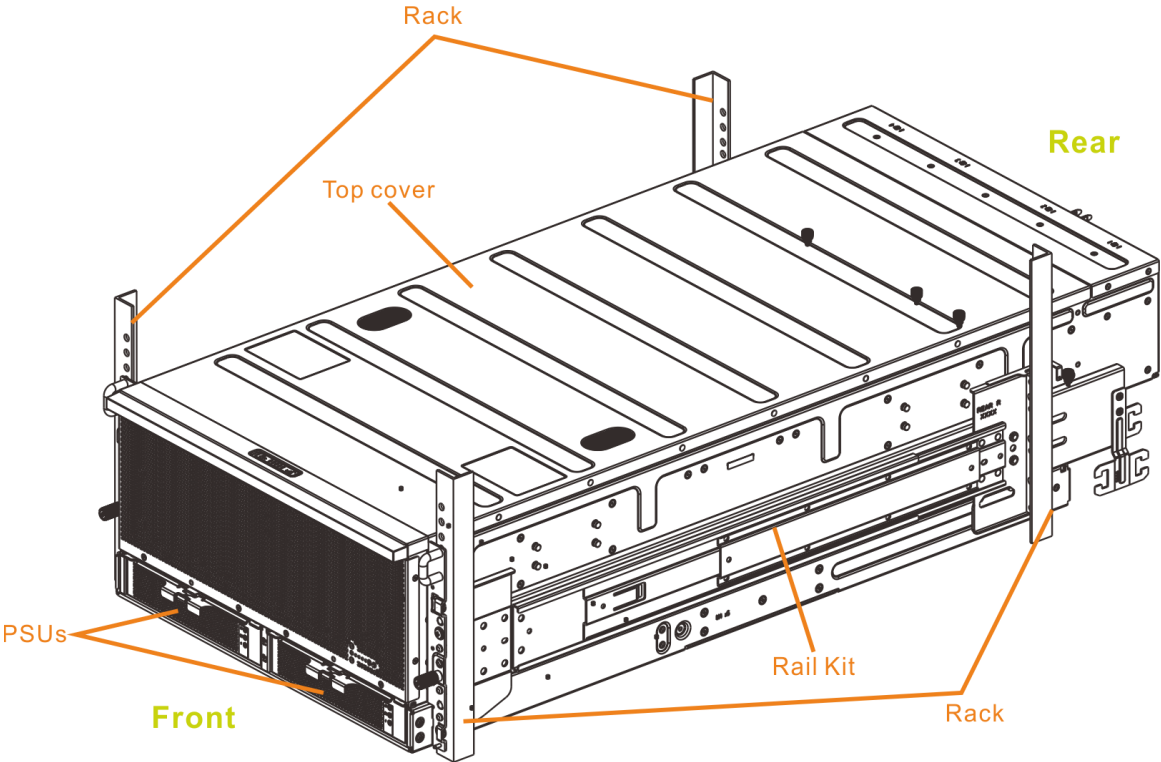
Figure 1-1   PS392e Chassis Trimetric View

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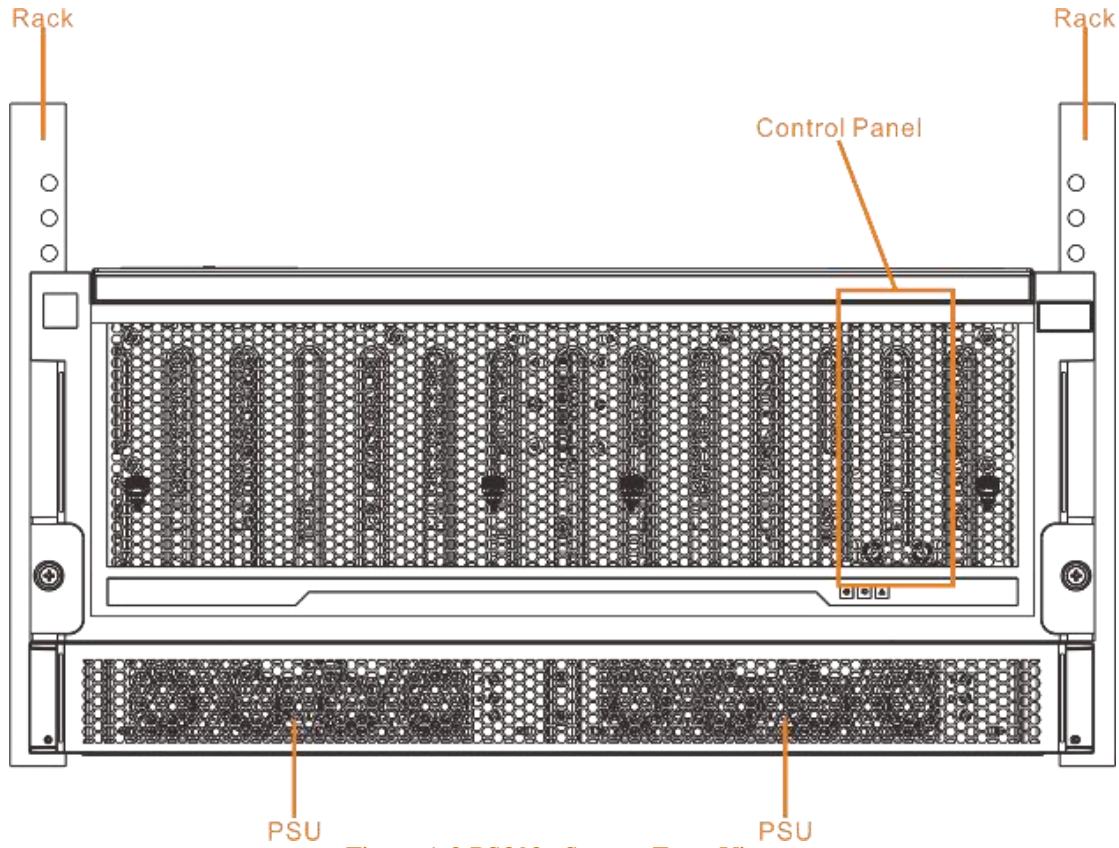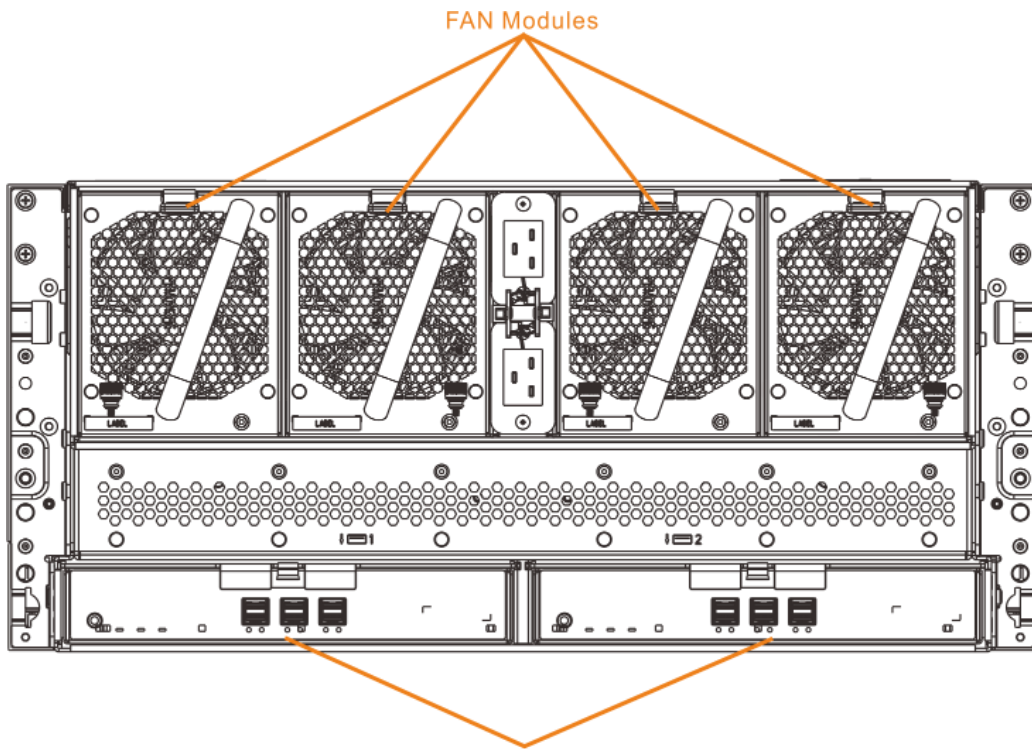16

Figure 1-2 below, is a front view of the chassis that shows PSU and Control Panel.

Figure 1-2 PS392e System Front View

Control Panel has one locator button which used as Locate button. When press it, the Locate indicator (Blue LED) will light on/off in turn.
Figure 1-3 below, is a rear view of the chassis, showing Fan Modules and ESM canisters.

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17

FAN Modules

ESM Canisters

Figure 1-3 PS392e System Rear View

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18

Figure 1-4~Figure 1-6 below, show the indicator information on PS392e.
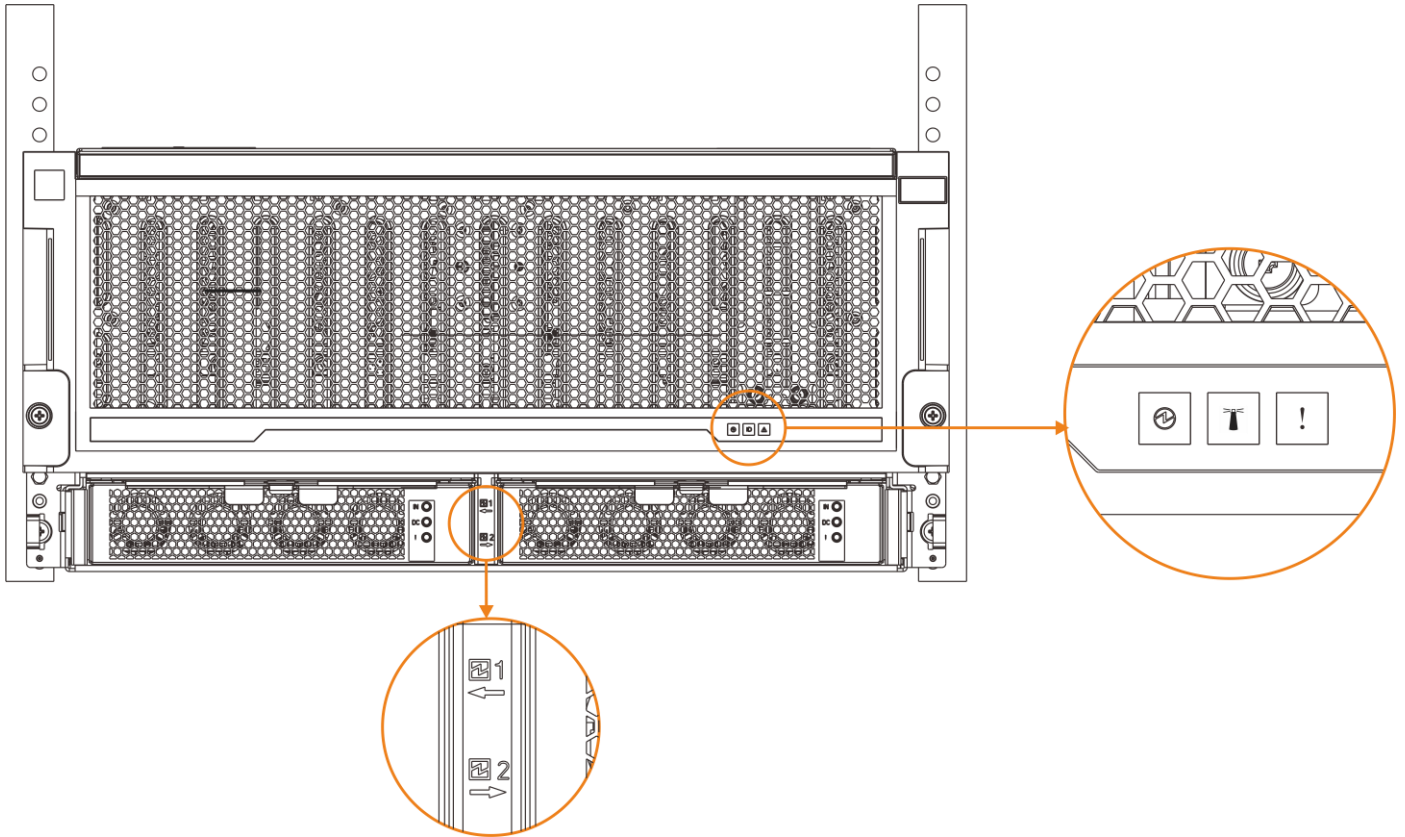
Figure 1-4 Indicator on the front of PS392e
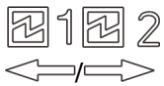
Indicator information	Description	
⚡1⚡2 ⟵/⟶	PSU1/ PSU2: Identify the components are PSUs.	
⊕	System Power LED (Green):	On – System power on
		Off – System power off
🔦	LED (Blue)	Not Used
!	Enclosure Fault LED (Amber)	On – System fault
		Off – Normal

Table 1-1 Indicator information on the front of PS392e

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19
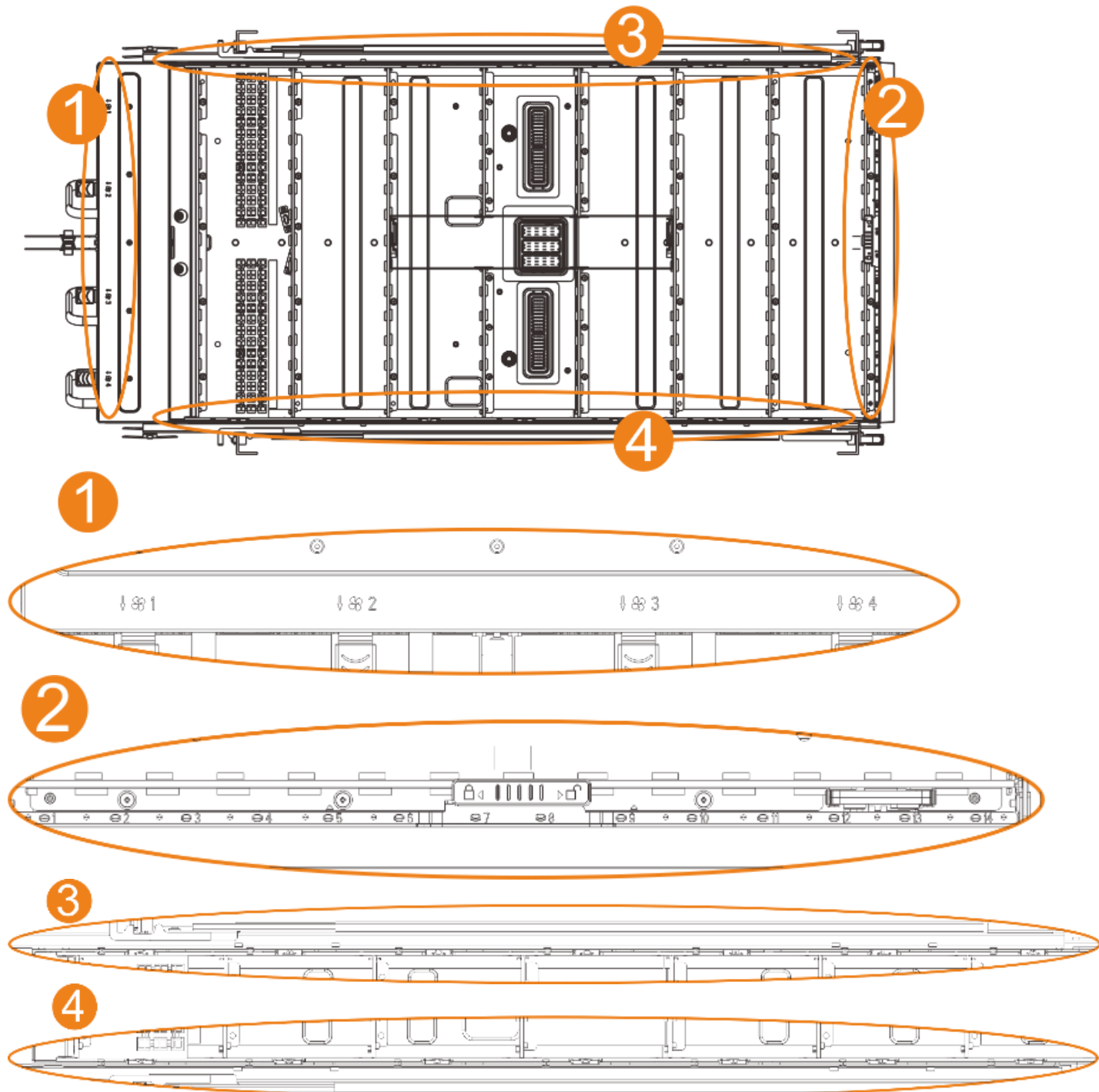
Figure 1-5 Indicator on the top of PS392e without top cover

Indicator information	Description
⇓ ❁ 1 ⇓ ❁ 4	Fan 1~ Fan 4: Fan indicators.

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20

Indicator information	Description
A~G	Drive Line A ~Drive Line G: Line number of Drive.
1~14	Drive Row 1~ Drive Row 14: Row number of Drive.
Lock	Lock (on top cover): Toggle left, lock the cover.
Unlock	Unlock (on top cover): Toggle right, unlock the cover.

Table 1-2 Indicator information on the top of PS392e without top cover

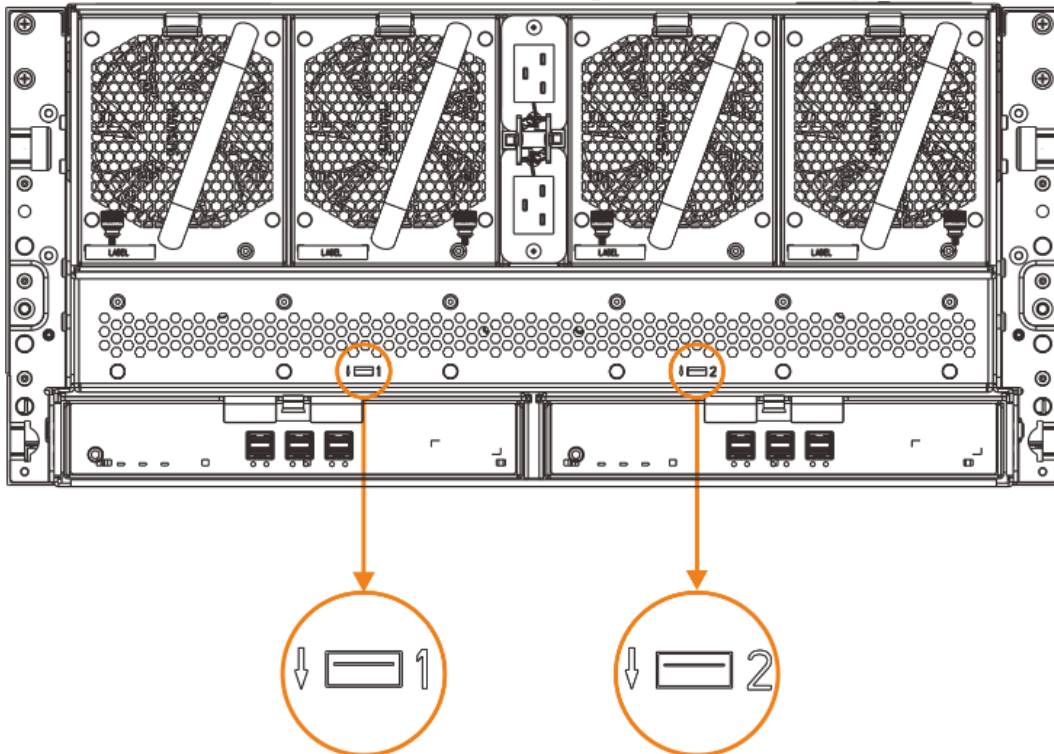Figure 1-6 Indicator on the rear of PS392e

Indicator	Description
1	ESM Canister 1: Canister indicator 1.
2	ESM Canister 2: Canister indicator 2.

Table 1-3 Indicator information on the rear of PS392e

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21

Below, top view of the chassis, showing PS392e drive numbering.

		G	F	E	D	C	B	A		
CHASSIS FRONT	PSU 1									ESM CANISTER 2
		1	Drive 78	Drive 64	Drive 52	Drive 40	Drive 28	Drive 14	Drive 00	FAN 4
		2	Drive 79	Drive 65	Drive 53	Drive 41	Drive 29	Drive 15	Drive 01	
		3	Drive 80	Drive 66	Drive 54	Drive 42	Drive 30	Drive 16	Drive 02	
		4	Drive 81	Drive 67	Drive 55	Drive 43	Drive 31	Drive 17	Drive 03	
		5	Drive 82	Drive 68	Drive 56	Drive 44	Drive 32	Drive 18	Drive 04	FAN 3
		6	Drive 83	Drive 69	Drive 57	Drive 45	Drive 33	Drive 19	Drive 05	
		7	Drive 84	Drive 70	SEM 1			Drive 20	Drive 06	
		8	Drive 85	Drive 71	SEM 2			Drive 21	Drive 07	
	PSU 2	9	Drive 86	Drive 72	Drive 58	Drive 46	Drive 34	Drive 22	Drive 08	FAN 2
		10	Drive 87	Drive 73	Drive 59	Drive 47	Drive 35	Drive 23	Drive 09	
		11	Drive 88	Drive 74	Drive 60	Drive 48	Drive 36	Drive 24	Drive 10	
		12	Drive 89	Drive 75	Drive 61	Drive 49	Drive 37	Drive 25	Drive 11	
		13	Drive 90	Drive 76	Drive 62	Drive 50	Drive 38	Drive 26	Drive 12	FAN 1
		14	Drive 91	Drive 77	Drive 63	Drive 51	Drive 39	Drive 27	Drive 13	

(ESM CANISTER 1 and CHASSIS REAR shown on right side)

Figure 1-7: PS392e Drive Numbering

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22

1.7 Product Exploded View

Top cover

System Fan Modules(4×)

ESM(2×)

3.5" HDD/2.5" HDD
Drive Assembly

Secondary Expansion Module
(SEM)(2×)

Slide Rail and CMA(not shown)

Main Chassis with Drive
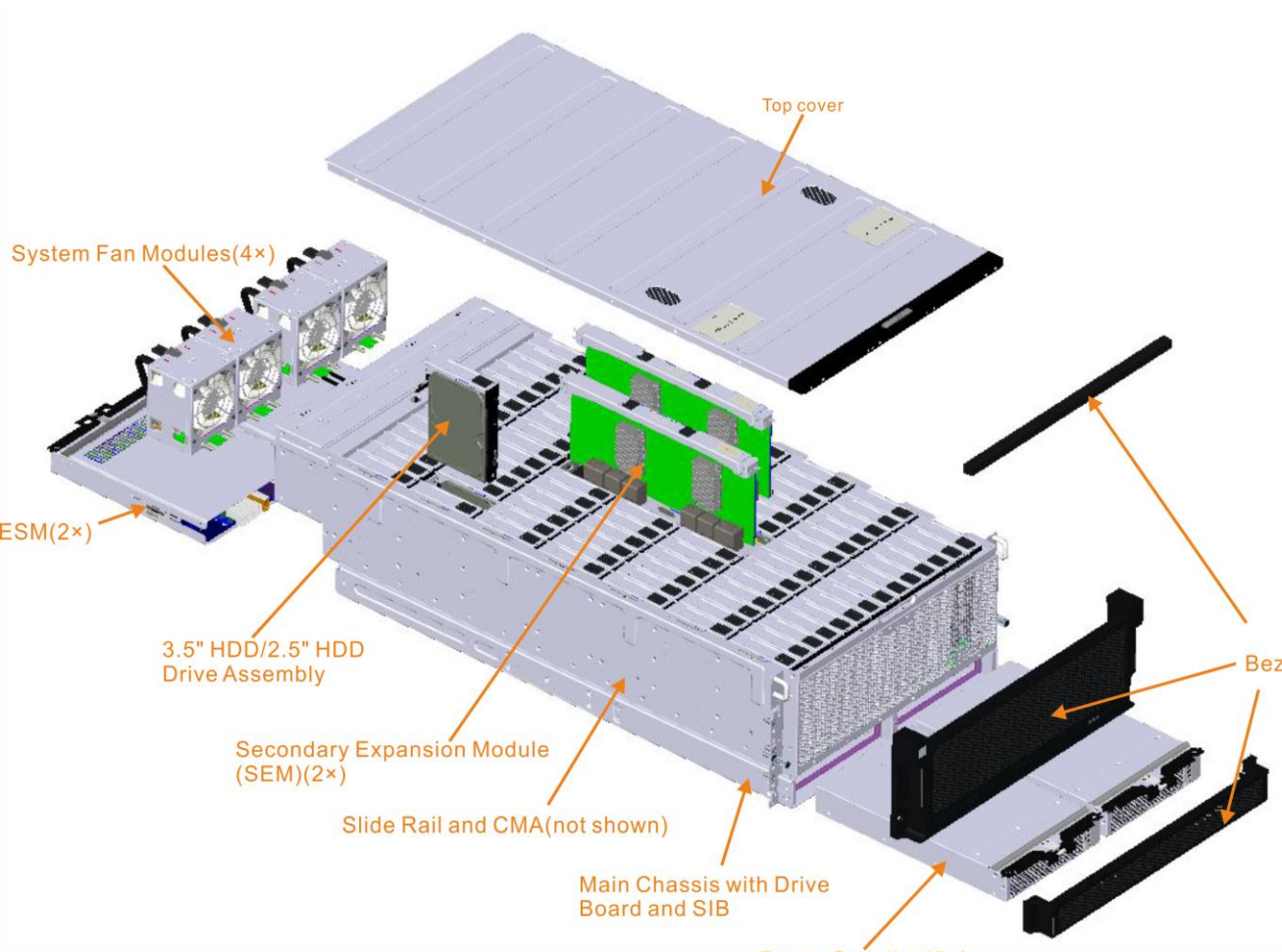Board and SIB

Power Supplies(2×)

Bezel

Figure 1-8 Trimetric View of PS392e Exploded

Chapter 2
Hardware Installation

Safety Instructions

Equipment Installation

Cabling / Electricity

Hardware Element

24

2 Hardware Installation

These instructions are intended to ensure that the user can use the product correctly to avoid danger or property loss. Please read this Guide carefully before using the product, and keep it properly for future reference. If the product cannot work normally or is damaged because the user does not follow the safety instructions, we shall not assume any responsibility.

2.1 Safety Instructions

This section maybe not applicable to all products, it's only for reference, and it's not limited.
Read this section before beginning any procedure. The following text provides safety precautions to follow when installing the product.

2.1.1 Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:
Follow all cautions and instructions marked on the equipment.
Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
Never push objects of any kind through openings in the equipment. Dangerous voltages, energy or moving part may be present. Conductive external objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.
Do not block or cover the openings of your product. Never place a product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your product.
Do not operate products without the cover in place. Failure to take this precaution may result in system damage.
This product is intended for restricted access whereby access is controlled through the use of a means of security (for example, key, lock, tool, badge access) and personnel authorized for access have been instructed on the reasons for the restrictions and any precautions that need to be taken.
Do not drop the product or subject it to physical shock.
Keep the product away from water or any liquid.
While shipping the product, pack it inside the qualified package and ship with pallet.

2.1.2 Power Cord Connection

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. For electrical power ratings on options, refer to the power rating label or the user documentation supplied with that option.

CAUTION: this product is designed to work with power systems having a grounded neutral (grounded return for DC-powered products). To reduce the risk of electric shock, do not plug products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

CAUTION: Not all power cords have the same current ratings. Do not use the power cord provided with your equipment for any other products or use. Do not use household extension cords with your product.

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25

CAUTION: For products with multiple power cords, all power cords must be disconnected to completely remove power from the system.

Below mark is used when multiple power supplies are installed in a system.

2.1.3 Electro-Static Discharge (ESD) Caution and Warnings

WARNING:

1) In order to maximize overall product quality and eliminate the possibility of damage from electro-static discharge, please observe ESD handling procedures wherever this symbol occurs during the system integration.
2) Electrostatic discharge (ESD) can damage static sensitive devices or micro circuitry. Proper packaging and grounding techniques are required to prevent damage.
3) Keep electrostatic-sensitive parts in their containers until they arrive at a static free work area.
4) Use a wrist strap connected to the work surface as well as properly grounded tools and equipment
5) Keep the area free of nonconductive materials such as ordinary plastic tools and foam packing.
6) Avoid touching pins, leads, or circuitry.
7) Always place drives with printed circuit board (PCB) assembly-side down.
8) Grasp cards and boards by the edges. Hold drives by the frame. Avoid touching the solder joints or pins.
9) If you need to lay the device down while it is out of the antistatic bag, lay it on the antistatic bag. Before picking it up again, touch the antistatic bag and the metal frame of the system unit at the same time.

2.1.4 Protection against moving fan blade

A warning symbol as below or a similar symbol combined with the triangle shaped warning sign from ISO 3864-2 is required to be placed closely to the moving part and can be easily found by user during servicing.
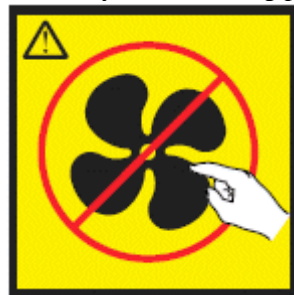
CAUTION: Keep fingers and other body parts away from the moving blade,Failure to take this precaution may result in personal injury.

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26

2.1.5 Rack System Instructions

The following or similar rack-mount instructions are included with the installation instructions:

Elevated Operating Ambient– If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Reduced Air Flow– Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading– Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading– Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Earthing– Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

⚠ **CAUTION:** Rack mounted equipment must not be used as a shelf or workspace.

Do not add weight to rack mounted equipment.
The following warnings apply to Racks and Rack Mounted systems:

⚠ **CAUTION:** For safety, equipment should always be loaded from the bottom up. That is, install the equipment that will be mounted in the lowest space of the rack first, then the next higher space, etc.

⚠ **CAUTION:** To prevent the rack from tipping during equipment installation, the anti-tilt bar on the rack must be deployed.

2.1.6 Others warnings and cautions

⚠ **WARNING**: **This storage is very heavy. To reduce the risk of personal injury or damage to the equipment:**

1) Observe local occupational health and safety requirements and guidelines for manual material handling.
2) Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. When the storage weighs more than 22.5 kg (50 lb), at least two people must lift the storage into the rack together. A third person may be required to help align the storage if the server is installed higher than chest level.

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27

2.1.7 System Warnings

- Avoid dust, humidity, and extreme temperatures; place the system on a stable surface.
- To reduce the risk of personal injury from hot surfaces, allow the hot-plug disk modules and other system modules to cool before touching them.
- To reduce the risk of electric shock or damage to the equipment, do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Ensure the power cord is inserted into a grounded electrical outlet that is easily accessible at all times. Unplug the power cord from the power supply module to shut off power to the equipment
- Protect the storage system from power fluctuations and temporary power interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system operational during a power failure.
- The storage system must always be operated with all hot plug modules installed or slot covers in place to ensure proper cooling.
- Route power cords so that they will not be walked on or pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

Figure 2-1：Weight label

WARNING: The drives and the internal system components maybe too hot to hurt, users should not touch them before they cool down.

2.1.8 Necessary Tools

We recommend the users to prepare and use the following tools for equipment installation:
1) ESD Protection: the users can wrap them around the wrist.

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28

Figure 2-2: ESD Protection

2) Protective gloves:

Figure 2-3: Protective gloves

3) Screw driver:

⊕ 0.3 Used for install 2.5" HDD

⊕ 0.6 Used for other screws

Figure 2-4: Screw drive

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29
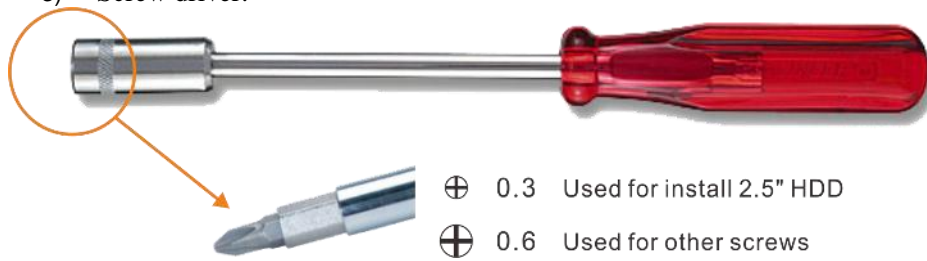
2.2 Equipment Installation

For safety reasons, it is recommended that the equipment should be installed as the flow chart as shows.

```
┌─────────────────────────────────────┐
│  Check the Installation Environment  │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│              Unpacking               │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│           Rail Kit Assembly          │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│         Insert Chassis into Rack     │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│             CMA Assembly             │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│         Pull out Chassis from Rack   │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│            Drive Assembly            │
└─────────────────────────────────────┘
                  ↓
┌─────────────────────────────────────┐
│         Push Chassis into Rack       │
└─────────────────────────────────────┘
```
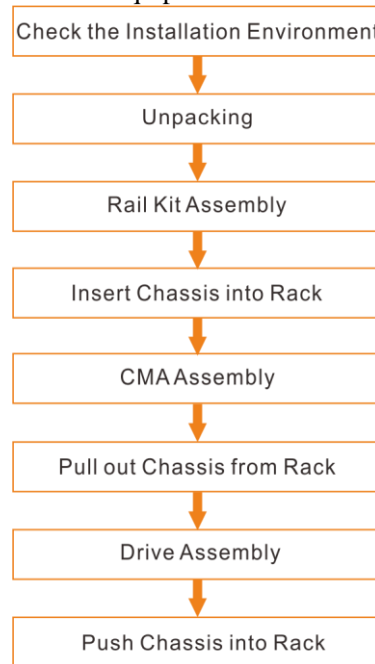
Figure 2-5: Flow chart

Unpacking: see 2.2.2.
Rail Kit Assembly: see 2.2.3
Insert Chassis into Rack: see Figure 2-13 below.
CMA Assembly: see2.2.5.
Pull out Chassis from Rack: see 2.2.6.1.
Drive Assembly: see 2.2.7.
Push Chassis into Rack: see section 2.2.8.
Bezel Assembly: see 2.2.9.

2.2.1 Check the Installation Environment

Check the cabinet or mounting bracket: ensure that rack or mounting bracket should be able to hold eight times of the total weight of equipment.
Check the cooling space: ensure thermal dissipation space has been enough.
Check another installation environment requirement, please reference the preface of this user manual.

2.2.2 Unpacking

Follow the following steps to unpack the product:
- Inspect the package to make sure that it has not been damaged.
  If you find damage, contact the local authorized PS392e distributor.
- Open the package and check whether any item on the packing list is missing.
- Take all items out of the package and check whether any item is in poor condition.

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30

If you find damage, contact the local authorized PS392e distributor.
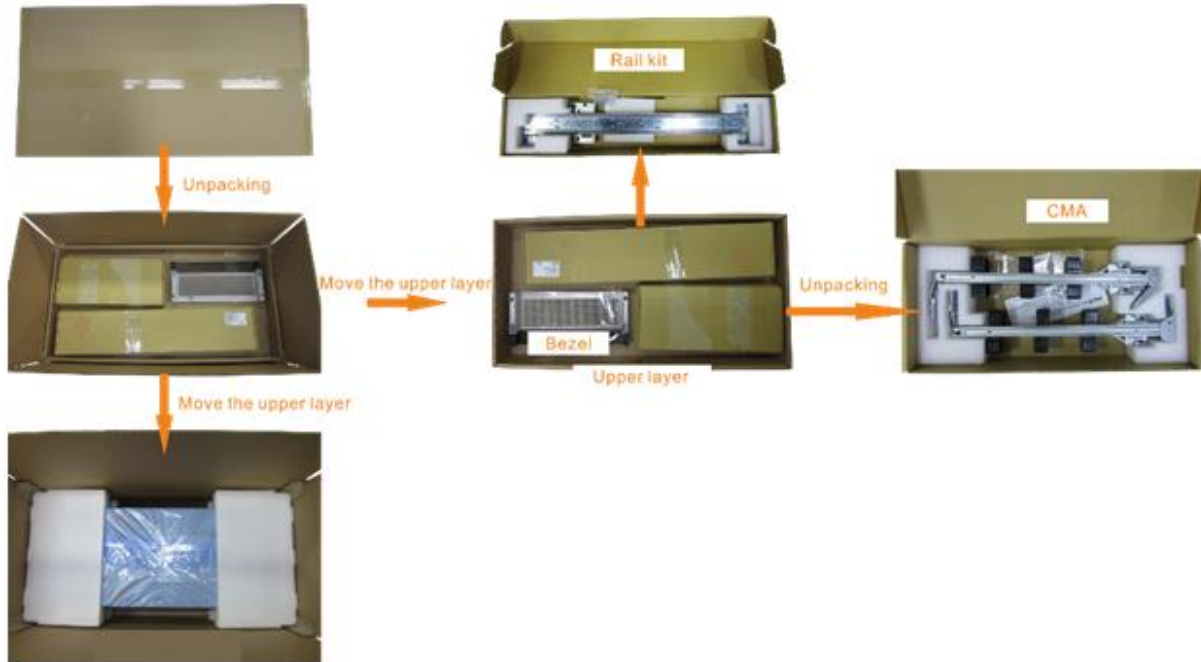
Figure 2-6: Unpacking

After unpacking, please be sure to examine and check the parts in good condition; after the check, suggest to install equipment or put to the cabinet.

2.2.3 Rail Kit Installation

The rail kit sample from the package is as below. The middle rail and external rail are shipped as a combination part.
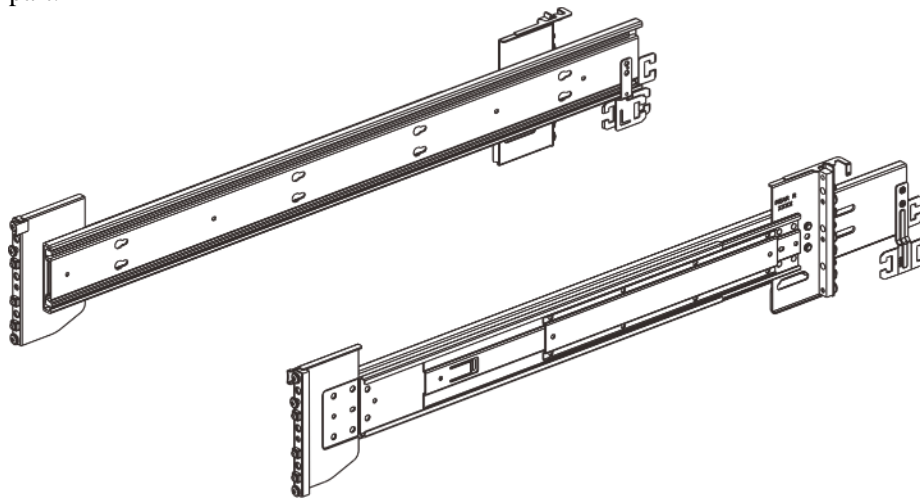
Figure 2-7: Slide Rail Sample

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31

Step 1:
1) Remove the inner member.
2) Push (a) and slide middle member back.
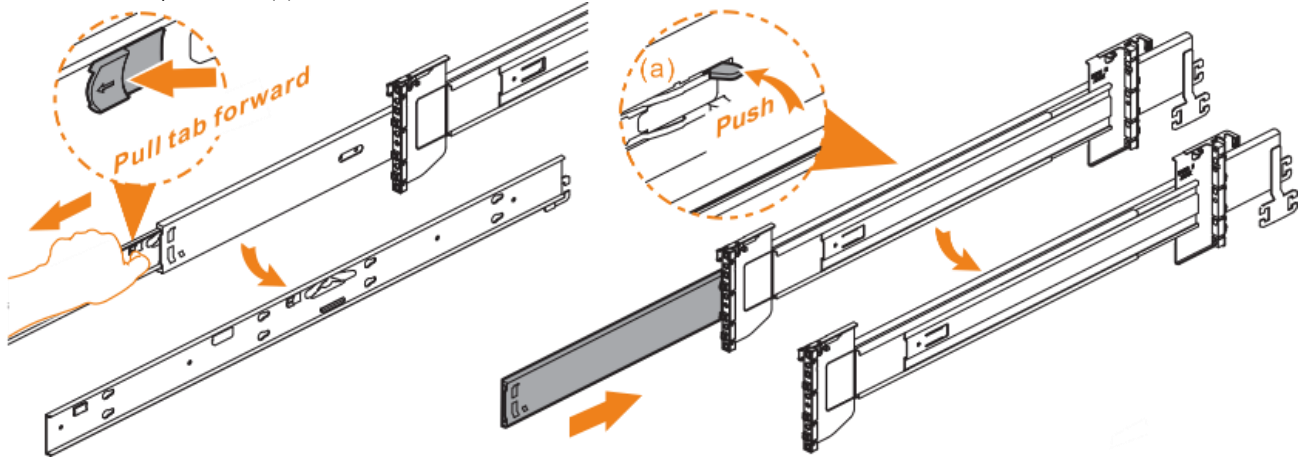
Figure 2-8: Remove the inner Rail

Step 2: Install the inner member onto the chassis.
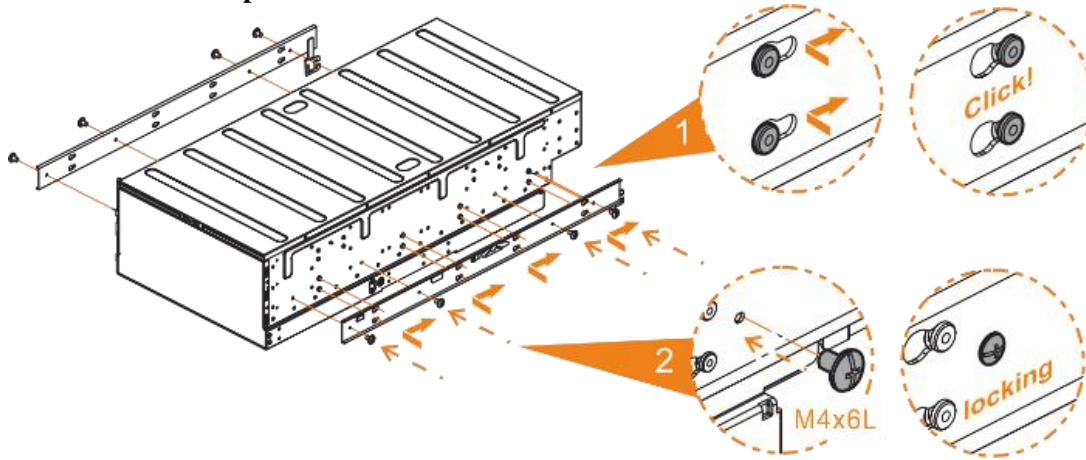
Figure 2-9 Install the inner member onto the chassis
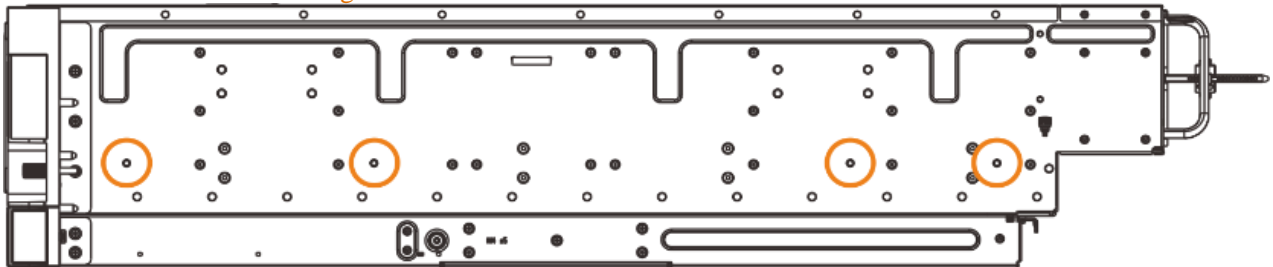
Figure 2-10: Sample pictorial diagram

The inner rail fixed on chassis by 8 pcs screw, on each side 4 pcs screw (M4xL6).

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33

Step 3: Install the outer member/bracket assembly to the Rack.
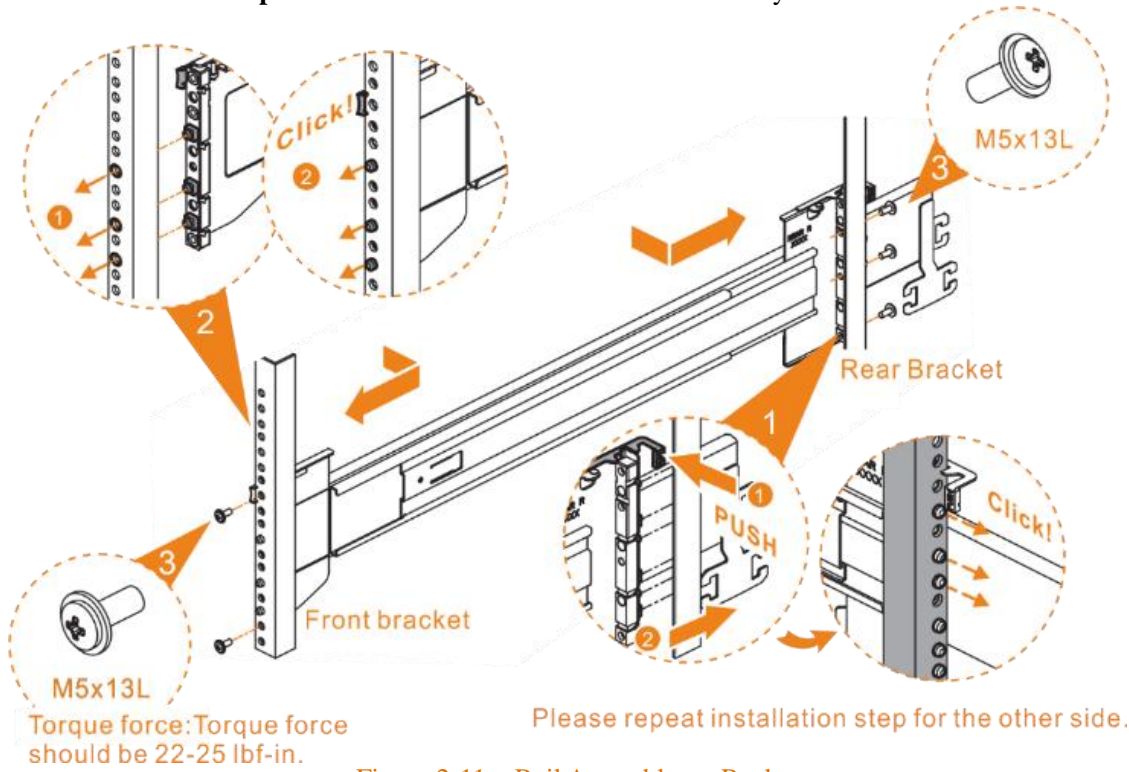
Figure 2-11   Rail Assembly on Rack

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34

Screw for fix rail
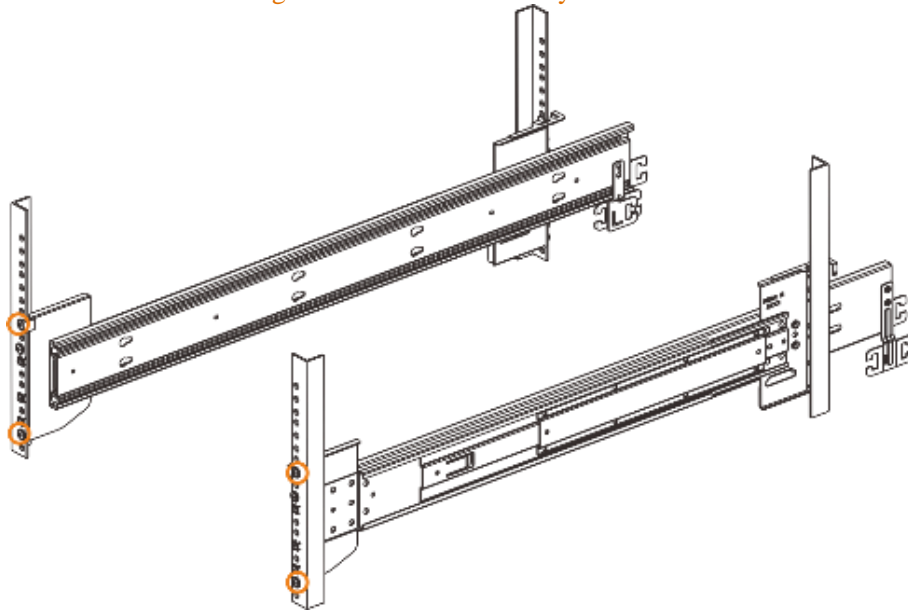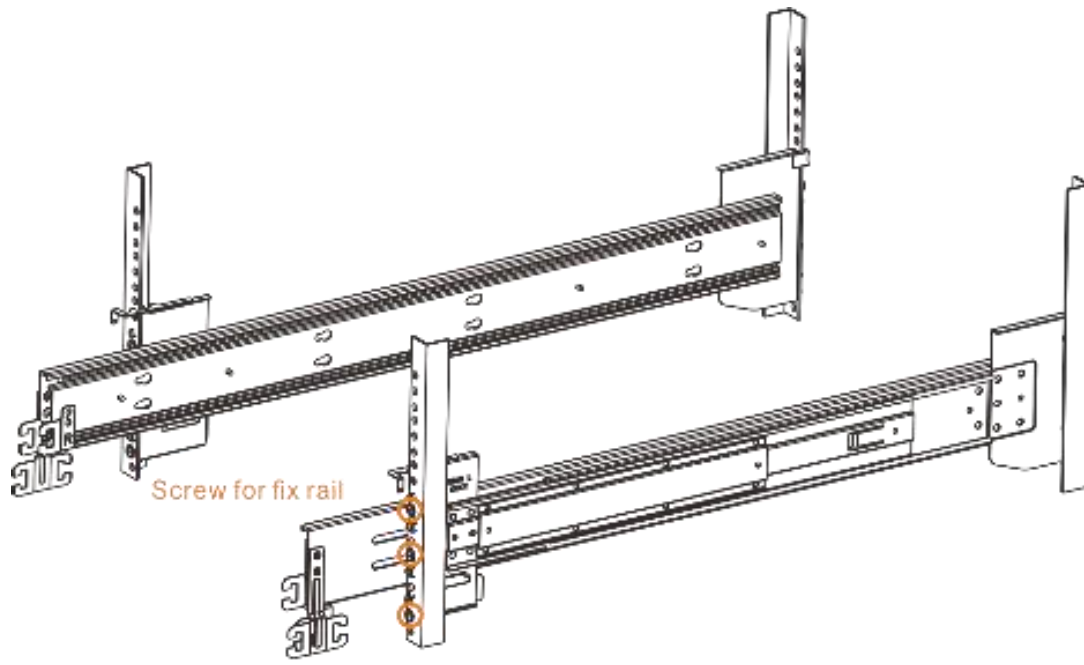
Rear

Figure 2-12: Fixing rail on Rack

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35

Step 4:Insert the chassis to complete the installation.
1) Pull the middle member fully extended in locked position.
2) Ensure ball bearing retainer is located at the front of the middle member.
3) Insert chassis into middle-outer member. When hit a stop.
4) Pull/push release tab to unlock and retract chassis into rack.
5) Tighten chassis with shipping screws before rack ship.
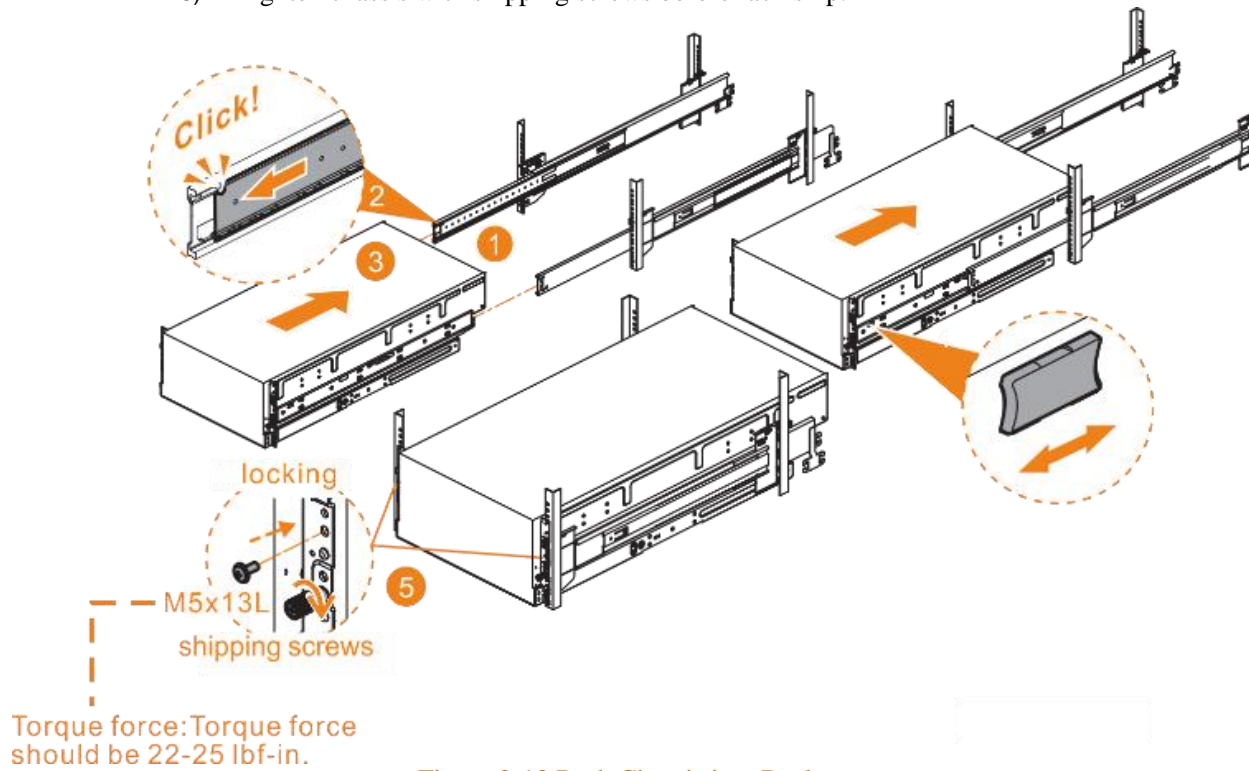
Figure 2-13 Push Chassis into Rack

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36
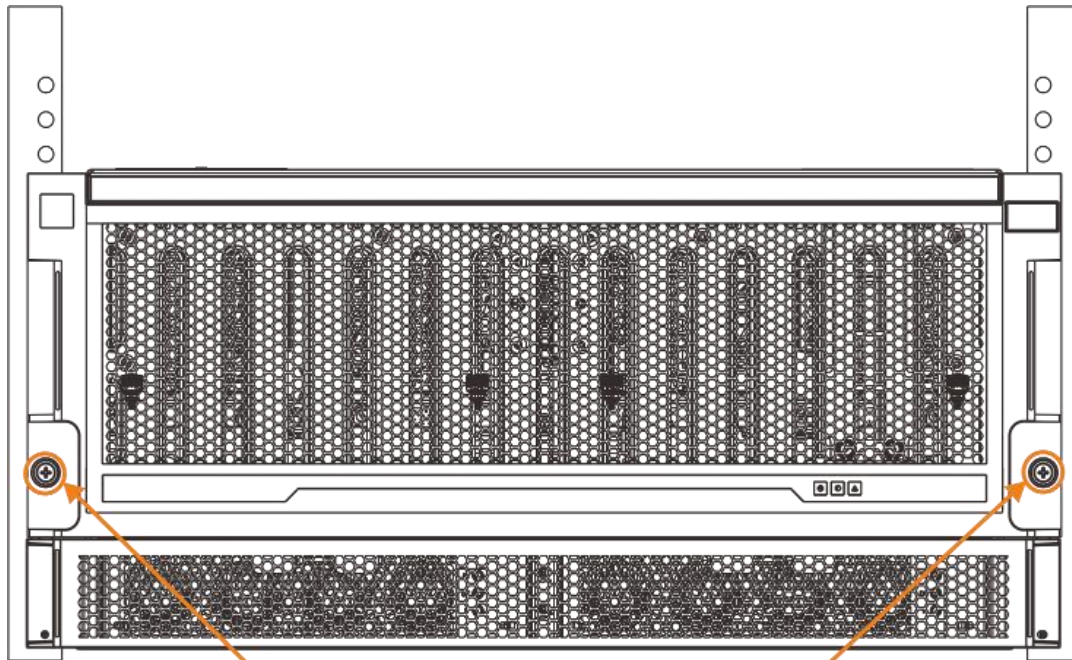
Fix system on the rack by 2pcs thumb screws.
Figure 2-14: Front bezel screw

2.2.4 Rail Kit Removal

Step 1: Remove the chassis from the rack.
1) Loosen shipping screw to pull out chassis.
2) Pull the disconnect tab forward to remove chassis.
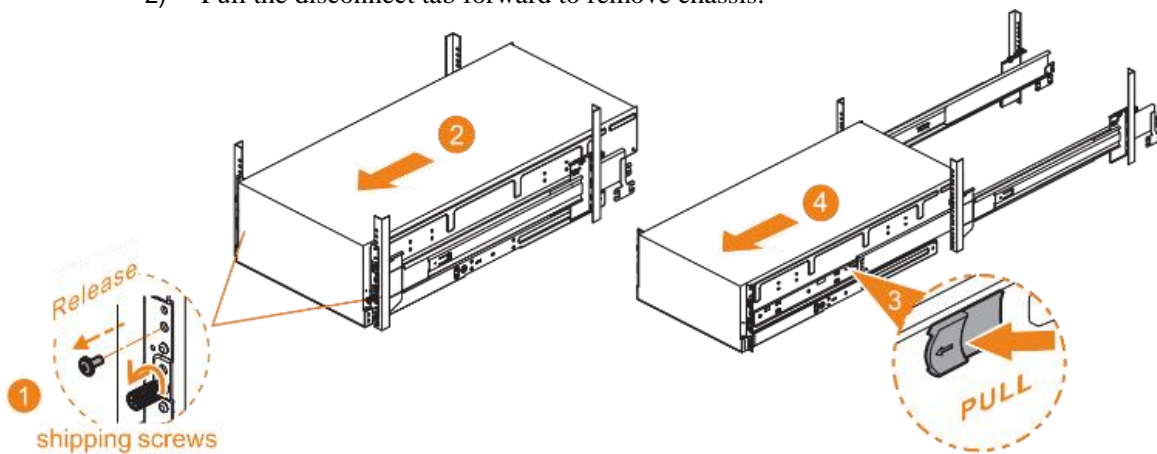
Figure 2-15 Pull Chassis from Rack
Step 2: Remove the bracket.

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37
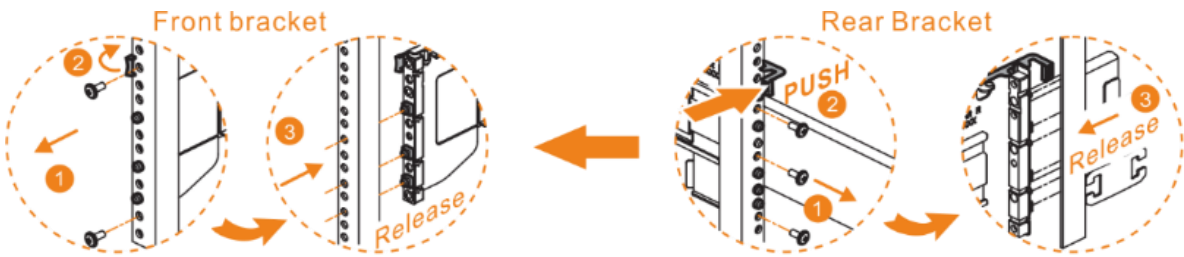
Figure 2-16 Removing bracket

2.2.5 Cable Management Assembly (CMA)

The CMA sample from the package is as below.

Insert into the rail hook
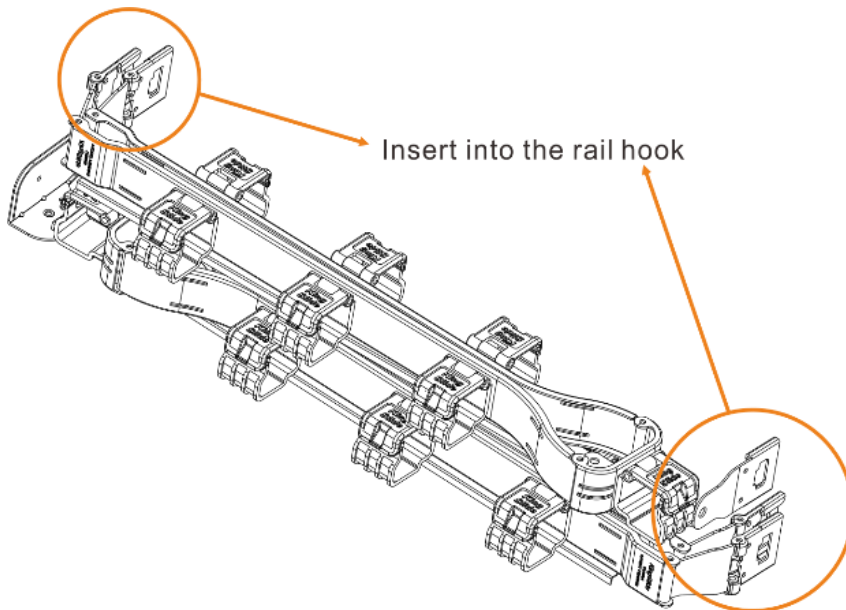
Figure 2-17: CMA Sample

Pictures below demonstrate the steps to install CMA with slide rail rear ending.

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38
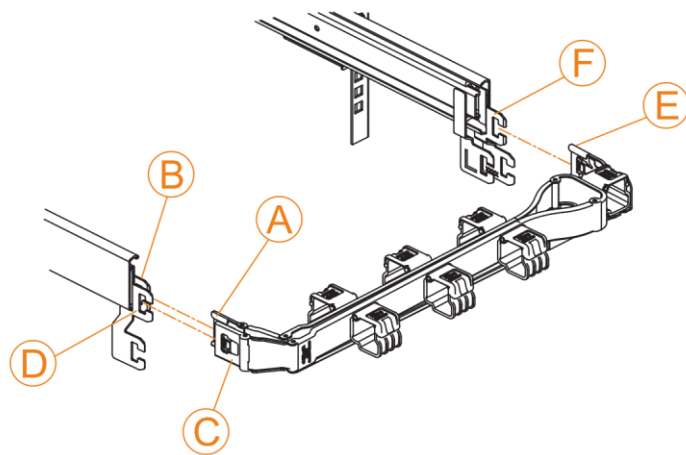
A = CMA connector
B = CMA connector base on inner member
C = CMA connector
D = CMA connector base on outer member
E = CMA connector beside the center CMA body
F = CMA connector base on outer member
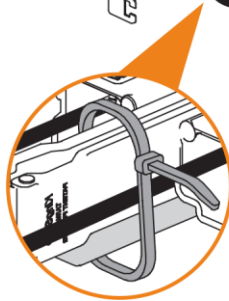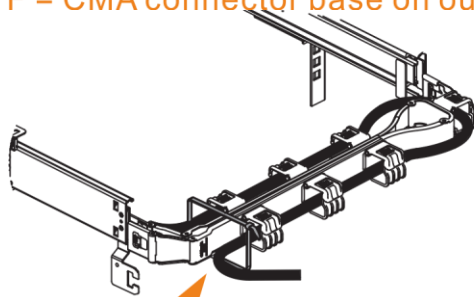
CAUTION!
Loop strap must be tied to the CMA crossbar. This is a transportation accessory;Remove the loop strap after the system arrives at the final destination.

Figure 2-18: CMA

Step 1: Install the inner member.
Install (A) onto (B).

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39
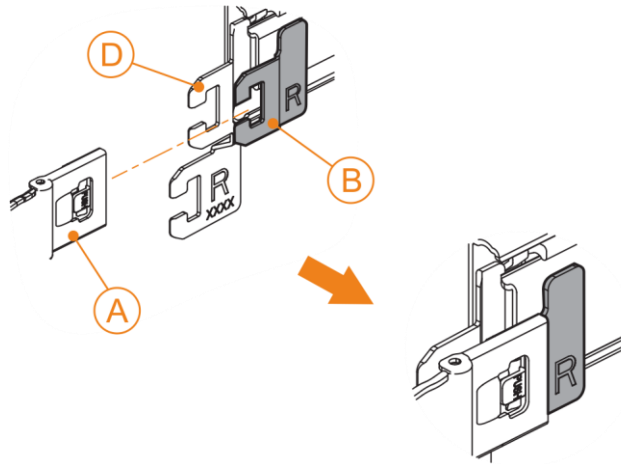
Figure 2-19: Step 1

Step2: Install the outer member.
Install (C) onto (D).
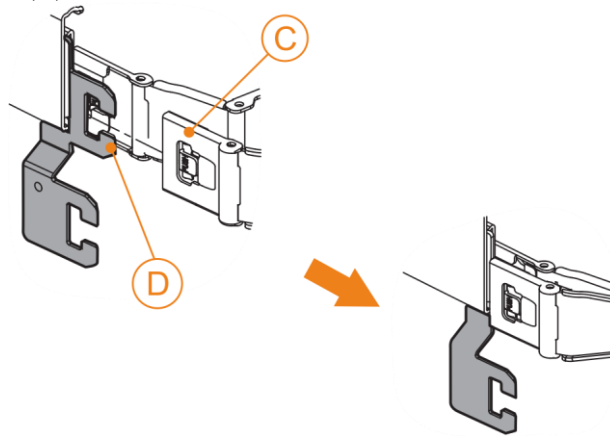
Figure 2-20: Step 2

Step3: Install the outer member.
Install (E) onto (F).
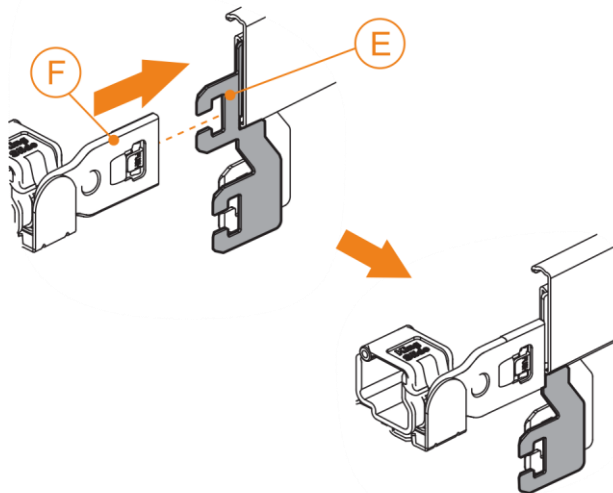
Figure 2-21: Step 3

Step4: Release Cable Management Arm from Left Side.
1) Press button on the CMA plug-in part (a) to draw it out (b).
2) Turn CMA 90 degree to the right hand side.
3) Maintain or remove the parts of the chassis.
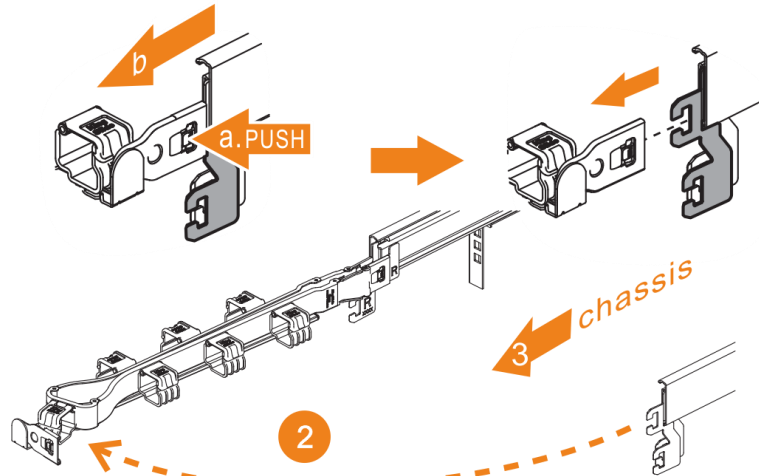
Figure 2-22: Step 4

2.2.6 Drive

This section simply introduces the Drive Assembly process which will happen on customer side.
For safety reasons, it is recommended that the equipment should be installed as the flow chart as shows.
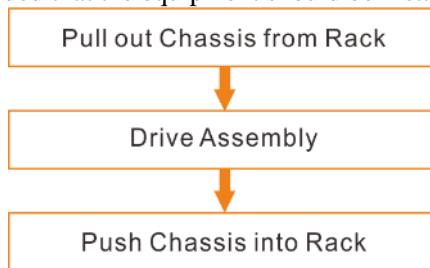
Figure 2-23   Flow chart

Pull out Chassis from Rack: see section 2.2.6.1.
Push Chassis into Rack: see section 2.2.8.

⚠️ **WARNING**: Hard drive configuration (for safe installation and use):

1) When the equipment is installed with rack, install hard drive in sequential from slot 1 to 92.
2) When the equipment is put on the plane, install hard drive randomly on drive slot, but all empty slot must be filled with dummy carrier.

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41

2.2.6.1 Pull out Chassis from Rack
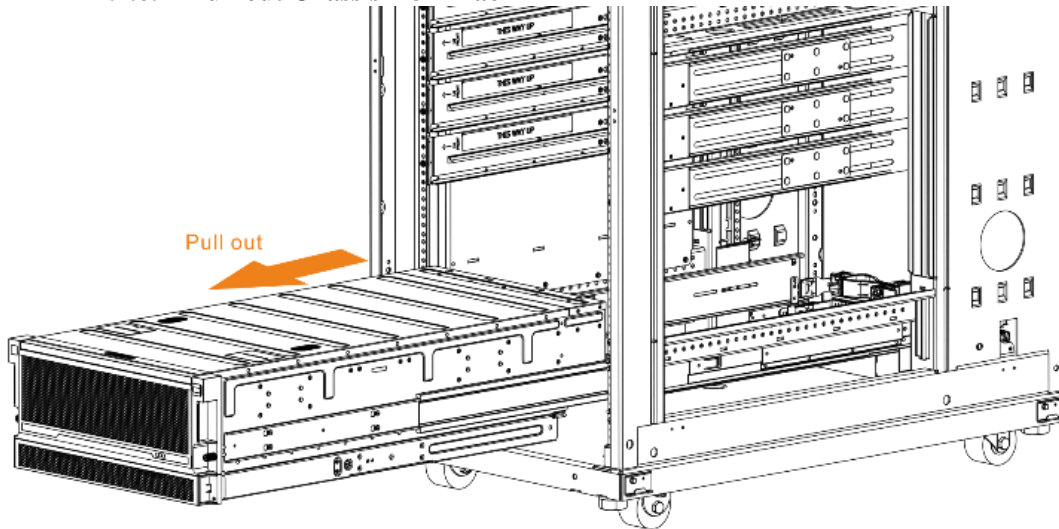
Figure 2-24   Pull out chassis from rack

⚠️ **WARNING**: To avoid the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

⚠️ **WARNING**: To avoid the risk of personal injury, be careful when sliding the chassis into the rack. The sliding rails could pinch your fingers.

2.2.7 Drive Installation

2.2.7.1 Install 3.5 inch Drive into carrier

Figures below show a detail sequence of pictures that show the proper kits and method of assembling. These methods must be followed or failure could occur to the isolator if not properly installed.
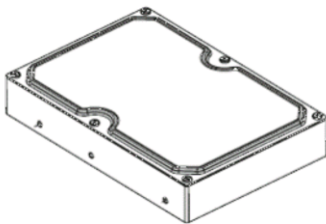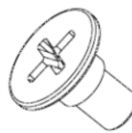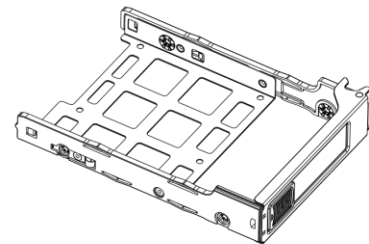
Figure 2-25: Drive Carrier Kit for 3.5 inch Drive

⚠ **NOTE**: **<u>Ensure 4 × grommets are installed before 3.5 inch drive installation</u>**, if not, user should install them first, please refer to Figure 2-26: Install grommets
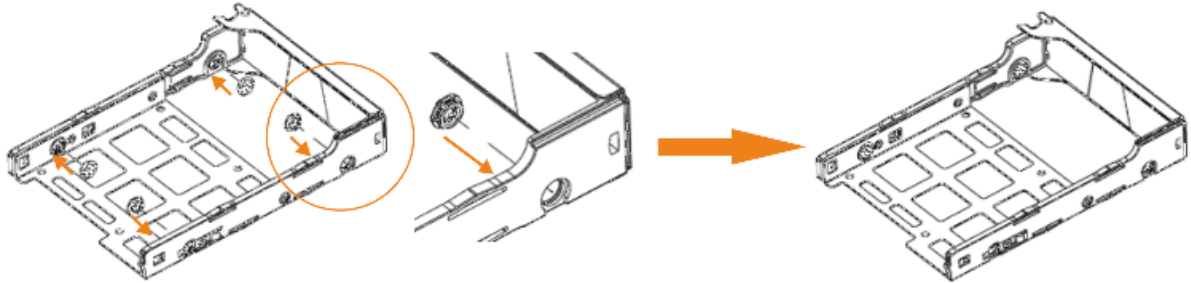
Install 4 grommets Observe direction

Figure 2-26: Install grommets
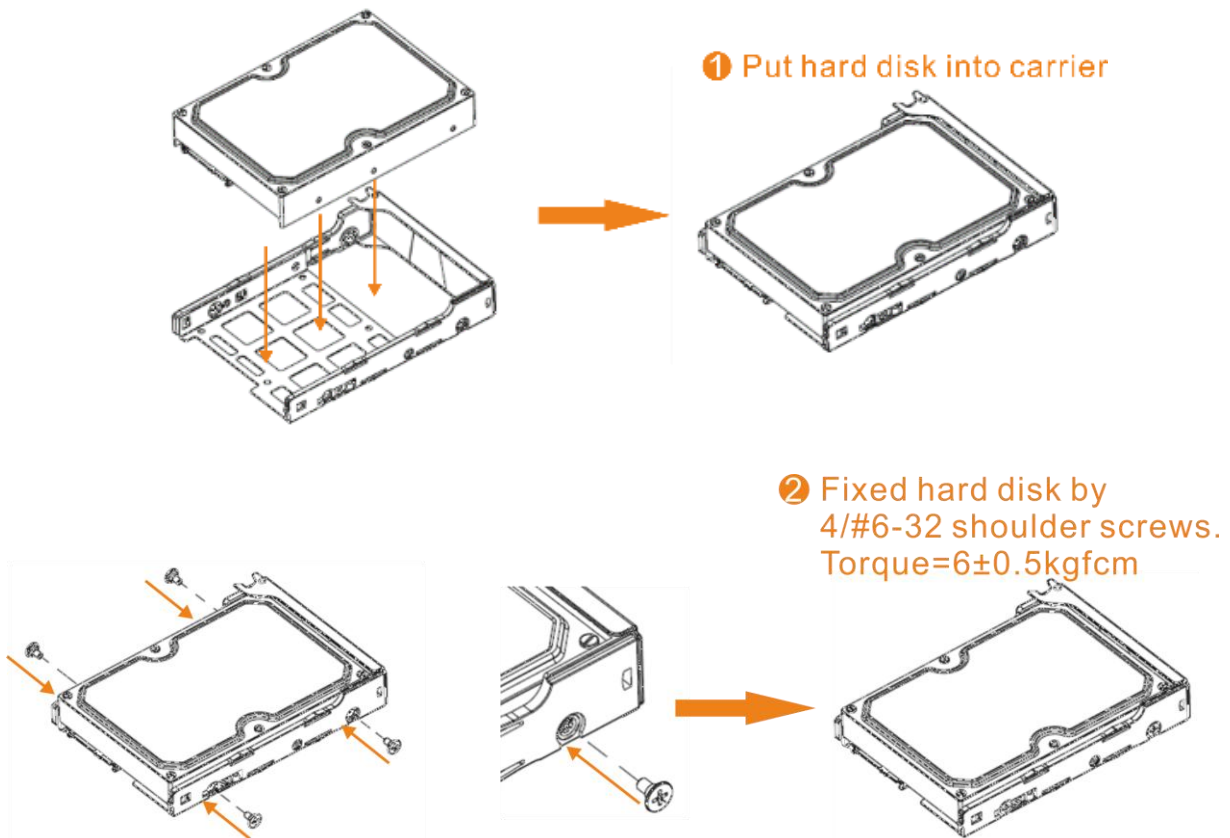
Figure 2-27: 3.5 inch Drive Assembly Sequence

⚠ **NOTE**: Please make sure the drives have been installed correctly and tightly, otherwise will affect the use.

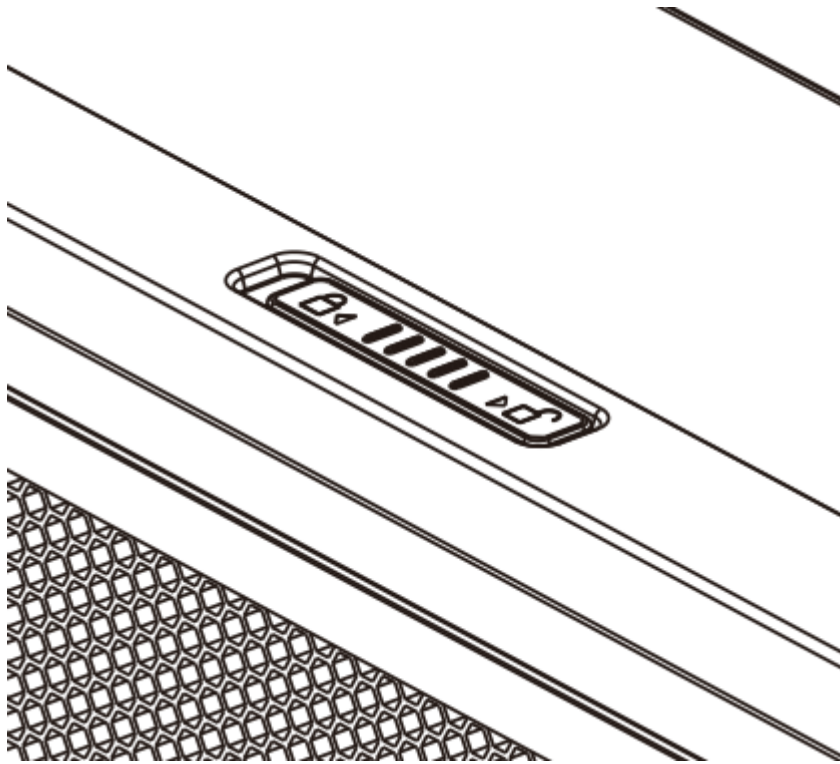### 2.2.7.2 Install Drives into chassis
Step 1: Open the chassis.

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44
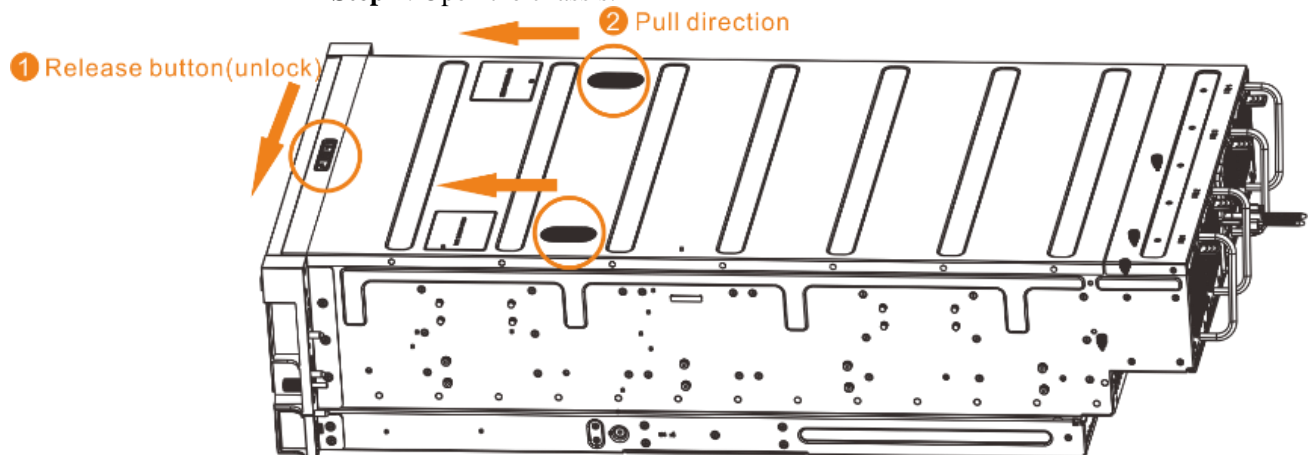
Figure 2-28: Release Button (lock)

❸ Up to open

Figure 2-29: Open Cover

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45
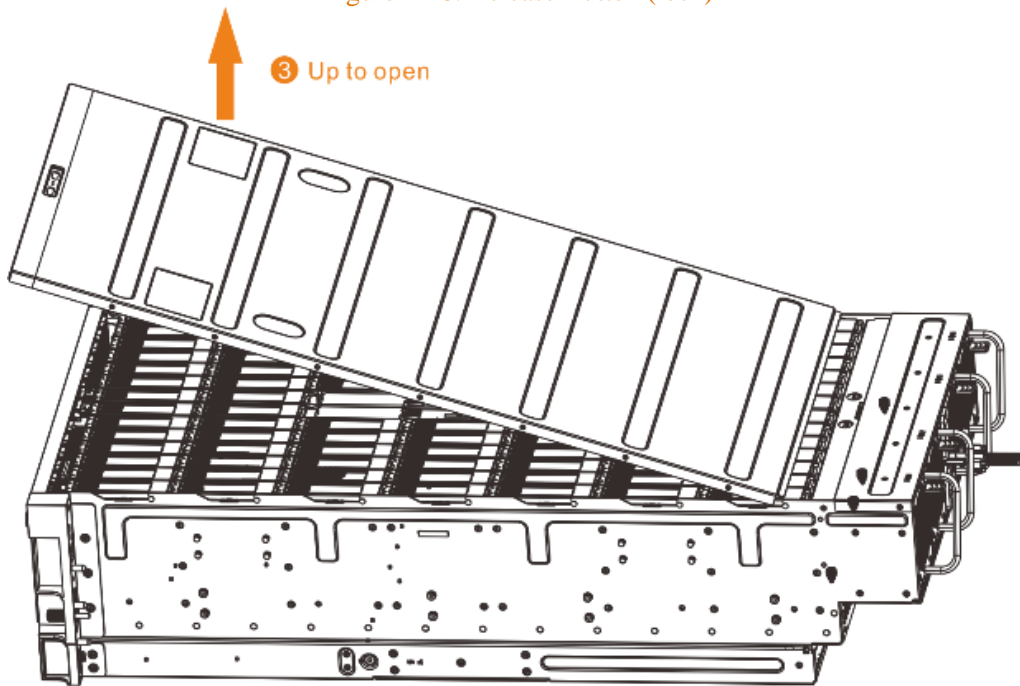
Step 2: Pull out / install the Drive carrier.

Pictures below will show the details for proper drive installation and removal process.

HDD assembly into the chassis

1 — Press

Aligning the HDD and HDD slot, then push HDD down until the latch top toe touches the partition

2 — Rotate the handle down to lock the HDD into the chassis

3 — The bottom toe will engage on the first step

4 — The second stage will engage to fully close
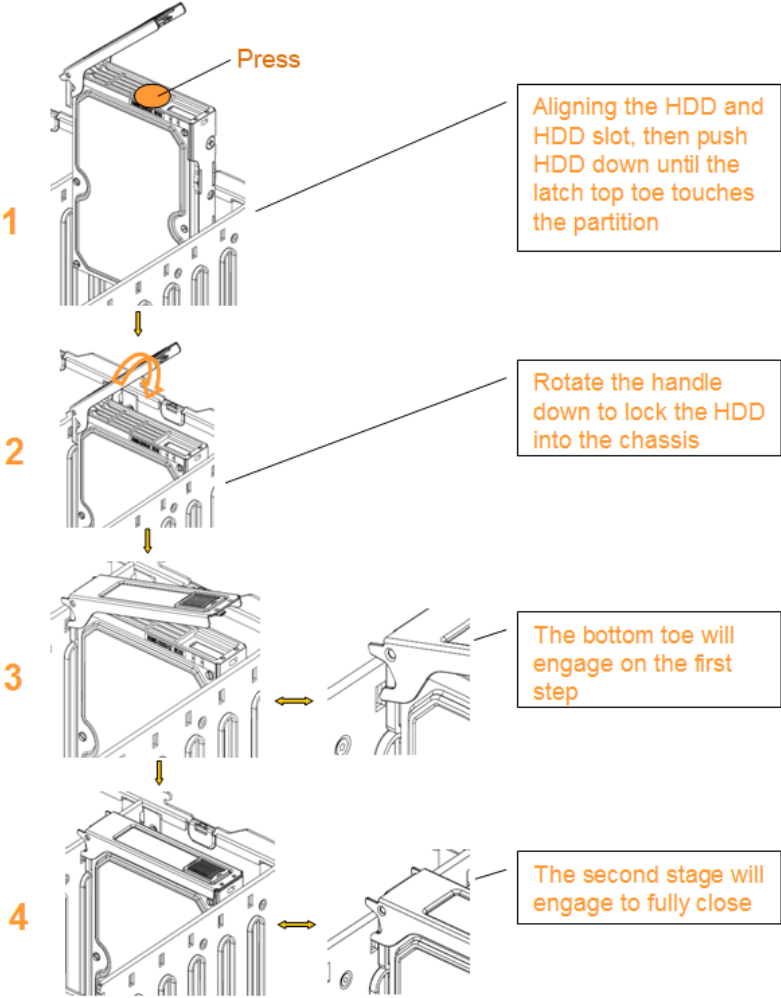
Removing Drive from Cage

1 To release the carrier, simply push/slide into the touch point

2 Reverse previous operation
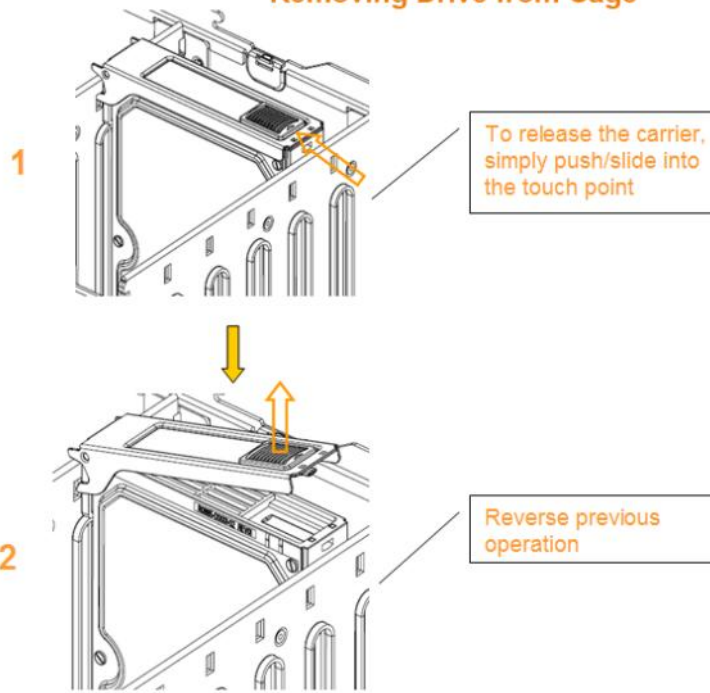
Figure 2-30: Installing and Removing Drive Carriers into the Chassis

Step 3: Close the chassis.

❶ Down to close

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47
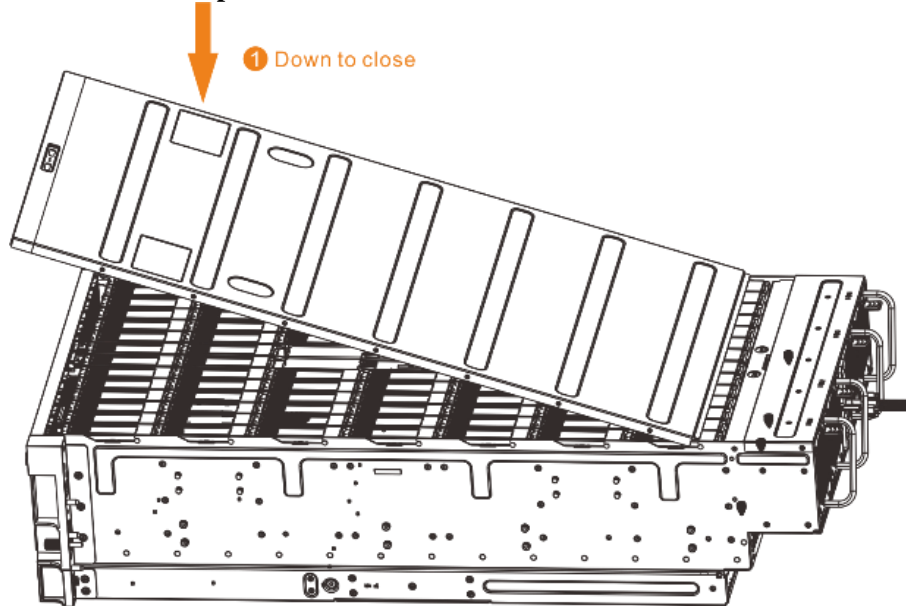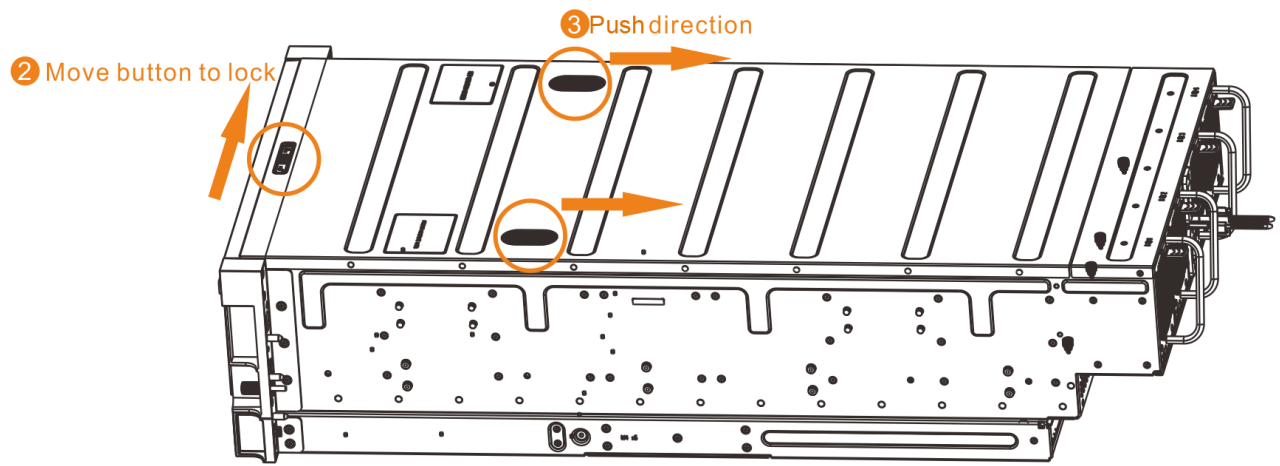
Figure 2-31: Close Chassis

2.2.8 Push Chassis into Rack
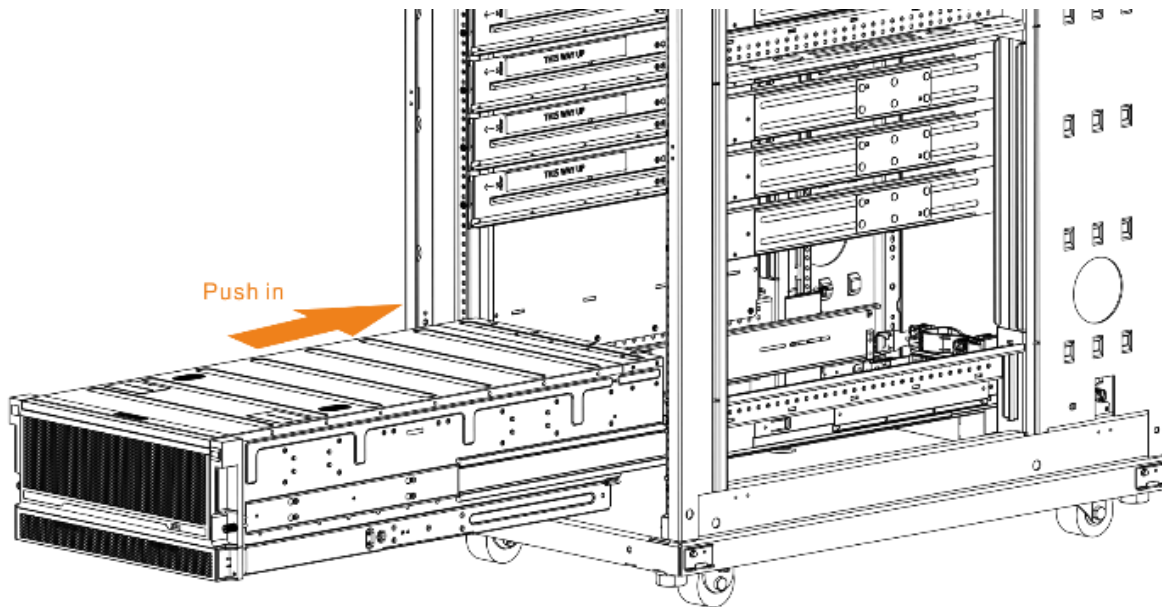
Figure 2-32   Push chassis into rack

2.2.9 Bezel

Top bezel

Front bezel
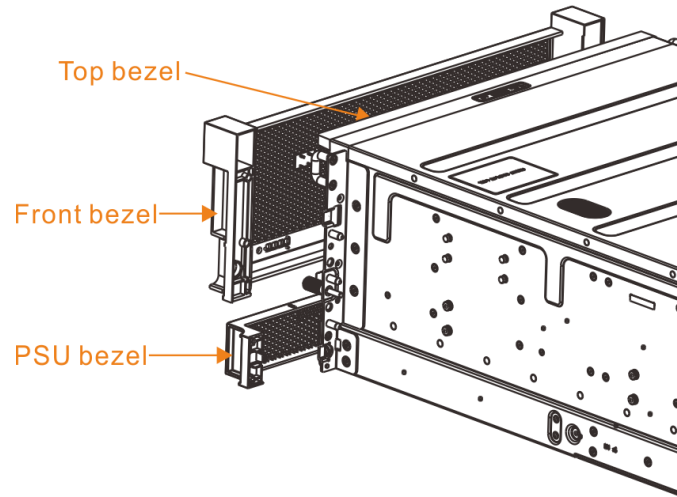
PSU bezel

Figure 2-33: The view of the Bezel

⚠ **NOTE**: Top bezel is assembled with top cover as one assembly. User need to install the front bezel and the PSU bezel. Secure the bezel with screws provided.

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49

2.3 Cabling and Access to electricity

After the equipment has been installed, please check again that the equipment has been fixed safely. After the check, connect AC power and SAS cables to the PS5012HD.

For safety reasons, it is recommended that the equipment should be installed as the flow chart below shows.
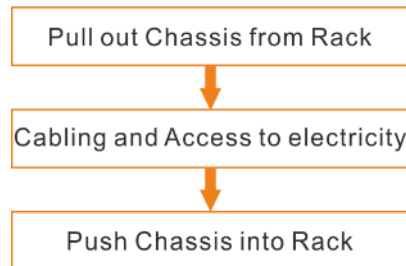
Figure 2-34   Flow chart

Pull out Chassis from Rack: see section 2.2.6.1.
Push Chassis into Rack: see section 2.2.8.

2.3.1 Connecting the power cords

1) Connect the system's power cords to the rear side of system.
2) Connect power cord to the power source.
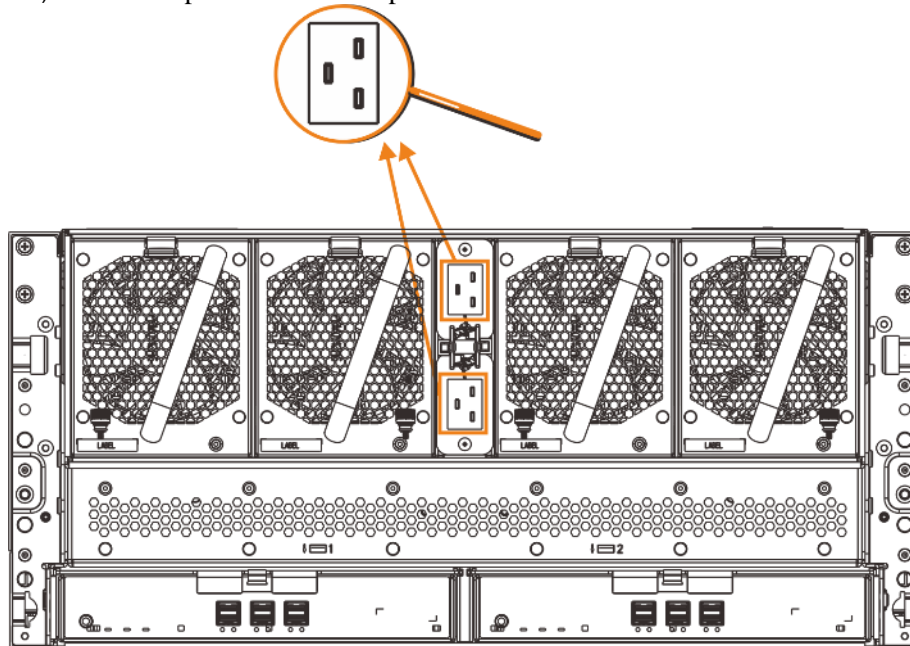
Figure 2-35   Connecting the Power cords

⚠ **NOTE**: Turn on your enclosure, check all the LEDs are lighting normally and there are no fault conditions.

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50

2.3.2 Securing the power cords

After connecting the power cords, attach to the cable strap. as shown in the illustration below:
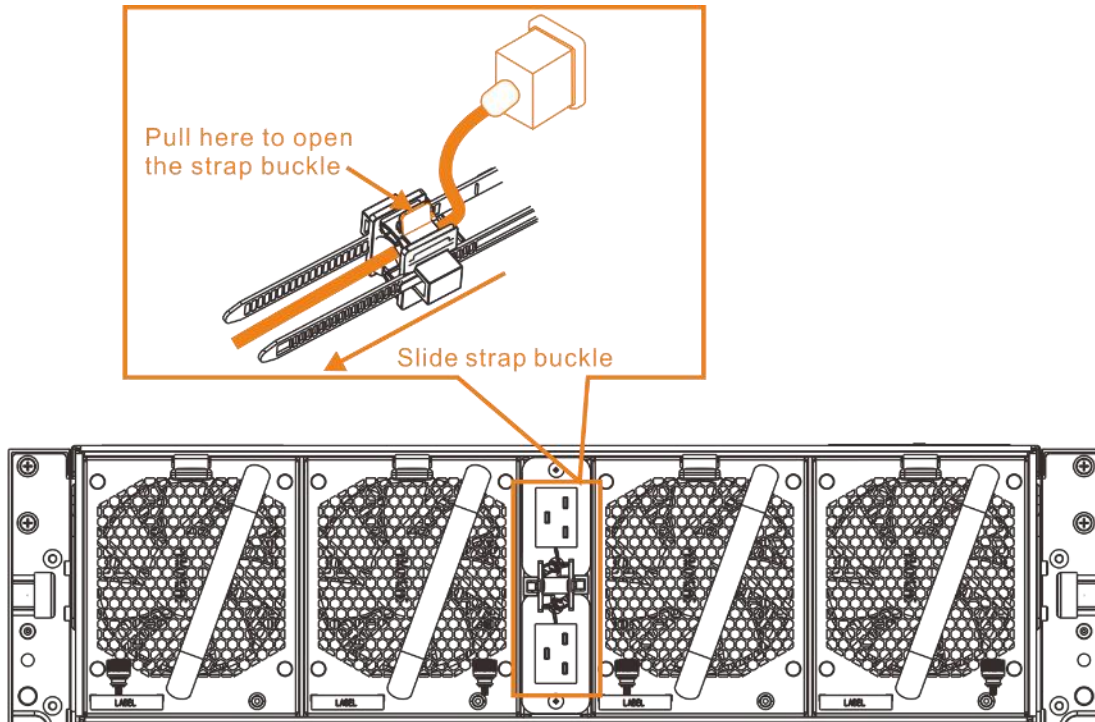

Figure 2-36   Securing the power cords

2.3.3 Connect the enclosure

To connect the enclosure to a host system:

1) Connect the SAS cable to ESM Mini-SAS HD connector on the storage enclosure and to the PS5012HD RAID controller(s). Push the cable into the connector until it clicks in place.

⚠ **NOTE**:

1) Connectors on both ends of the SAS cable are universally keyed. Connect miniSAS HD end of the cable to the ESM and miniSAS end to the PS5012HD RAID controller as shown.
2) To remove the SAS cable, pull the pull-tab to release the cable from the connector on the ESM and the PS5012HD system.

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51
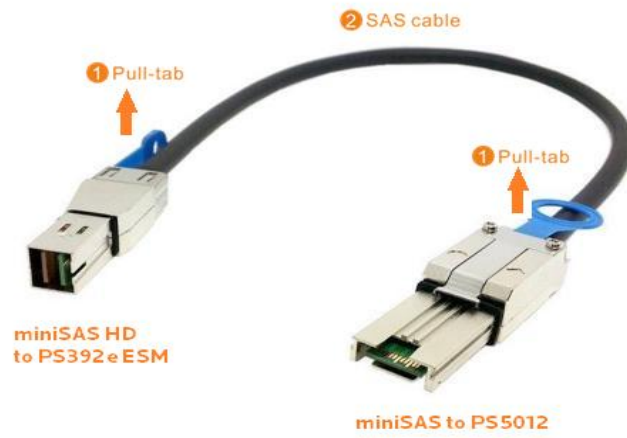
Figure 2-37 Connecting a SAS cable

  2)   Check the LED indicators on the front panel of the storage enclosure.
For more information about LED indicators, see 2.4. **Hardware Element Overview**; for more information about cabling your enclosure, see 3.4 Supported system connections

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52

2.4 Hardware Element Overview

⚠ **NOTE**: The ESM, PSU, Fan Modules, control panel, HDD and SEM are all hot-pluggable.

⚠ **WARNING :**User should replace drive FRU one by one, not recommend to pull out multiple drive FRUs at the same time without putting new HDD or dummy carrier in place.

⚠ **WARNING:** The hardware element replacement maximum time, that is, from the hardware element to replace and install a new one for this period, please refer to the following:

1) Top cover replacement maximum time is 16 minutes.
2) Canister replacement maximum time is 10 minutes.
3) PSU replacement maximum time is 10 minutes.
4) System fan module replacement maximum time is 14 minutes.
5) Drive replacement maximum time is 12 minutes.

For safety reasons, it is recommended that the equipment should be installed as the flow chart as shows.
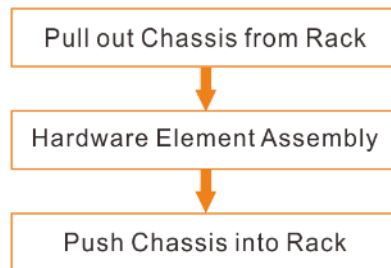
Figure 2-38   Flow chart

Pull out Chassis from Rack: see section 2.2.6.1.
Push Chassis into Rack: see section 2.2.8.

2.4.1 ESM Canister-Expander Storage Module Canister

2.4.1.1 Overview

This section describes a typical ESM canister. The ESM canister module provides external SAS connectivity for the three (3) Mini-SAS HDs from the rear of the canister and provides three external SAS 4 lane Mini-SAS HD (SFF-8644) connectors, a RS-232 serial port (audio jack), and three status LEDs.

2.4.1.2 ESM Canister LED

ESM canister front view refers to the picture below. There are nine LEDs on the canister face. Three LEDs are for canister power, locate and fault. Two LEDs are for each Mini-SAS HD port active status identification.

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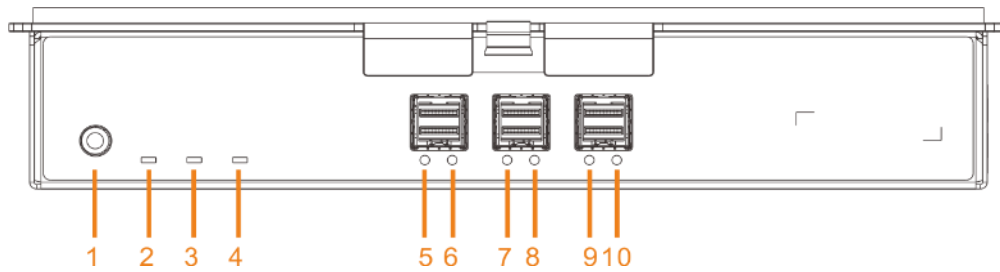
53

Figure 2-39: ESM Canister Front View

Below is description for each LED:

- No.1: Audio Jack Serial Cable
- No.2: One (1) Canister Fault LED
    - On –Canister Fault
    - Off – Normal
- No.3: One (1) Blue LED for Locate
    - On – Canister located
    - Off – Default
- No.4: One (1) Green LED for Power
    - On – Canister Power on
    - Off – Canister power off
- No.5/No.7/No.9: Amber LEDs for Mini-SAS HD status
    - Amber On – Fault happen on the port
    - Amber Off – Normal operation
- No.6/No.8/No.10: Green LEDs for Mini-SAS HD status
    - Green On – Link established, any or all SAS ports within the connector are linked
    - Green Off – Loss of link on all of the SAS ports within the connector

2.4.1.3 Mini-SAS HD port

There are six Mini-SAS HD ports on PS392e system, each canister has three ports.
Three Mini-SAS HD port for JBOD upstream/downstream connection. Only one is used for connection to PS5012HD chassis.

2.4.1.4 Debug port

There is a console port on each canister for software debug with 3.3V TTL serial port in 3.5mm Audio Jack connector.
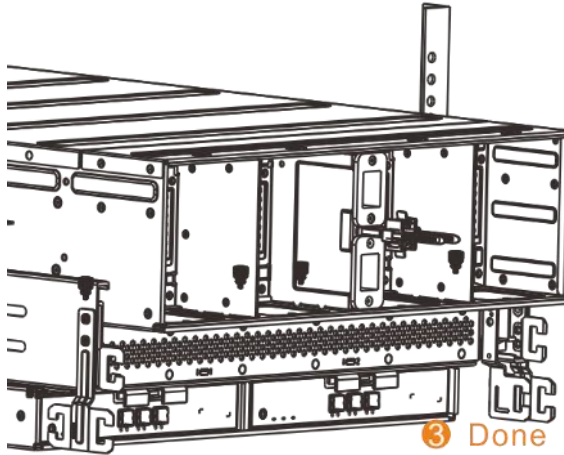
2.4.1.5 ESM Canister Installation

Rotate the ESM Canister handle with a stop angle and push it into the chassis. Then rotate the ESM Canister handle to close.

❶ Rotate the ESM Canister handle with a stop angle and push it into the chassis

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54
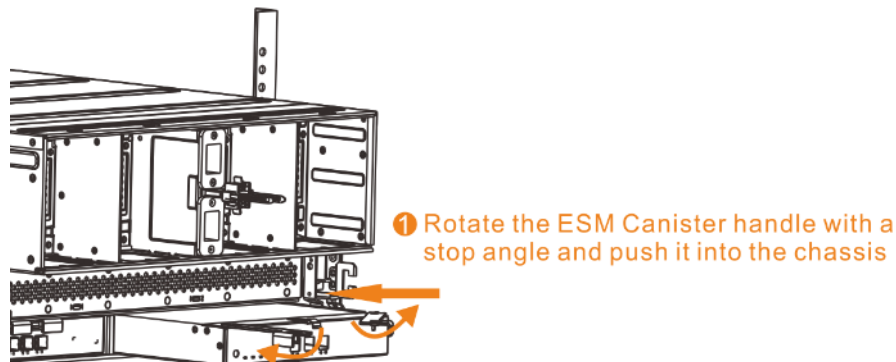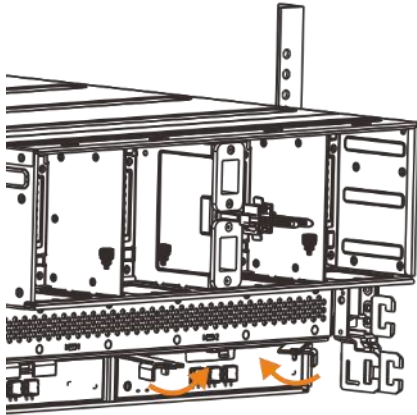
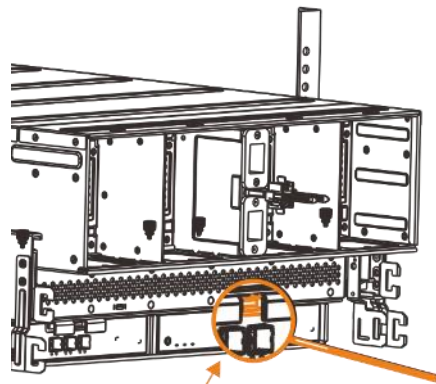② Rotate the ESM Canister handle to close

③ Done

Figure 2-40: ESM Canister Installation

2.4.1.6 ESM Canister Removal

Click the handle lock and rotate the handle then pull the canister out of the chassis.

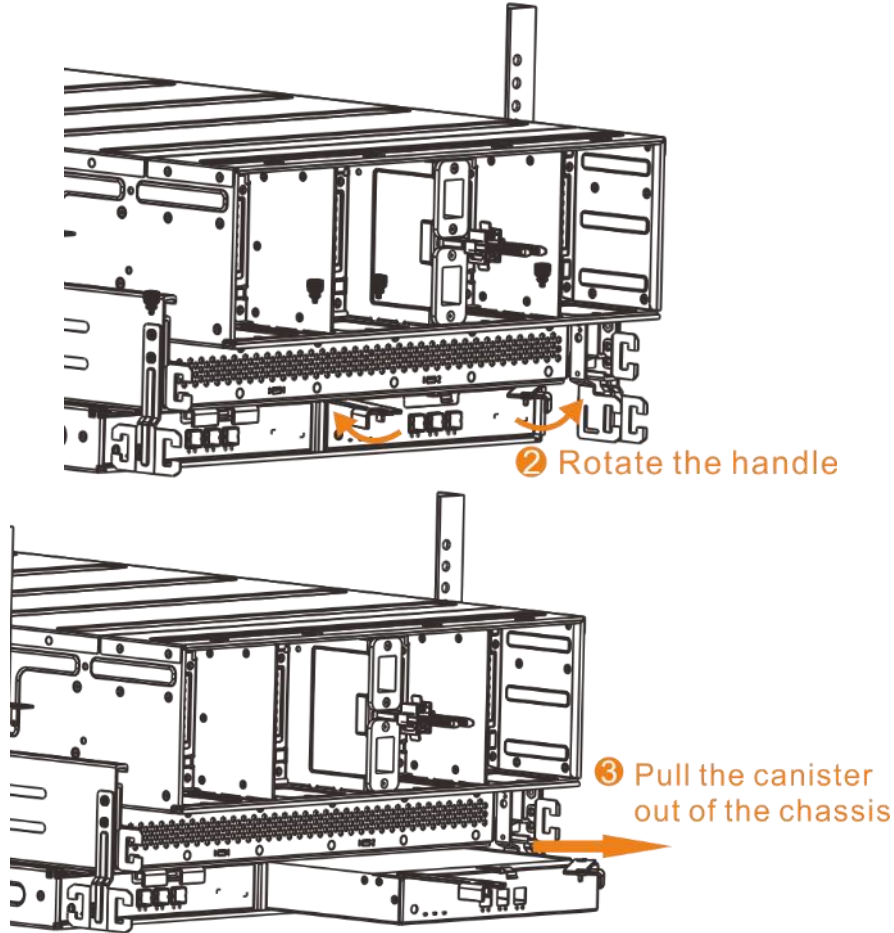❶ Keep pressing the handle lock
until ❷ done

Figure 2-41: ESM Canister Removal

2.4.2 PSU-Power Supply Unit

The PS392e storage enclosure is powered by two 2400 watt redundant Power Supply Units with following features:
- 2400w N+1 Redundant (80Plus Gold Level)
- Input:180-264VAC via IEC C-20 inlet on the system rear

2.4.2.1 PSU LED

PSU front view refers to the picture below. There are three LEDs on the PSU face. Two LEDs are for AC IN and DC output status LED. One is for Fault LED.
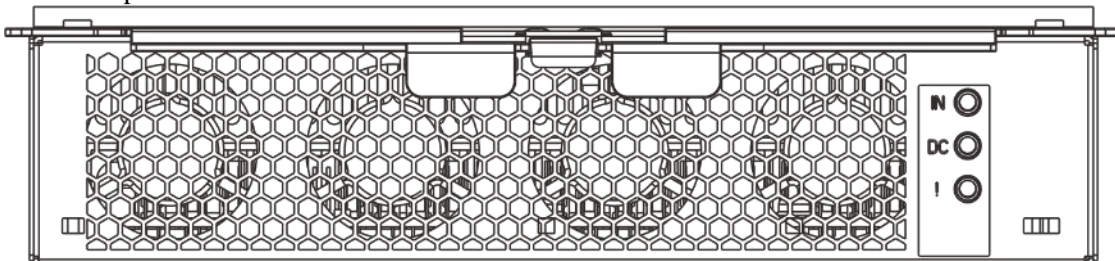

Figure 2-42: PSU Front View

56

- One INPUT state LED (Green)
  - o   On –Normal operation, when input voltage is within specification
  - o   Off – No AC input
- One DC OUTPUT state LED (Green)
  - o   On –Normal operation, when +12V and +5V output voltage are within specification
  - o   Off – No DC output, or DC output out of spec
- One Fault LED (Amber)
  - o   On – PSU fault
  - o   Off – Normal

2.4.2.2 AC Power Connection

The AC power connectors are located on the chassis rear side, not on the front (PSU) side. The AC connector type at PS392e side is IEC C20.

NOTE: The PSU AC input range: 180 to 264V rms.
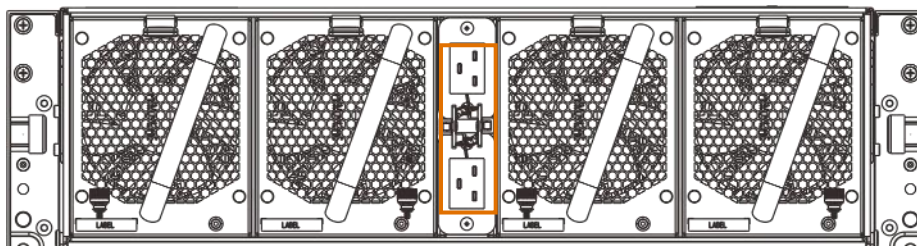
Figure 2-43: Power AC Cord

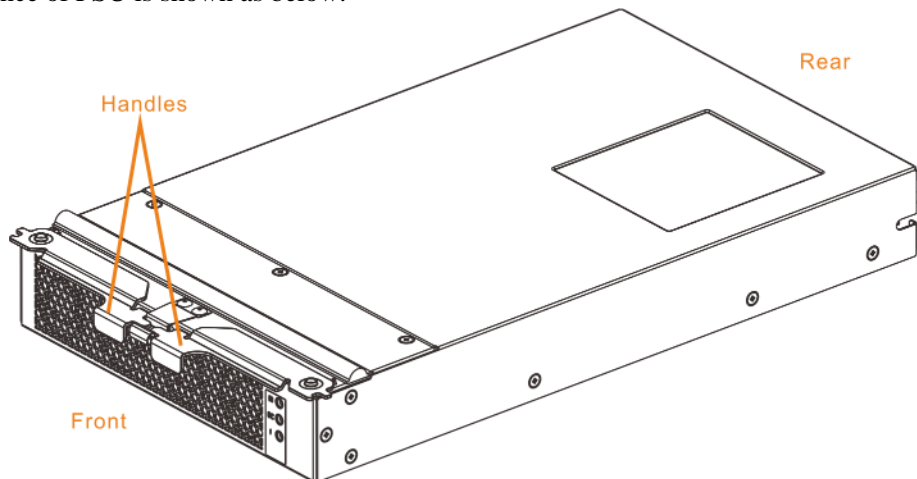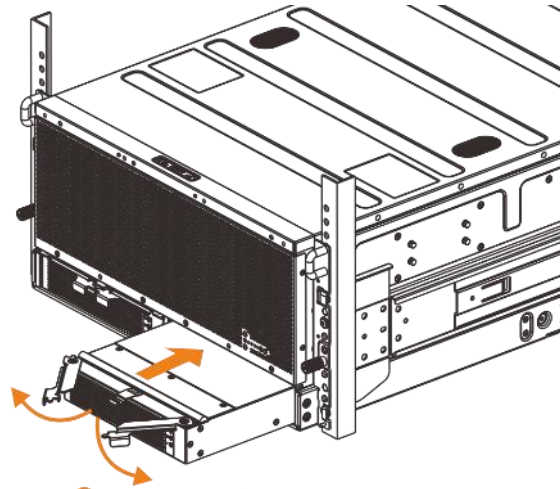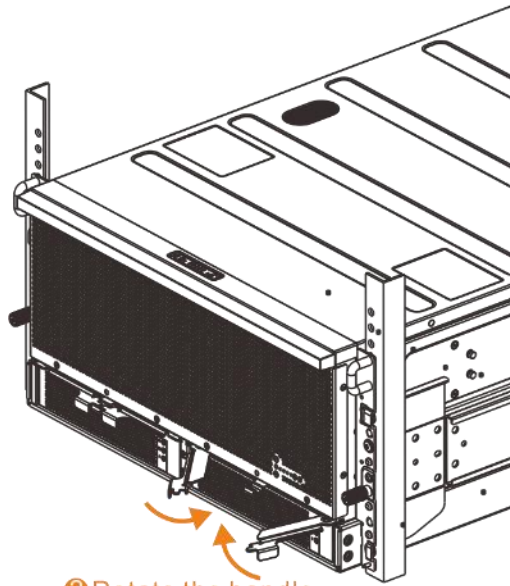### 2.4.2.3 PSU Installation

The appearance of PSU is shown as below:

Figure 2-44: PSU Overview

Rotate the PSU handle with a stop angle and push the PSU into the chassis. Then rotate the PSU handle to close.

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57

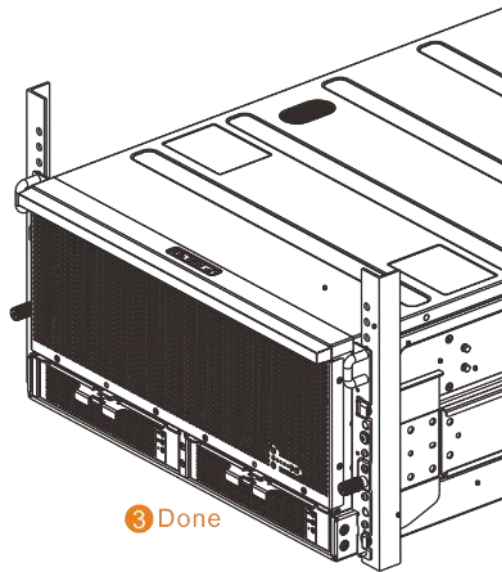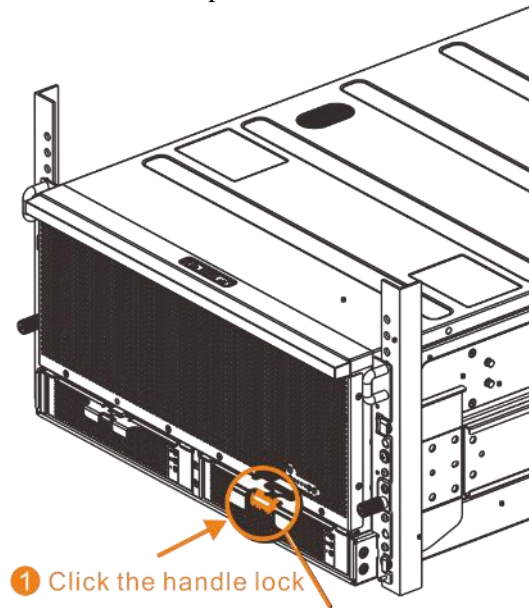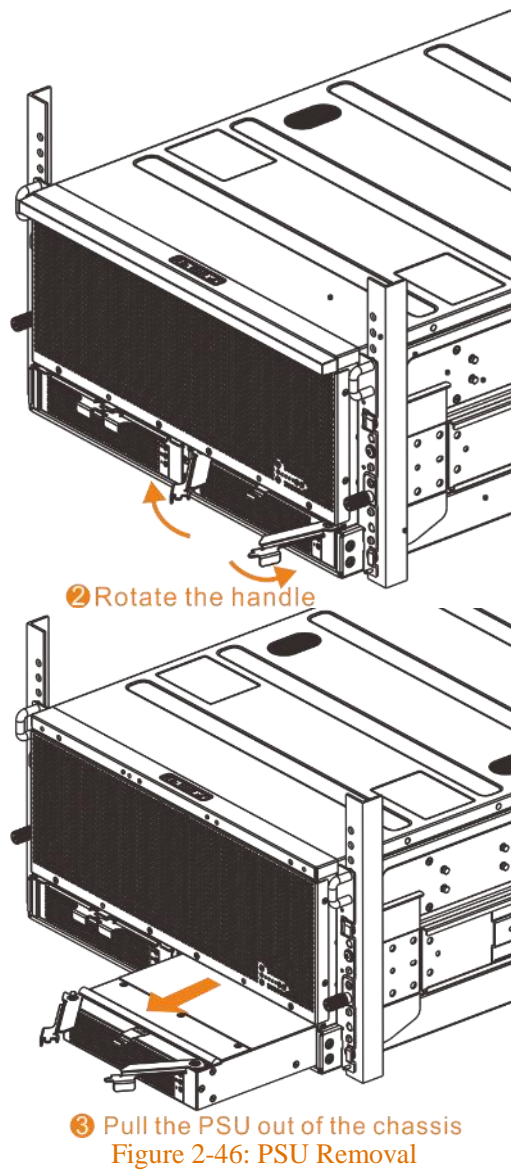❶ Rotate the PSU handle with a stop angle and push the PSU into the chassis

❷ Rotate the handle

Figure 2-45: PSU Installation

2.4.2.4 PSU Removal

Click the handle lock and rotate the handle then pull the PSU out of the chassis.

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59

❷ Rotate the handle

❸ Pull the PSU out of the chassis

Figure 2-46: PSU Removal

2.4.3 Fan Modules

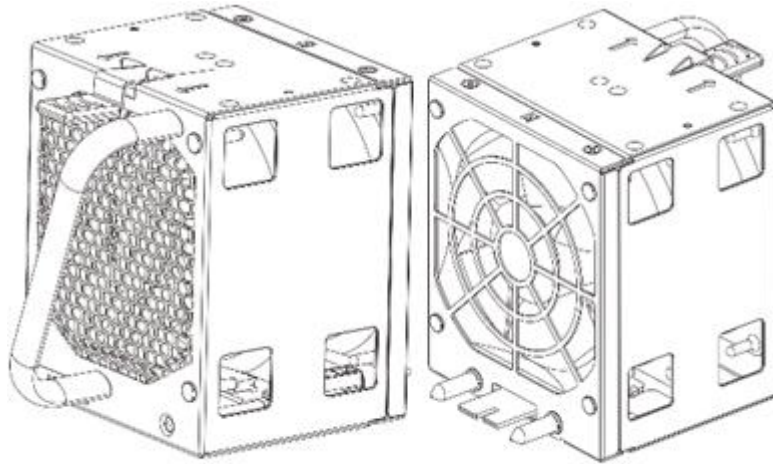The PS392e enclosure houses four fan modules in the rear of the chassis.

Figure 2-47: Fan Module Front View

2.4.3.1 Fan Module LED

Fan Module front view refers to the picture below. Each Fan Module has one status LED.
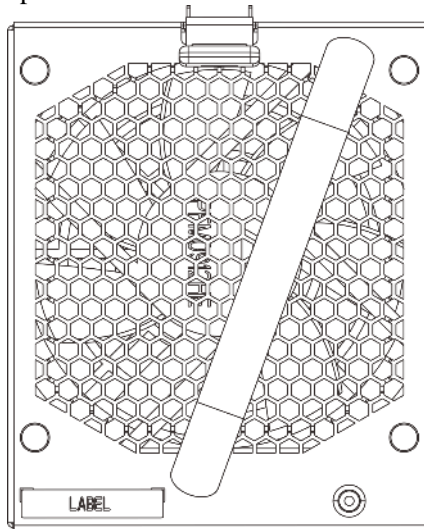

Figure 2-48: Fan Module Front View

- One Status LED (Amber)
  - On –Fan module power on
  - Off – Normal

2.4.3.2 Fan Module Installation

Align the fan module with the fan slot, then insert fan module in the system. Listen for "Click. The installation is finished.
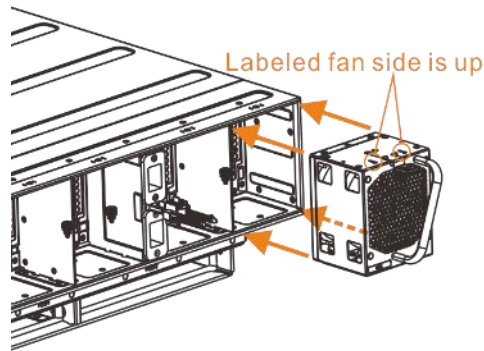
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61

Figure 2-49Fan ModuleInstallation

2.4.3.3 Fan Module Removal

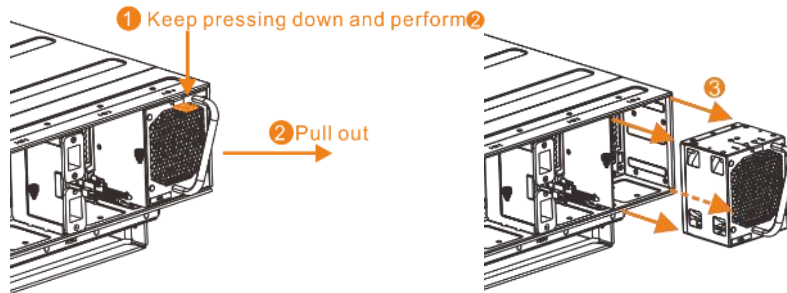Press down the latch and pull out fan module from system.

Figure 2-50 Fan module Removal

⚠ **NOTE**: Users should not disassemble the fan module without Rasilient engineer authority.

2.4.4 Control Panel

2.4.4.1 Control Panel LED

Control Panel front view refers to the picture below. It is located on the front side of the chassis.

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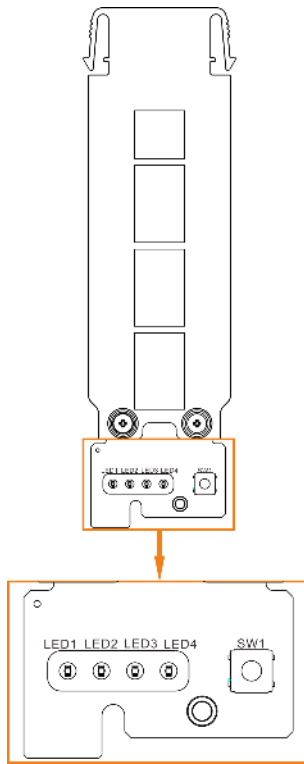
62

Figure 2-51: Control Panel Front View

- LED1: System Power LED (Green)
  - On – System power on ok, controlled by hardware
  - Off – System power off
- LED2: Enclosure LED (Blue)
  - Reserved
- LED3: Enclosure Fault LED (Amber)
  - On – FW detect system fault
  - Off – Normal operation
- LED4: Reserved and not visible to user (Amber)

⚠ **WARNING:** Control panel is not a redundant part.

2.4.4.2 Control Panel Installation
Align the control panel module and control panel slot, then insert control panel module in the system. Listen for "Click" the installation is finished.
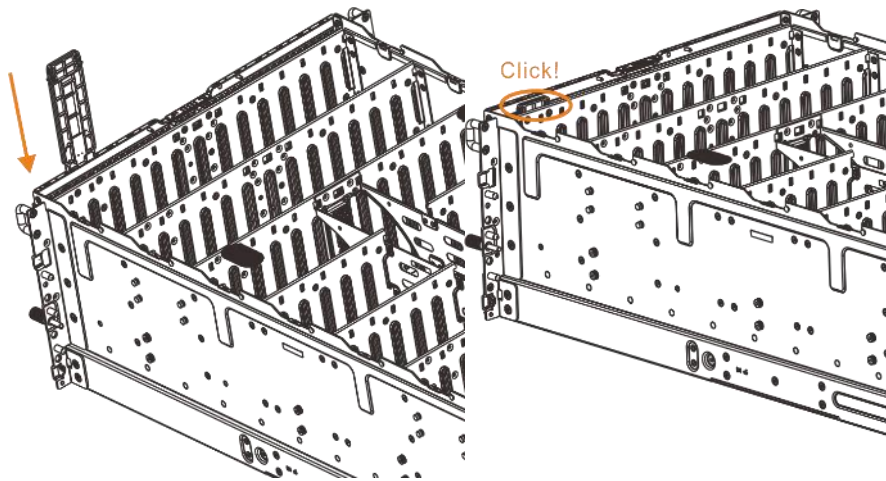
Figure 2-52 Control Panel Installation

2.4.4.3 Control Panel Removal

Press the clip and pull out control panel module from system.

Figure 2-53 Control Panel Removal
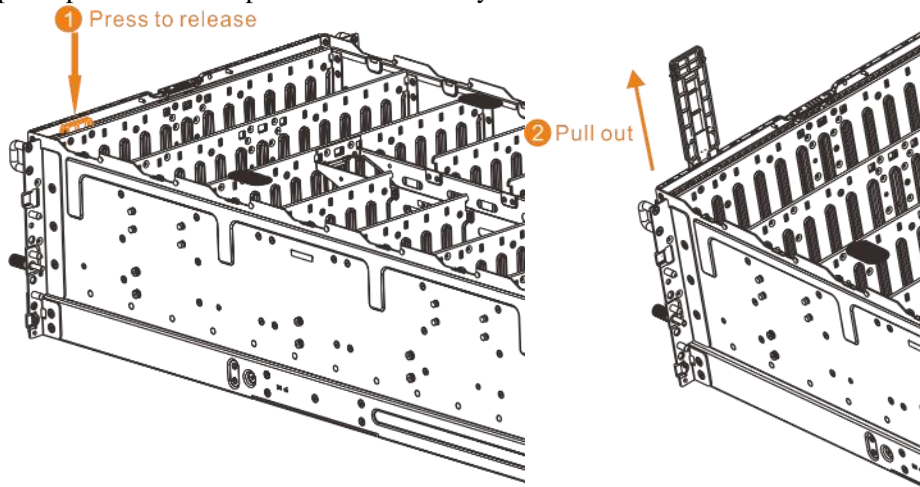
2.4.5 Drive Carrier

The drive carrier side view refers to Figure below. It is designed to support both 2.5 inch and 3.5 inch drive. For Detail drive assembly refers to section 2.2.7 of this user guide.
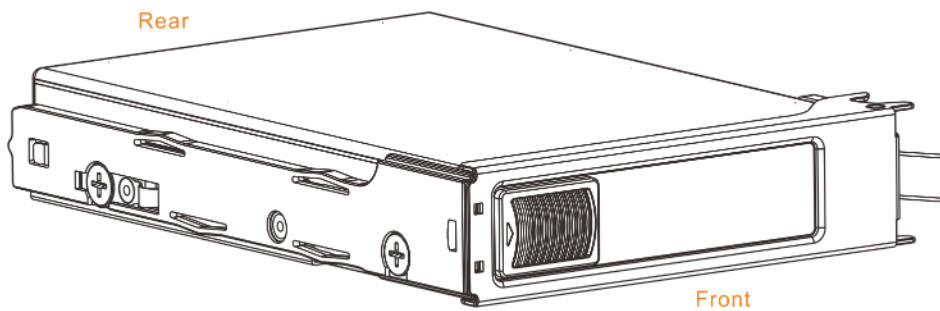

Figure 2-54: Drive Carrier Side View

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64

2.4.5.1 Drive LED

Drive Carrier front view refers to the picture below. There are two indicators on the front face. One shows drive link/active status. The other one is the drive fault LED.
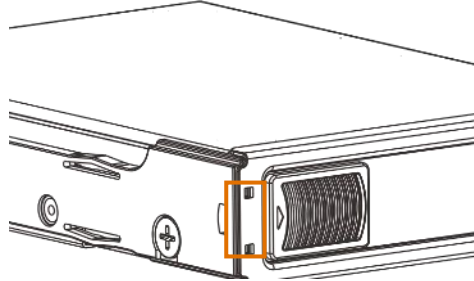
- One Link/Act LED (Green)
  - o Drive link/act indicator, which is driven by Hard Drive directly.
- One Fault LED (Amber)
  Drive fault status indicator.
  - o Solid On – Drive fault
  - o Off – Normal operation

2.4.5.2 Drive Installation

This section simply introduces the Drive assembly process which will happen on customer side.
See *2.2.6 Drive*.

2.4.6 SEM Card

The SEM provides SAS connectivity between the drives and ESM and enclosure management within the PS392e system. The SEM has a custom form factor located in the drive bay area. One or both SEM cards must be installed in PS392e chassis depending upon single or redundant configuration.
Firmware in the canister provides SAS topology configuration, enclosure management.

Secondary Expander Module Features:
  - o Supports native 12G connections.
  - o Dimension: 328.68 (L) x 140.85mm(W).
  - o Two PMC Expanders.
  - o Integrated SCSI Enclosure Service firmware (SES).

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65
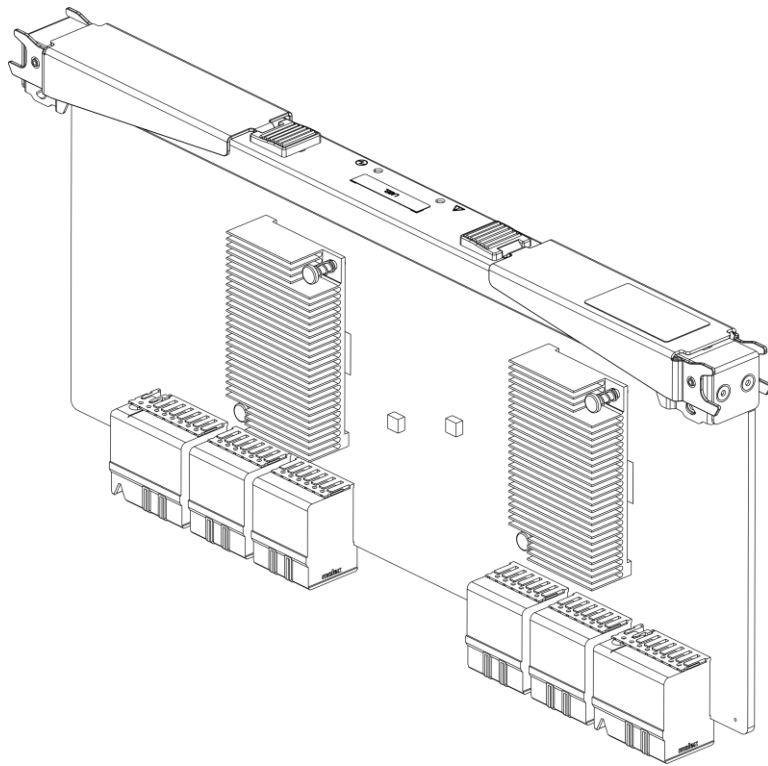
Figure 2-56: Secondary Expansion Module (SEM) Isometric View

2.4.6.1 LED

SEM card front view refers to the picture below. There are two LEDs on the SEM card face. One is power LED, the other is Fault LED.
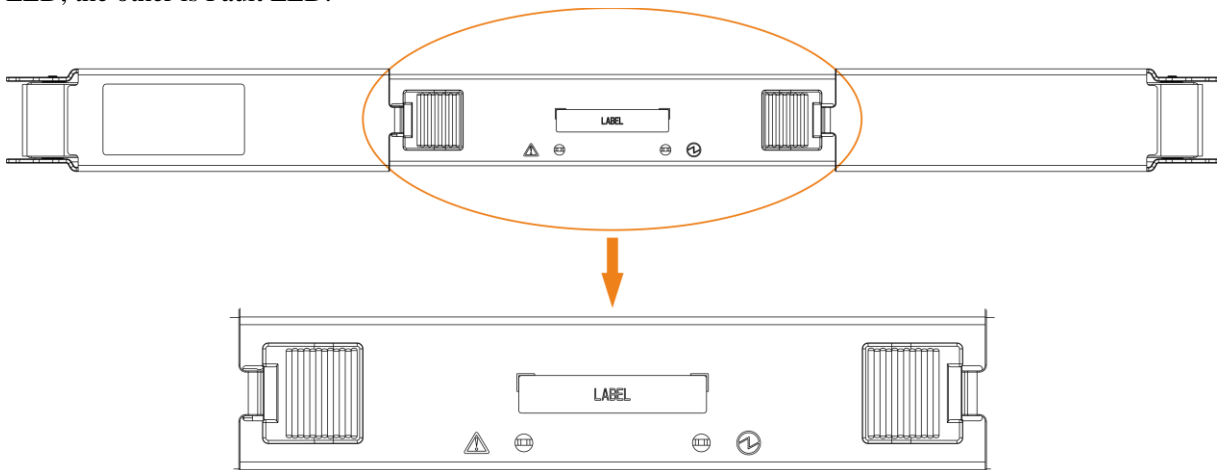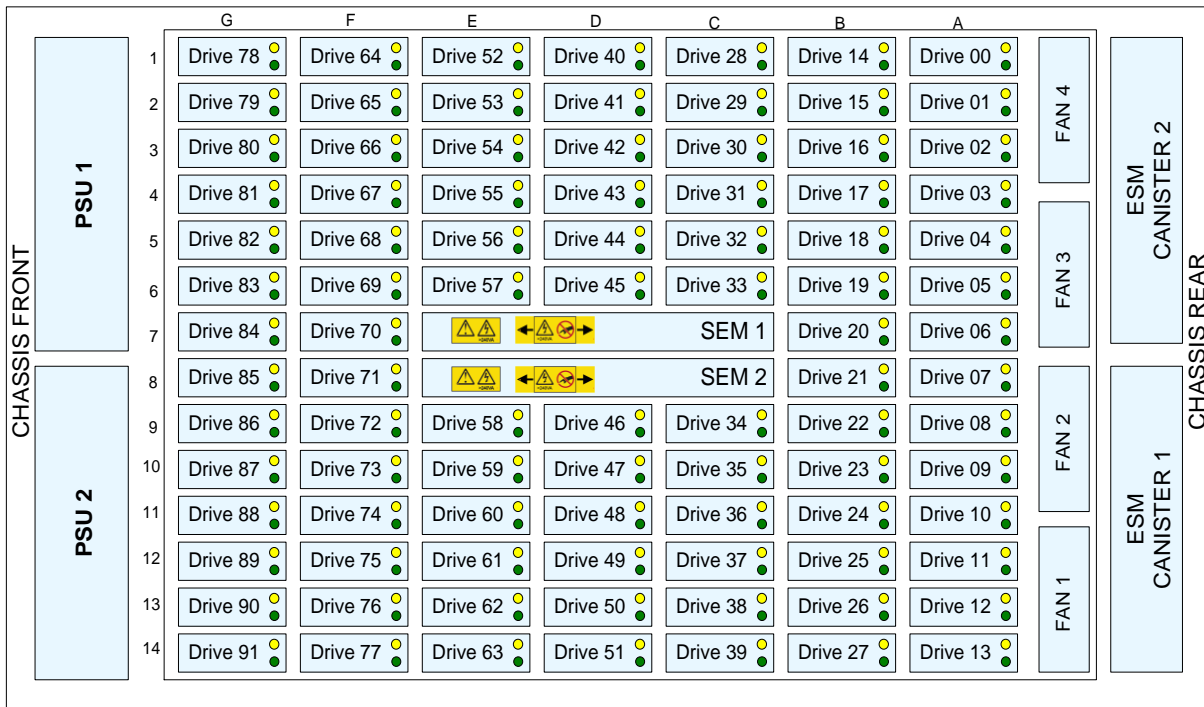

Figure 2-57: SEM card Front View

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66

	G	F	E	D	C	B	A
1	Drive 78	Drive 64	Drive 52	Drive 40	Drive 28	Drive 14	Drive 00
2	Drive 79	Drive 65	Drive 53	Drive 41	Drive 29	Drive 15	Drive 01
3	Drive 80	Drive 66	Drive 54	Drive 42	Drive 30	Drive 16	Drive 02
4	Drive 81	Drive 67	Drive 55	Drive 43	Drive 31	Drive 17	Drive 03
5	Drive 82	Drive 68	Drive 56	Drive 44	Drive 32	Drive 18	Drive 04
6	Drive 83	Drive 69	Drive 57	Drive 45	Drive 33	Drive 19	Drive 05
7	Drive 84	Drive 70	SEM 1		Drive 20	Drive 06
8	Drive 85	Drive 71	SEM 2		Drive 21	Drive 07
9	Drive 86	Drive 72	Drive 58	Drive 46	Drive 34	Drive 22	Drive 08
10	Drive 87	Drive 73	Drive 59	Drive 47	Drive 35	Drive 23	Drive 09
11	Drive 88	Drive 74	Drive 60	Drive 48	Drive 36	Drive 24	Drive 10
12	Drive 89	Drive 75	Drive 61	Drive 49	Drive 37	Drive 25	Drive 11
13	Drive 90	Drive 76	Drive 62	Drive 50	Drive 38	Drive 26	Drive 12
14	Drive 91	Drive 77	Drive 63	Drive 51	Drive 39	Drive 27	Drive 13

CHASSIS FRONT — PSU 1, PSU 2

CHASSIS REAR — FAN 4, FAN 3, FAN 2, FAN 1, ESM CANISTER 2, ESM CANISTER 1

Figure 2-58: Indicator on the top of the SEM

Indicator	Description	
(Power symbol)	Power LED (Green)	On – SEM power on
		Off – SEM power fault
(Warning symbol)	Alarm LED (Amber)	On – SEM fault
		Off – Normal

Table 2-1 Indicator information on the top of the SEM

⚠ **WARNING**: Pay attention to the label on the top of the SEM, to avoid the risk of personal injury, do not touch the SEM before power off.

Figure 2-59: SEM label

2.4.6.2 SEM Card Installation and Removal

This section simply introduces the SEM card installation process which will happen on customer side.

⚠ **NOTE**:2 SEM cards have been installed when users unpack.

Step 1: Pull out Chassis from Rack. See *2.2.6.1*.
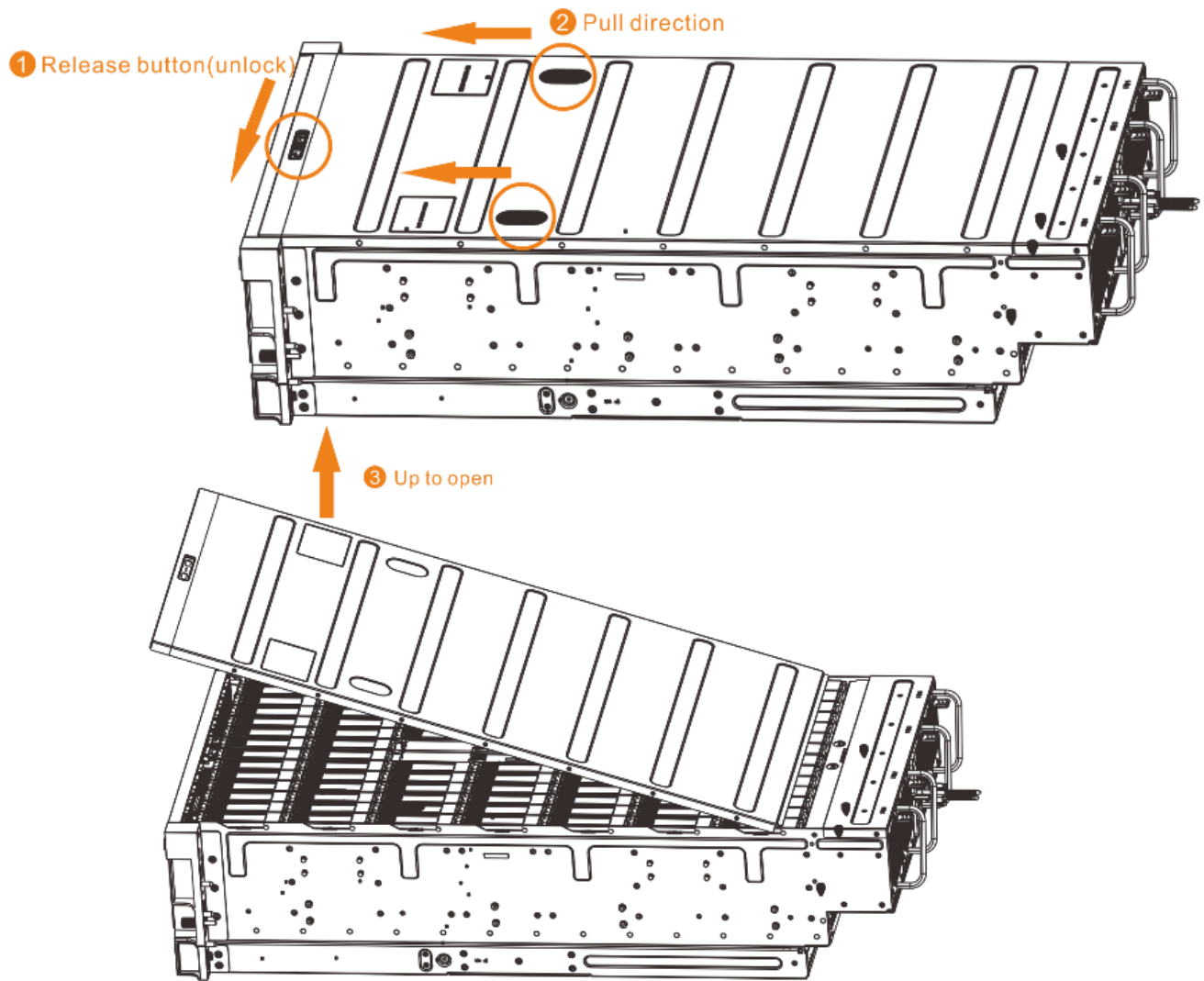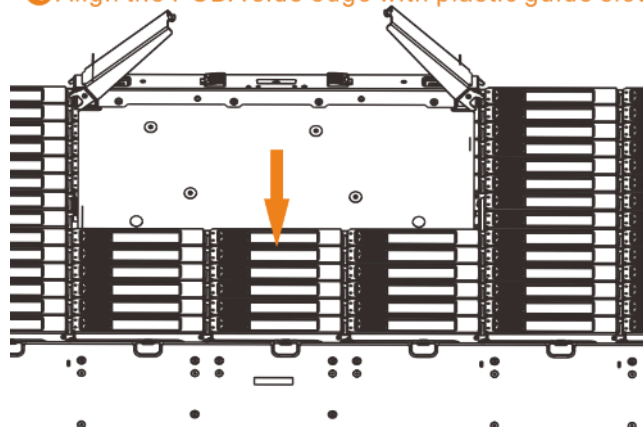**Step 2:** Open the chassis cover.

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67

Figure 2-60: Open Chassis Cover

Step 3: Install/ pull out the SEM card from / into the chassis.

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68
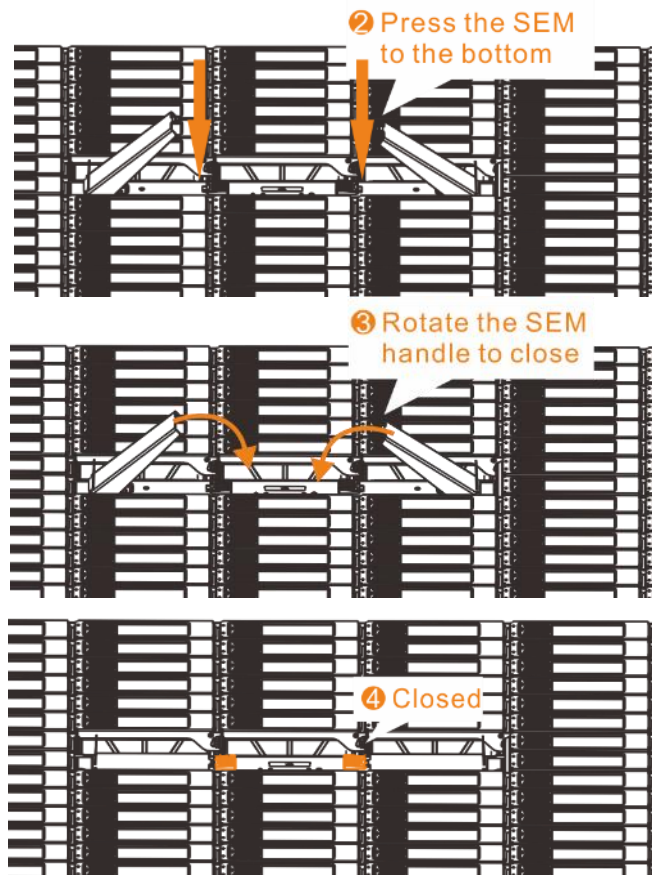
Figure 2-61 Install the SEM card

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69
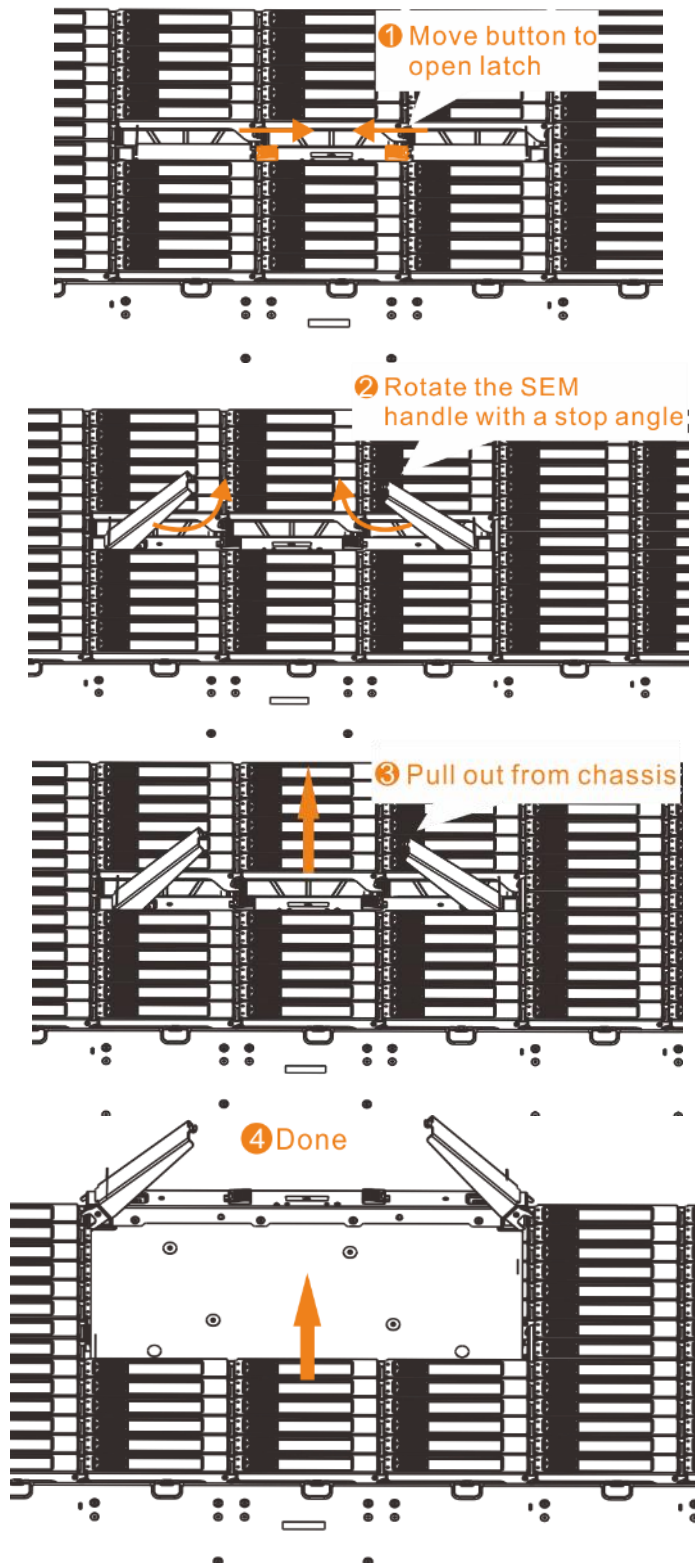
Figure 2-62: Pull out SEM Card from Chassis

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70

Step 4: Close the chassis cover.
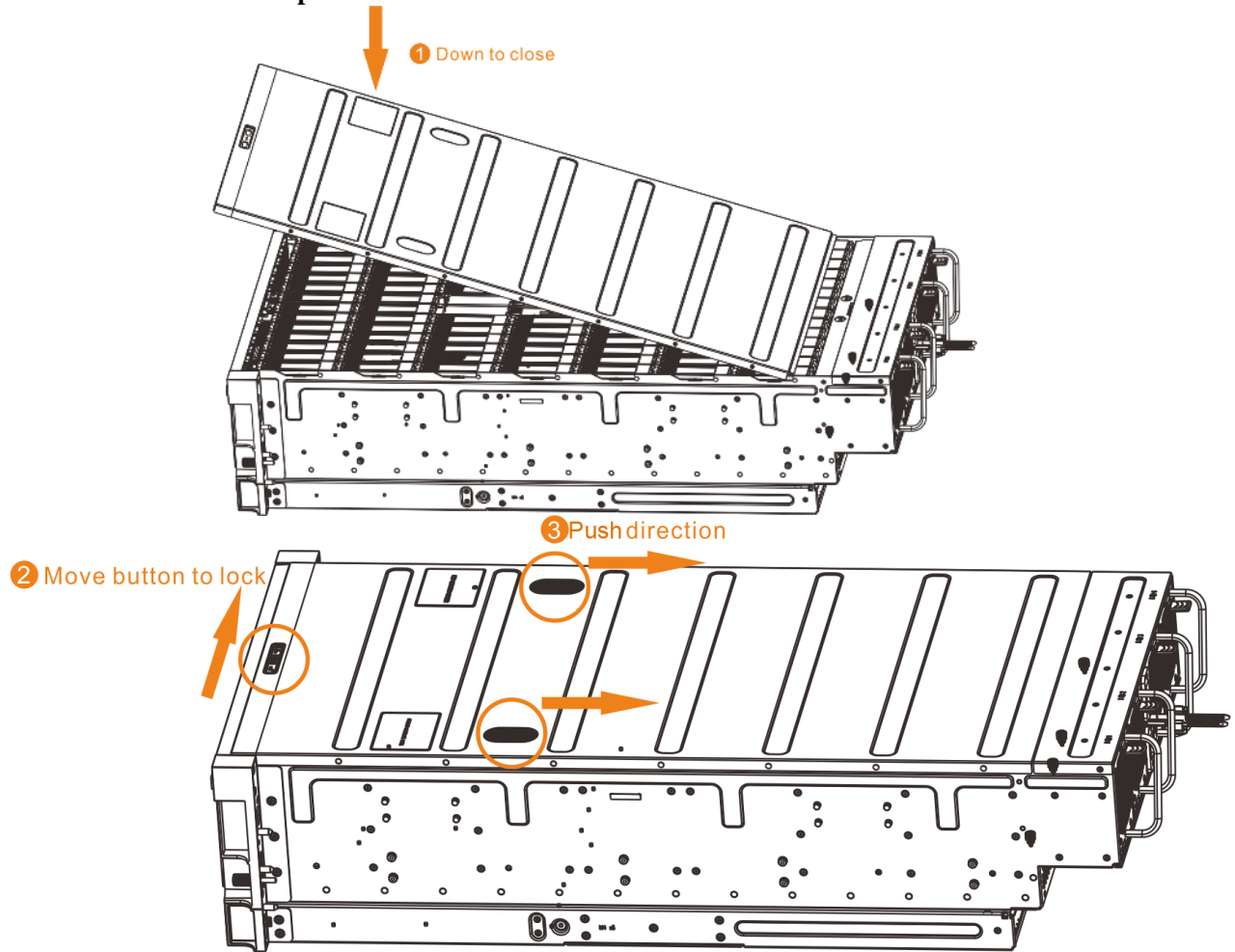
Figure 2-63: Close Chassis Cover

Step 6: Push Chassis into Rack. See *2.2.8.*

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Chapter 3
Support Matrix

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72

3 Support Matrix

This document provides information about supported software, firmware and hardware for PS392e.

3.1 PS392e Storage enclosure rules

This section contains consideration rules for the PS392e Storage Enclosures.

Components	PS392e
Maximum Supported SAS cable length (Mini-SAS-HDD)	2m
Maximum number of Supported Drives	92
Maximum HDD Power Consumption	13.5w

Table 3-1   PS392e Storage enclosure rules

3.2 Supported RAID Application Controller

PS392e is only qualified to be used with Rasilient PS5012HD.

3.3 Supported physical disk drives

Please refer to the Rasilient Supported Drive List.

3.4 Supported system connections

You can connect the storage enclosure to host system in two different configurations:
- Single port configuration
- Redundant configuration

3.4.1 Single port configuration

In the single port configuration ESM 2 is connected to a Controller 0 on the PS5012HD. ESM 1 is not installed.

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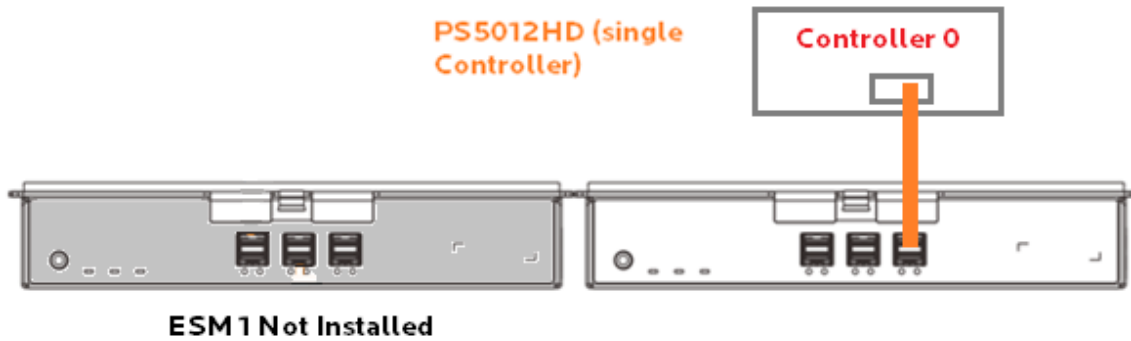
73

Figure 3-1   Single port configuration

3.4.2 Redundant configuration

In Redundant configuration, ESM 2 is connected to PS5012HD's Controller 0 (bottom) and ESM 1 is connected to Controller 1 (top) controller.
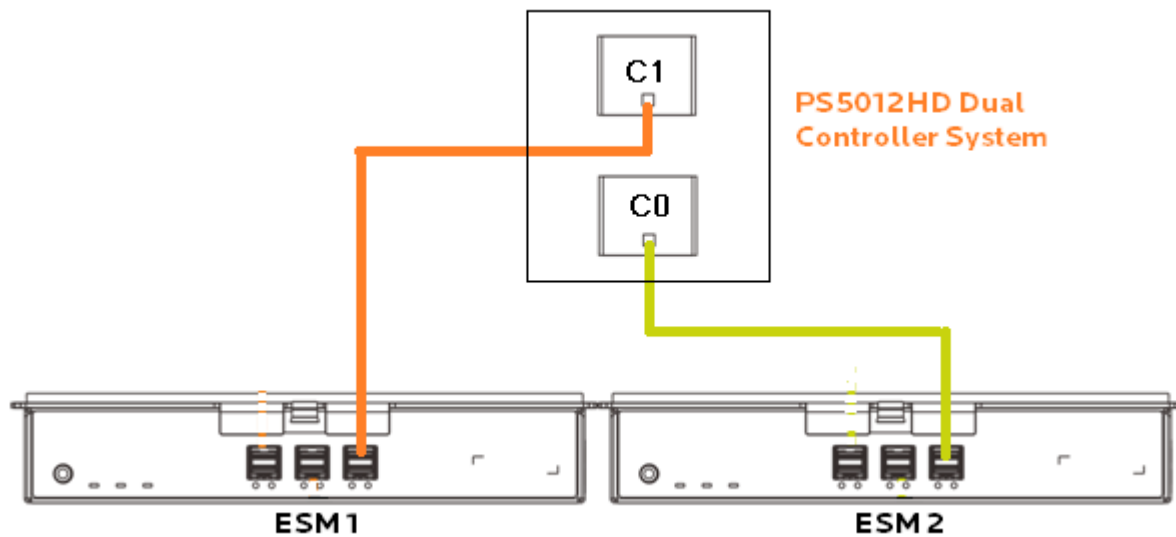

Figure 3-2   Redundant configuration

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