

# **Network Storage Disk Expansion Units**

## Quick Guide

Thank you for purchasing our product. If there are any questions, or requests, please do not hesitate to contact the dealer.

## Disclaimer

To the maximum extent permitted by applicable law, the product described, with its hardware, software, firmware and documents, is provided on an “as is” basis.

Best effort has been made to verify the integrity and correctness of the contents in this manual, but no statement, information, or recommendation in this manual shall constitute formal guarantee of any kind, expressed or implied. We shall not be held responsible for any technical or typographical errors in this manual. The contents of this manual are subject to change without prior notice. Update will be added to the new version of this manual.

Use of this manual and the product and the subsequent result shall be entirely on the user’s own responsibility. In no event shall we be reliable to you for any special, consequential, incidental, or indirect damages, including, among others, damages for loss of business profits, business interruption, or loss of data or documentation, or product malfunction or information leakage caused by cyber attack, hacking or virus in connection with the use of this product.

Video and audio surveillance can be regulated by laws that vary from country to country. Check the law in your local region before using this product for surveillance purposes. We shall not be held responsible for any consequences resulting from illegal operations of the device.

The illustrations in this manual are for reference only and may vary depending on the version or model.

This manual is a guide for multiple product models and so it is not intended for any specific product.

Due to uncertainties such as physical environment, discrepancy may exist between the actual values and reference values provided in this manual. The ultimate right to interpretation resides in our company.




## Environmental Protection

This product has been designed to comply with the requirements on environmental protection. For the proper storage, use and disposal of this product, national laws and regulations must be observed.



## Safety and Compliance Information

### Safety Symbols

The symbols in the following table may be found on installation-related equipment. Be aware of the situations indicated and take necessary safety precautions during equipment installation and maintenance.

Symbol	Description
	Generic alarm symbol: To suggest a general safety concern.
	ESD protection symbol: To suggest electrostatic-sensitive equipment.
	Electric shock symbol: To suggest a danger of high voltage.

The symbols in the following table may be found in this manual. Carefully follow the instructions indicated by the symbols to avoid hazardous situations and use the product properly.

Symbol	Description
 <b>WARNING!</b>	Indicates a hazardous situation which, if not avoided, could result in bodily injury or death.
 <b>CAUTION!</b>	Indicates a situation which, if not avoided, could result in damage, data loss or malfunction to product.



**NOTE!**

Indicates useful or supplemental information about the use of product.

## Safety Information

Installation and removal of the unit and its accessories must be carried out by qualified personnel. Please read all of the safety instructions below before installation and operation.

Before the power cable is installed or removed, the power must be turned off.

Never attempt to disassemble the device yourself. We shall not assume any responsibility for problems caused by unauthorized repair or maintenance.

The installation must be made by qualified personnel and should conform to all the local codes.

Ensure a proper operating environment, including temperature, humidity, ventilation and power supply. Keep the device from moisture, rain, dust, strong electromagnetic radiation and vibration.

Strictly follow the procedure to shut down the device. Sudden power failures can cause disk damage and functional abnormalities. In an environment where power supply is frequently interrupted, use an Uninterrupted Power Supply (UPS).

Verify that installation is correct. Incorrect cable connection may cause personal injury or device damage.

Make sure the device is properly grounded and the lightning protection meets requirements.

The separate grounding terminal must be permanently connected to earth.

Improper use or replacement of the battery may result in hazard of explosion. Please use the manufacturer recommended battery type.

Take necessary measures to ensure data security and protect the device from network attack and hacking (when connected to Internet). Possible risks and consequences are at user's sole discretion.

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**WARNING!**



Never look at the transmit laser while the power is on. Never look directly at the fiber ports and the fiber cable ends when they are powered on.

**Caution:** Use of controls or adjustments to the performance or procedures other than those specified herein may result in hazardous laser emissions.

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## Regulatory Compliance

### FCC Part 15

This equipment has been tested and found to comply with the limits for 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 not installed and used in accordance with the instruction manual, 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.

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

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

**LVD/EMC Directive**



This product complies with the European Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC.

**WEEE Directive–2002/96/EC**



The product this manual refers to is covered by the Waste Electrical & Electronic Equipment (WEEE) Directive and must be disposed of in a responsible manner.

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# 1 Overview

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As new generation network storage expansion units (hereafter referred to as disk expansion unit, abbreviated as DEU), the devices use mini-SAS cables to connect to the hosts and features high expandability and stability, superior performance, and easy management.

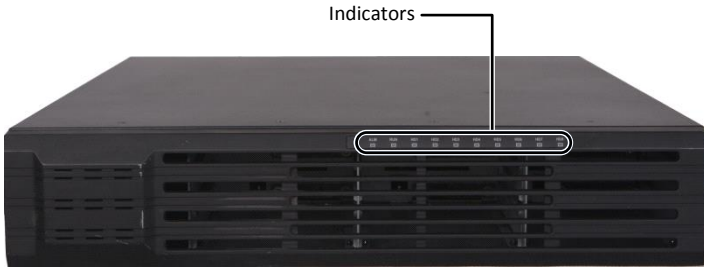
# 2 Appearance

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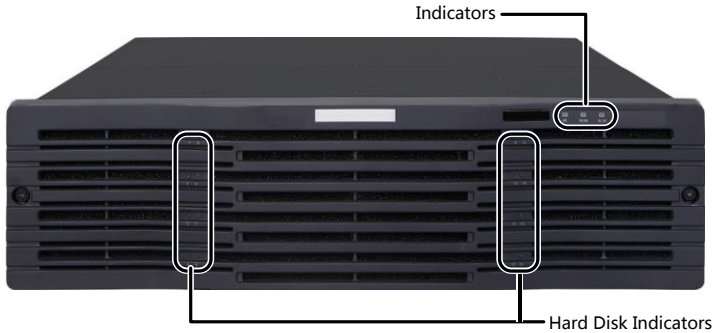
The figures in the following are for your reference only. The actual appearance may vary with your device model.

## Front View

**Figure 2-1** 8-DISK DEU Front View



**Figure 2-2** 16-DISK DEU Front View



## Indicators

The following table describes the front panel indicators. The LED color may vary with the equipment model.

**Table 2-1** 8-DISK DEU Status Indicators

Indicator	Color	Status	Description
ALM (Alarm)	Red	Steady on	Device alarms triggered.
		Off	The system is running normally without alarms.
RUN (Operation)	Green	Steady on	The system is running normally.
		Blinking	The system is starting.
		Off	The system is shut down.
HD (Hard disk)	Green	Steady on	The system is running without data access.
		Blinking	The system is running with data access.
	Red	Steady on	The hard disk is faulty.
		Blinking	The array is rebuilding.

Indicator	Color	Status	Description
	-	Off	Hard disk is not installed or the system is shut down.
LINK (Network, next to the mini-SAS interface)	Green	Blinking	Network is properly connected.
		Off	Network is not connected.

**Table 2-2** 16-DISK DEU Status Indicators

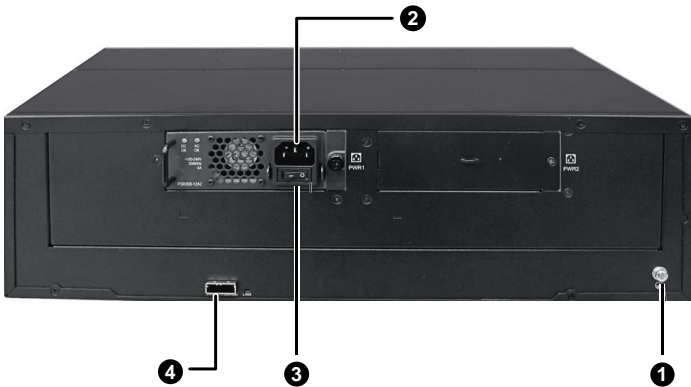
Indicator	Color	Status	Description
ALM (Alarm)	Red	Steady on	Device alarms triggered.
		Off	The system runs normally without alarms.
RUN (Operation)	Green	Steady on	The system is running normally.
		Blinking	The system is starting.
		Off	The system is shut down.
HD (Hard disk)	Green	Steady on	The system is running without data access.
		Blinking	The system is running with data access.
	Amber	Steady on	The hard disk is faulty.
		Blinking	The array is rebuilding.
	-	Off	Hard disk is not installed or the system is shut down.
LINK (Network, next to the mini-SAS interface)	Green	Blinking	Network is properly connected.
		Off	Network is not connected.

## Rear View

Figure 2-3 8-DISK DEU Rear View



Figure 2-4 16-DISK DEU Rear View



## Interfaces

The following table describes the rear panel interfaces.

Table 2-3 Interfaces

No.	Item	Description
①	Grounding terminal	Equipment grounding
②	Power interface	AC power, 100 V-240 V AC
③	Power switch	Turn on/off device when connected to power

No.	Item	Description
④	Mini-SAS interface	For connection to the host

## 3 Mounting

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### Preparation

The devices can be installed in a 19" cabinet or on a workbench. Prepare a slotted screwdriver and a Phillips screwdriver for the installation.



#### **WARNING!**

Make sure the device is disconnected from the power supply before installation. Please wear anti-static gloves when installing the device.

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### Installing the Device

The device provides front, side and back ventilation openings. Leave a minimum space of 30 cm at the front and back sides and a minimum space of 10 cm at the left and right sides of the device for efficient heat dissipation.



#### **WARNING!**

- Do not stack the devices up or place anything heavy on it. Otherwise heat dissipation will be affected.
  - Keep the device away from vibration sources such as an electric generator.
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### Mounting on a Workbench (For 8-DISK DEU Only)

1. Remove the stickers from the foot pads delivered with the device, and attach the pads to the bottom of the device where appropriate.

2. Place the device on a clean workbench.

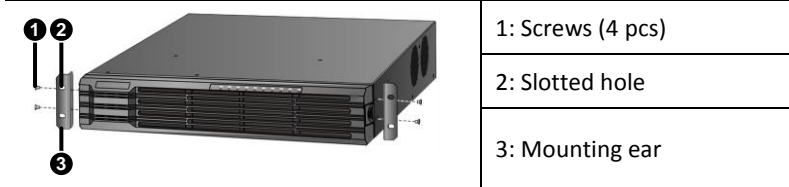
## Mounting in a Cabinet



### WARNING!

Make sure the cabinet has slide rails or a tray to hold the device. Do not use mounting ears only to hold the device.

1. As shown in the following figure, attach a mounting ear to the device and secure it with two M4 × 8 screws.
2. Install the other mounting ear by doing the same.



Place the device on the slide rails and then push it in place. Secure the mounting ears to the cabinet with nuts and screws.

## Installing the Hard Disks

The hard disk interfaces are located inside the device. You need to remove the front panel to install the hard disks. The hard disks are hot-swappable and support mixed insertion. The disks can be powered on in sequence to minimize the impulse current produced during the startup.



## WARNING!

- Do not unplug the hard disks when data is being read or written. The hard disk indicator does not blink when no data is being processed.
  - Wear anti-static gloves when installing a hard disk.
  - Insert hard disks into the slots of a running device at an interval of at least six seconds.
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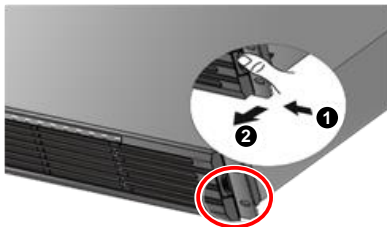
## Installing in 8-DISK DEU

Install hard disks as follows:

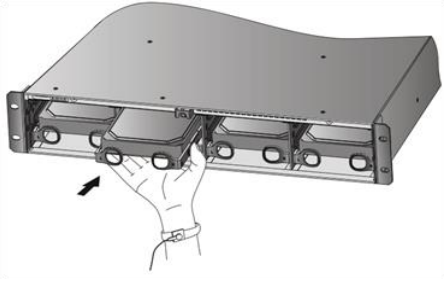
1. Fix the handle bars to the hard disk with screws on the correct side.



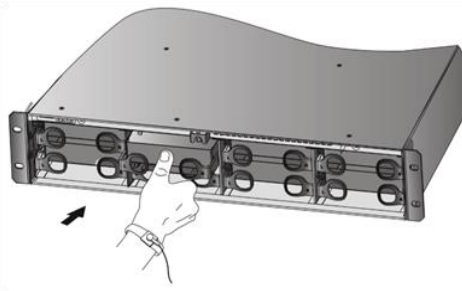
2. Press the buckles on both sides of the front panel and remove the panel.



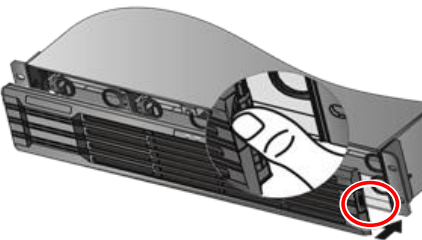
3. Align the hard disk with the slot and push in the hard disk gently and steadily.



4. Push the hard disk in position with your thumb until the buckles click. Repeat the above steps to install all the hard disks.



5. Hold the buckles on both sides of the front panel and push in the front panel into position in the direction as indicated by the arrow.



## Installing in 16-DISK DEU

Install hard disks as follows:

1. Attach the handle bars (marked with L and R) correctly with screws.





2. Unscrew the front panel using a Phillips screwdriver.



3. Slowly insert the hard disk into the slot.



4. Steadily push the hard disk till it clicks into place. Repeat this step to install all other hard disks.



5. Put back the front panel and fix it with screws.



## Replacing the Hard Disks

Preparation:

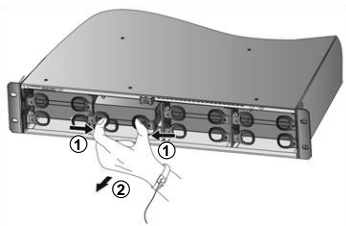
- Wear an anti-static wriststrap/band.
- Remove the front panel. For details, see Installing the Hard Disks.

### Replacing in 8-DISK DEU

Replace the hard disks as follows:

1. Hold the left and right handle bars in the manner as shown in the figure below and then pull the handle bars smoothly to disengage the hard disk from the backplane. Wait for at least 30 seconds till

the hard disk stops spinning and then fully remove the hard disk from the slot.



### **CAUTION!**

Excessive force may damage the handle bars.

2. Remove the six screws to detach the handle bars from the hard disk.



3. To finish the installation of the new hard disk, see Installing in 8-DISK DEU.

## Replacing in 16-DISK DEU

Replace the hard disks as follows:

1. Hold the left and right handle bars in the manner as shown in the figure below and then pull the handle bars smoothly to disengage the hard disk from the backplane. Wait for at least 30 seconds till the hard disk stops spinning and then fully remove the hard disk from the slot.



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**CAUTION!**

Overexerted force may damage the handle bars.

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2. Remove the six screws to detach the handle bars from the hard disk.



3. To finish the installation of the new hard disk, see [Installing in 16-DISK DEU](#).

## Connecting Cables

### Connecting a Mini-SAS Cable

Insert one end of the mini-SAS cable into the mini-SAS interface on the device, as shown in the figure below, and then connect the other end of the mini-SAS cable to the host.

**Figure 3-1** 8-DISK DEU Mini-SAS Connection



**Figure 3-2** 16-DISK DEU Mini-SAS Connection



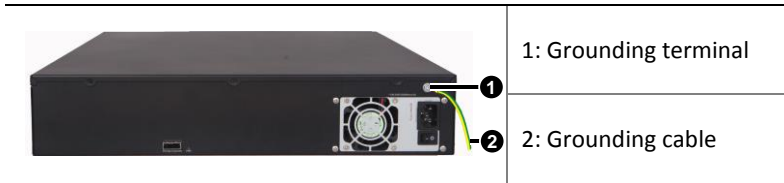
## Connecting a Grounding Cable

To ensure personal and equipment safety (lightning protection and resistance against interference), please ground the device properly.

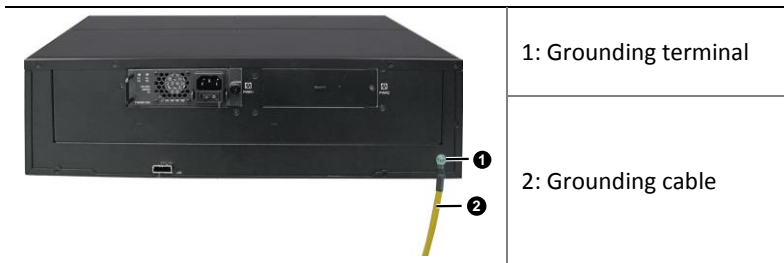
The grounding cable must not exceed 30 m long and provide a grounding resistance of less than 5  $\Omega$ . For specific requirements, refer to the standards for the IEC61024 series.

As shown in the following figure, connect one end of the grounding cable to the grounding terminal of the device and the other end to a reliable grounding point.

**Figure 3-3** 8-DISK DEU Grounding Connection



**Figure 3-4** 16-DISK DEU Grounding Connection



## 4 Power On

### Before Power-On

To avoid bodily injury and device damage, check the following items before you power on the device.

- The device is firmly and securely installed with all the screws fixed.
- Nothing is put on the device.
- All the cables are properly connected.
- The power supply meets technical specifications.

### Starting the Device

After the device is properly connected to the host, connect the device to power and then turn on the power to start the device.

## 5 Specifications

**Table 5-1** Specifications

Item	8-DISK DEU & 16-DISK DEU
Hard disk interface	<ul style="list-style-type: none"><li>• 8-DISK DEU: 8 SATA interfaces</li><li>• 16-DISK DEU: 16 SATA interfaces</li></ul>
Dimensions (W × D × H)	<ul style="list-style-type: none"><li>• 8-DISK DEU: 523.0 mm × 442.0 mm × 86.1 mm (20.6" × 16.6" × 3.4", with front panel)</li><li>• 16-DISK DEU: 477.1 mm × 481.6 mm × 130.5 mm (18.8 × 19.0" × 5.1", with front panel)</li></ul>
Weight	<ul style="list-style-type: none"><li>• Without disks &lt; 9 kg (19.8 lb)</li><li>• Fully equipped with hard disks 8-DISK DEU &lt; 16 kg (35.27 lb) 16-DISK DEU &lt; 19 kg (41.89 lb)</li></ul>
Power	100 V AC to 240 V AC; 50Hz/60Hz
Consumption	<ul style="list-style-type: none"><li>• 8-DISK DEU &lt; 100 W (fully equipped with hard disks)</li><li>• 16-DISK DEU &lt; 150 W (fully equipped with hard disks)</li></ul>
Operation temperature	-10 °C to 55 °C (14 °F to 131 °F)
Operation humidity	5% to 95% (noncondensing)
Altitude	-60 m to 5000 m (-196.9 ft to 16404.2 ft)

## 6 HDD Storage Calculation Chart

The following chart shows an estimation of storage space used based on recording at one channel for 24 hours at a constant bit rate.

**Table 6-1** Storage Calculation

Bit Rate (Kbps)	Storage Used (GB)
256	2.900
512	5.801
768	8.701
1024	11.602
1536	17.402
2048	23.203
3072	34.805
4096	46.406



**NOTE!**

Please note that supplied values for storage space used is estimated by formulas and is for reference only.



BOM: 3101COCL