JBOD 设备

TL-R1620Sdc

用户指南

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1. 前言

关于本指南

本指南提供有关设备的信息以及有关硬件安装的分步说明。此外，还提供了有关基本操作和故障排除信息的说明。

受众

本文档的目标读者为用户和存储管理员。本指南假定用户已对存储和备份概念有基本了解。

文档约定

符号	描述
	注释，提供默认配置设置和其他补充信息。
	重要注释，提供有关所需配置设置的信息以及其他关键信息。
	提示，提供有关执行任务或配置设置的建议或备选方法。
	警告，提供警告信息，如果忽略此信息，可能会导致潜在损失、伤害甚至死亡。

2. 产品概述

本章提供有关 QNAP 设备的基本信息。

关于 QNAP JBOD 设备

QNAP JBOD 设备旨在提高 NAS 或服务器的容量和实用性，并提供多种存储应用程序。您可以独立管理已安装的硬盘，或者使用主机将其配置为软件 RAID 组。TL-R1620Sdc 具有十六个 3.5 英寸 SAS 12 Gbps 硬盘架，每个控制器三个 SFF-8644 端口。

硬件规格

警告

- 如果您的 QNAP 产品有硬件方面的缺陷，请将产品退回 QNAP 或 QNAP 授权的服务中心进行维修或更换。您本人或未经授权的第三方对产品进行的任何维修或维护流程均会使保修失效。
- 对于因未经授权进行的修改和安装不受支持的第三方应用程序而造成的任何损坏或数据丢失，QNAP 概不负责。
- 有关详细信息，请参见 QNAP 产品保修服务条款。

注
型号规格如有更改，恕不另行通知。要查看最新规格，请转到 https://www.qnap.com。

组件	TL-R1620Sdc
存储空间	
硬盘架	• 16 x 3.5 英寸 SAS 12 Gbps • 16 x 3.5 英寸 SAS 6 Gbps

硬盘兼容性	3.5 英寸硬盘架：
	• SAS 硬盘
	  • 3.5 英寸 SAS 机械硬盘
	  • 2.5 英寸 SAS 机械硬盘
	  • 2.5 英寸 SAS 固态硬盘
	• SATA 硬盘
	  • 2.5 英寸 SATA 机械硬盘
	  • 2.5 英寸 SATA 固态硬盘
	注
	2.5 英寸 SATA 硬盘需要一个 QDA-SA2 硬盘适配器。

热插拔	支持
外部 I/O 端口和扩展插槽	
SFF 端口	每个控制器 3 个 SFF-8644

组件	TL-R1620Sdc
RJ45	每个控制器 1 个 **注** 此端口仅供工程使用。
界面	
按钮	• 电源：每个控制器 1 个 • OLED 面板电源：每个控制器 1 个
尺寸	
外形规格	3U 机架式
尺寸（高 x 宽 x 深）	131.3 x 482.2 x 425.3 mm （5.17 x 18.98 x 16.74 英寸）
净重	12.26 kg（27.03 磅）
其他	
电源单元	2 x 550W，100-240V AC，50/60 Hz
系统电池	CR2032 锂电池（3V，225 mAh）
噪声声级	28.8 db(A) **注** 噪声声级在距设备一米以内的旁观者位置测得。测试设备安装了最大数量的硬盘以低速运行。
风扇	3 x 80 mm 12V DC 风扇
工作温度	0˚C 至 40˚C（32 至 104˚F）
相对湿度	• 无冷凝相对湿度：5% 至 95% • 湿球温度：27˚C (80.6˚F)

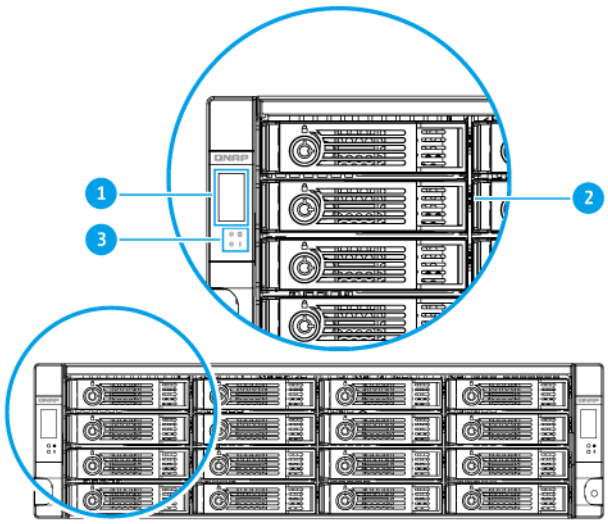
提示
有关兼容的硬盘型号和扩展卡的列表，请转到 https://www.qnap.com/compatibility。

包装内容

项目	数量
JBOD 设备	1
SAS 线缆	2
电源线	2
适用于 3.5 英寸硬盘的螺丝	64
适用于 2.5 英寸硬盘的螺丝	48
快速安装指南 (QIG)	1

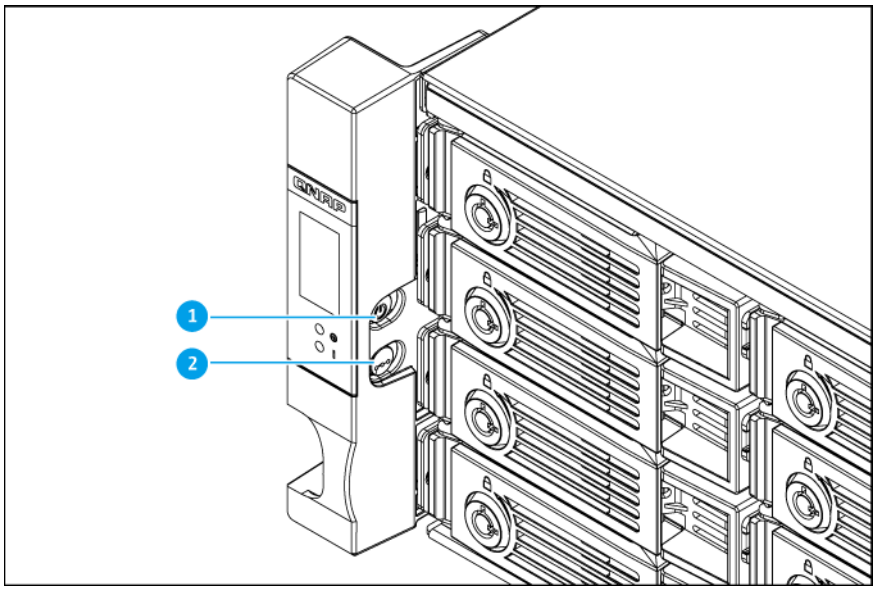
组件

前面板



编号	组件	编号	组件
1	OLED 面板	3	前面板 LED
2	硬盘 LED	-	-

前面板按钮



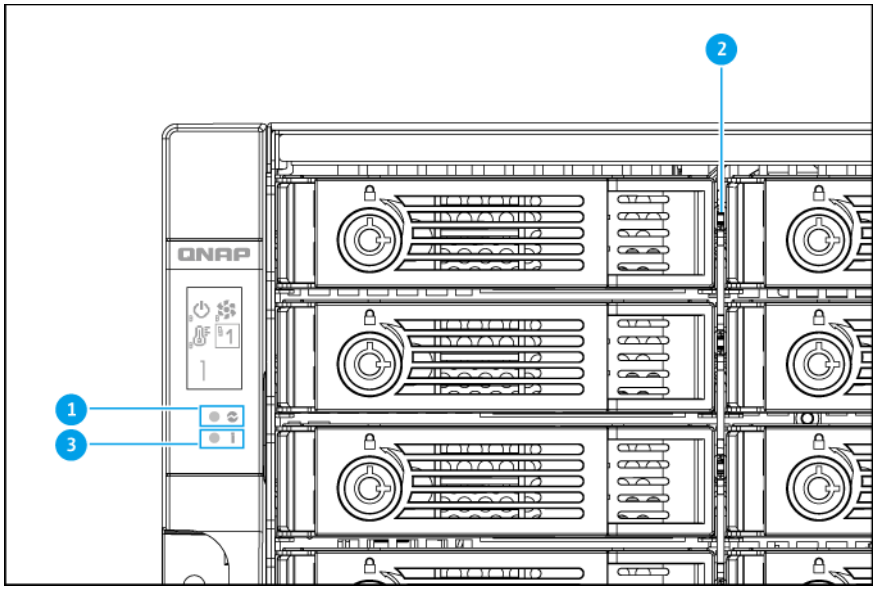
注
每个控制器都有自己的电源和 OLED 按钮。

编号	组件	编号	组件
1	电源按钮	2	OLED 面板电源按钮

操作	用户操作	结果
启动控制器电源	按下电源按钮	控制器开机。 **提示** • QNAP 建议从后面板启动控制器电源。有关详细信息，请参见后面板和存储控制器电源按钮。 • 系统启动需要 10 到 15 分钟，具体取决于安装的硬盘和连接的设备数量。可以查看后面板 LED 来确认启动状态。有关详细信息，请参见后面板 LED。
启动 OLED 显示屏电源	按下 OLED 按钮。	OLED 显示屏的电源开启。
关闭 OLED 显示屏电源	按下 OLED 按钮。	OLED 显示屏的电源关闭。

前面板和硬盘 LED

开启设备电源后，前面板 LED 指示灯会指示系统状态和相关信息。以下 LED 信息仅适用于硬盘已正确安装并且设备已连接到网络的情况。



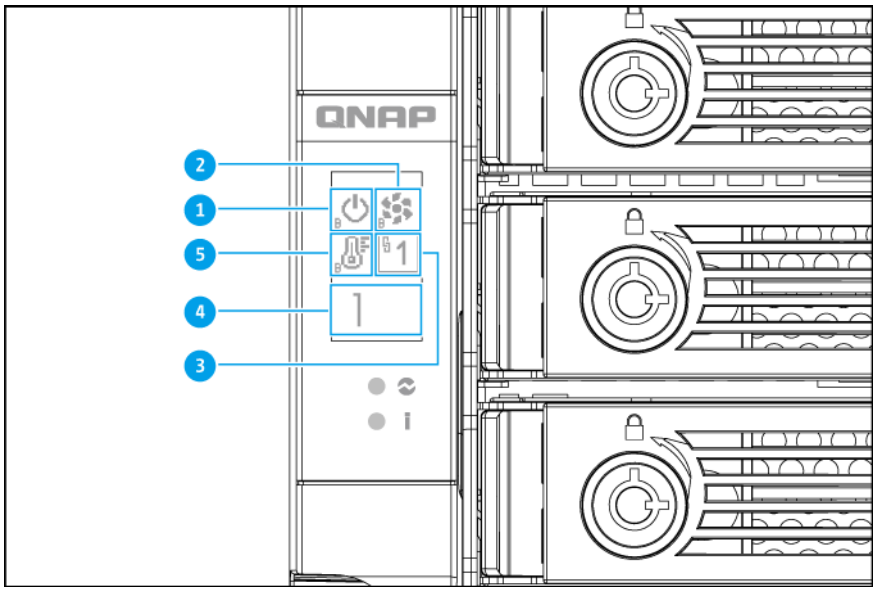
编号	组件	编号	组件
1	系统电源 LED	3	系统状态 LED
2	硬盘 LED	-	-

LED	状态	描述
系统电源	蓝色	控制器开机。
	关	控制器关机。

LED	状态	描述
系统状态	绿色	设备已就绪。
	红色	• 电源故障。 • 系统风扇故障。 • 系统温度过高。 • 磁盘温度过高。 • 电源单元已拔出。
	熄灭	• 所有硬盘都处于待机模式。 • 设备已关机。
云端硬盘	绿色	• JBOD 设备已开机。 • 硬盘可供访问。
	闪烁绿色	正在访问硬盘。
	红色	发生硬盘读/写错误。
	闪烁红色，每秒 5 次	操作系统正在定位硬盘。
	熄灭	未检测到硬盘。

前面板 OLED 显示屏

OLED 显示屏可显示控制器和主要组件的状态。



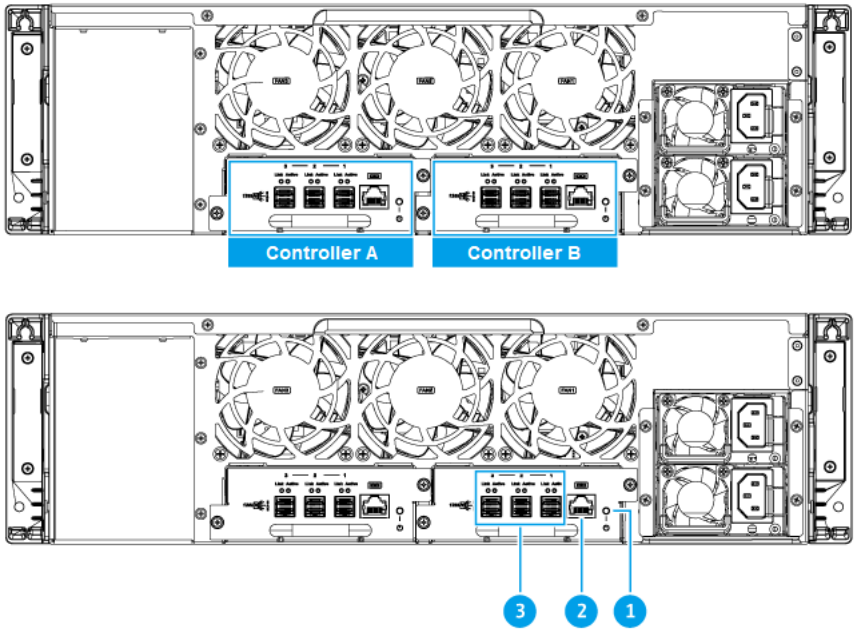
编号	组件	编号	组件
1	控制器电源状态	4	设备 ID
2	风扇状态	5	温度状态
3	SAS 连接器状态	-	-

图标名称	图标	描述
控制器电源状态		• 常亮：控制器已开机。 • 熄灭：控制器已关闭。
控制器风扇状态		• 常亮：控制器中的风扇模块运行正常。 • 闪烁：控制器中的风扇模块运行异常或未安装。 • 熄灭：控制器已关闭。
控制器温度状态		• 常亮：控制器温度正常。 • 闪烁：控制器温度过高或过低。 • 熄灭：控制器已关闭。

控制器 SAS 连接器状态		• 常亮：SAS 连接器状态显示已链接的 SAS 通用端口号。
		• 闪烁：任何物理层中发生错误。可能的错误列表如下。
		  • 其中一个物理层已断开连接或与低速（6 Gbps 或 3 Gbps）链接。
		  • 存在其他链接错误。
		• 熄灭：控制器已关闭。

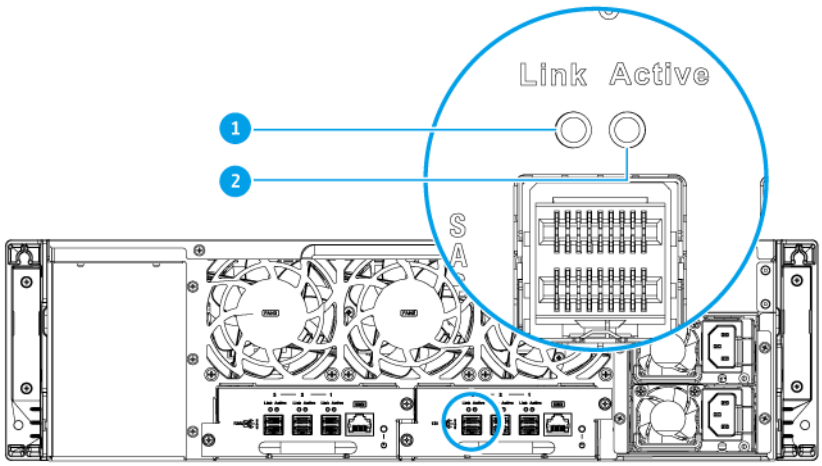
控制器设备 ID		• 设备 ID 由主机配置。 • 设备 ID 表示全局控制器 ID。

后面板



编号	组件	编号	组件
1	控制器电源按钮	3	SFF-8644 端口
2	RJ45 控制台端口 **注** 此端口仅供工程使用。	-	-

后面板 LED



编号	组件	编号	组件
1	Mini-SAS 链路 LED	2	Mini-SAS 活动 LED

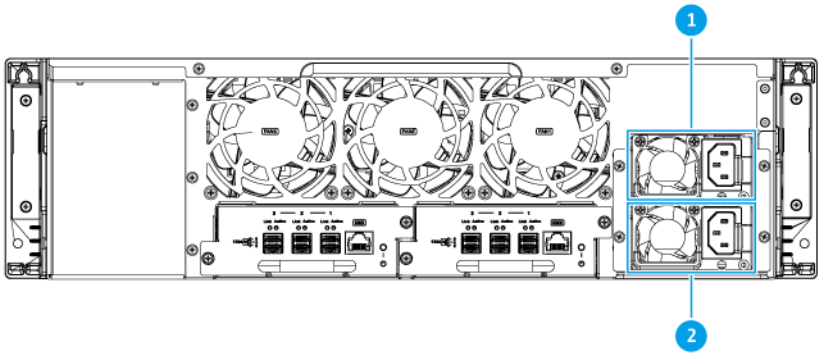
LED	状态	描述
Mini-SAS 链路连接器	绿色	设备已连接至主机。
	橙色	设备未连接至主机。
Mini-SAS 活动连接器	蓝色	设备处于活动状态。
	熄灭	设备处于非活动状态。

存储控制器电源按钮

操作	用户操作	结果
启动电源	按下此按钮一次。	• OLED 面板开启。 • 控制器开机。 **注** 根据您按下的控制器上的按钮，控制器 A 或 B 开机。

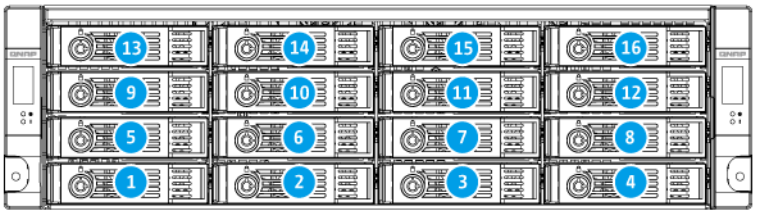
操作	用户操作	结果
关闭电源	按住 4 秒钟。	• OLED 面板关闭。 • 控制器关机。 **注** 根据您按下的控制器上的按钮，控制器 A 或 B 关机。
强制关机	按住此按钮 10 秒钟。	• OLED 面板关闭。 • 控制器关机。 **注** 根据您按下的控制器上的按钮，控制器 A 或 B 关机。 **警告** 仅当存储控制器无响应时才能使用此方法。此操作可能会导致数据丢失。

电源单元



编号	组件	编号	组件
1	电源单元 1	2	电源单元 2

硬盘编号



警告音

时长	频率	描述
长提示音	3（每 5 分钟）	• 系统风扇尚未安装。 • 系统风扇故障。 • 系统温度超过阈值。 **注** 默认的温度警告阈值为 55°C。您可以使用 QNAP JBOD Manager 将该阈值设置为介于 55°C 至 69°C 之间的温度。
	1 次（每秒）	QES 或 QNAP JBOD Manager 正在定位设备。
短提示音	1	• 设备与主机之间的线缆连接已建立。 • 设备与主机之间的线缆连接已移除。

安全信息

以下说明有助于确保个人安全和环境安全。在执行任何操作之前，请仔细阅读这些说明。

一般说明

- 设备应存放在通过器具、锁和钥匙或任何安保措施限制进入的安全场所。
- 只有经过授权并掌握技能的合格人员才能实际接触设备，相关人员需了解所有限制措施、安全预防措施和安装维护流程。
- 为避免潜在伤害或组件的损坏，请务必等硬盘和其他内部系统组件冷却后再触碰。
- 请执行静电放电 (ESD) 规程，以避免可能的人员受伤或组件受损。

电源

- 为降低失火或触电风险，请确保只将电源线连接到接地良好的电源插座。
-

  配备冗余电源的设备可能有一条或多条电源单元 (PSU) 线。为避免受到严重伤害，安装或更换系统组件前，必须由经培训的维修技师从设备拔下所有 PSU 线。

系统电池

- 为避免潜在的电池爆炸、导致人员受伤或组件受损，请确保使用同型电池更换现有电池。
- 请按当地法规或电池制造商的指示正确处置使用过的电池。

运动的部件

-

  转动的风扇叶片：在设备连接到电源时，使您的身体各部位远离正在转动的风扇叶片。
-

  运动的组件：使您的身体各部位远离正在运动的其他组件。

安装要求

类别	项目
环境	• 室温：0˚C 至 40˚C（32 至 104˚F） • 无冷凝相对湿度：5% 至 95% • 湿球温度：27˚C (80.6˚F) • 平坦的防静电表面，无直射阳光、液体或化学药剂
硬件和外围设备	• NAS 或服务器 • 存储硬盘 **提示** 有关兼容硬盘型号的列表，请转到 https://www.qnap.com/compatibility。 • 一条或多条 SFF-8644 或 SFF-8644-至-SFF-8088 连接器线缆 • 主机总线适配器
工具	• 1 号或 2 号十字螺丝刀 • 防静电腕带

设置 JBOD 设备

注
在设置 JBOD 或安装 JBOD 设备组件之前，请仔细阅读所有安全要求和信息。

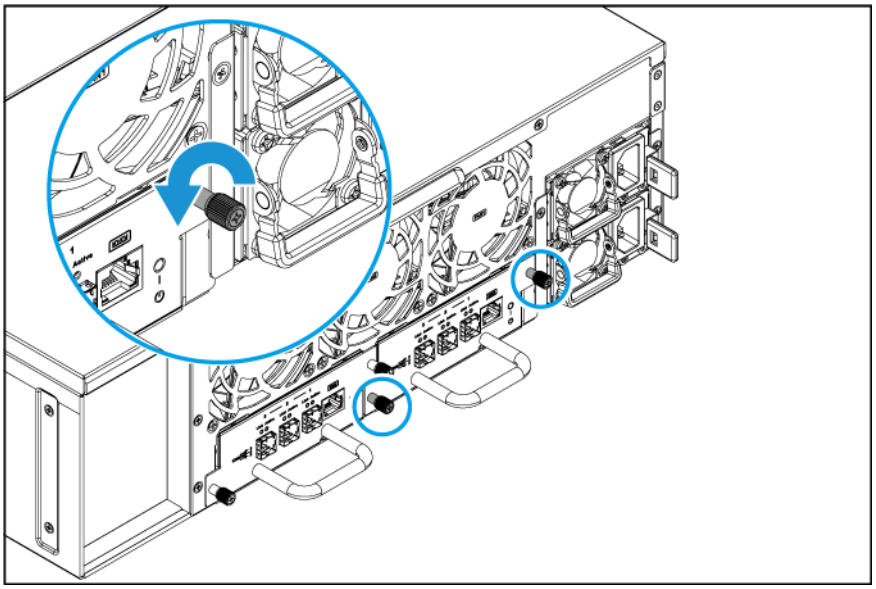
1. 将 JBOD 设备置于符合要求的环境中。
   有关详细信息，请参见安装要求。
2. 将 JBOD 设备安装在机架上。
   有关详细信息，请参见导轨套件。
3. 安装硬盘。
   有关详细信息，请参见以下主题：
   - 在 3.5 英寸托盘上安装 3.5 英寸硬盘
   - 在 3.5 英寸托盘上安装 2.5 英寸硬盘或固态硬盘
4. 连接电源线和所有适用的线缆。
5. 将 JBOD 设备连接到 NAS 或服务器。
   有关详细信息，请参见以下主题：
   - 将 TL-R1620Sdc 连接到 NAS
   - 将 TL-R1620Sdc 连接到服务器
6. 启动 JBOD 设备电源。

3. 硬件安装

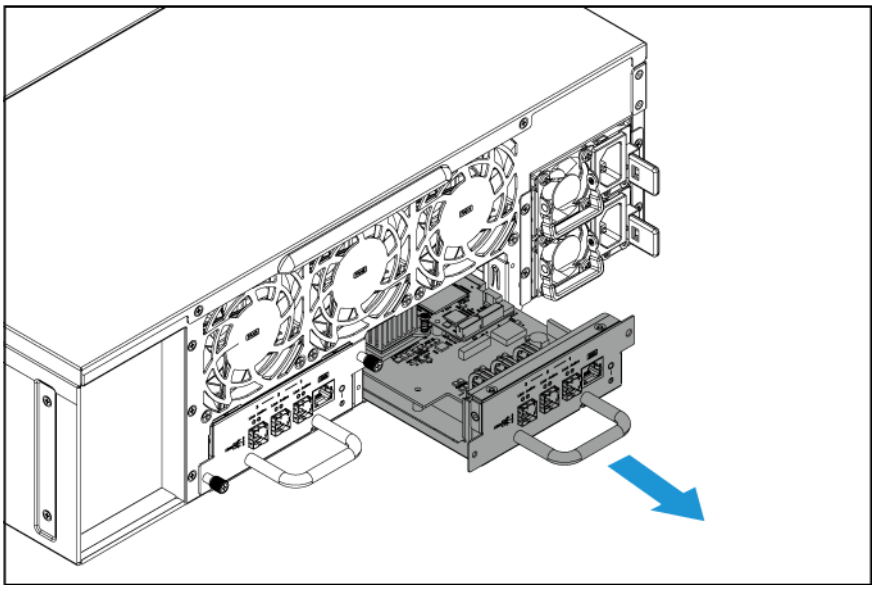
本节提供有关安装控制器、安装硬盘、将 JBOD 设备连接到 NAS 或服务器、热插拔冗余电源单元和导轨套件的信息。

拆卸控制器

1. 关闭 JBOD 设备电源。
2. 从插座上拔下电源线。
3. 拔掉所有线缆和外接部件。
4. 拆卸控制器。
   a. 松开螺丝

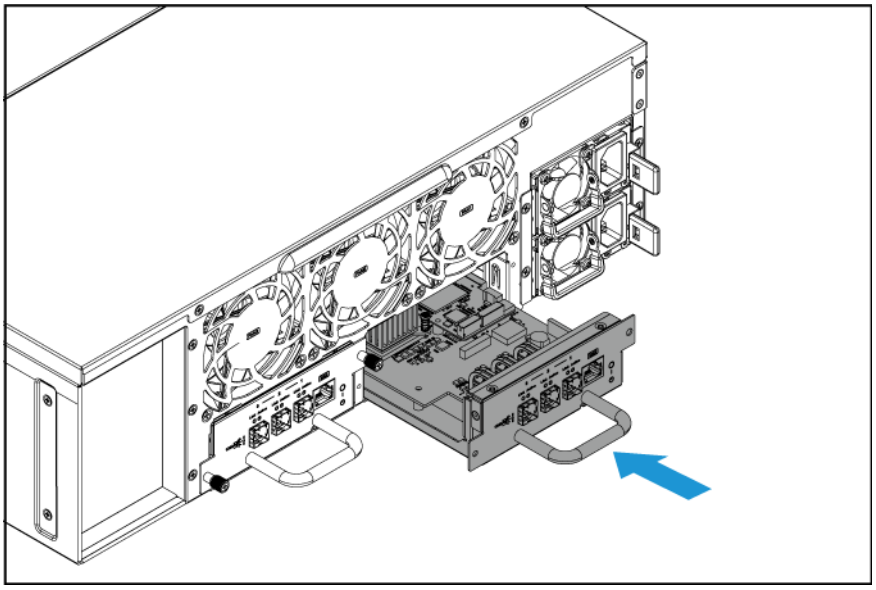


   b. 拉动手柄以拉出控制器。

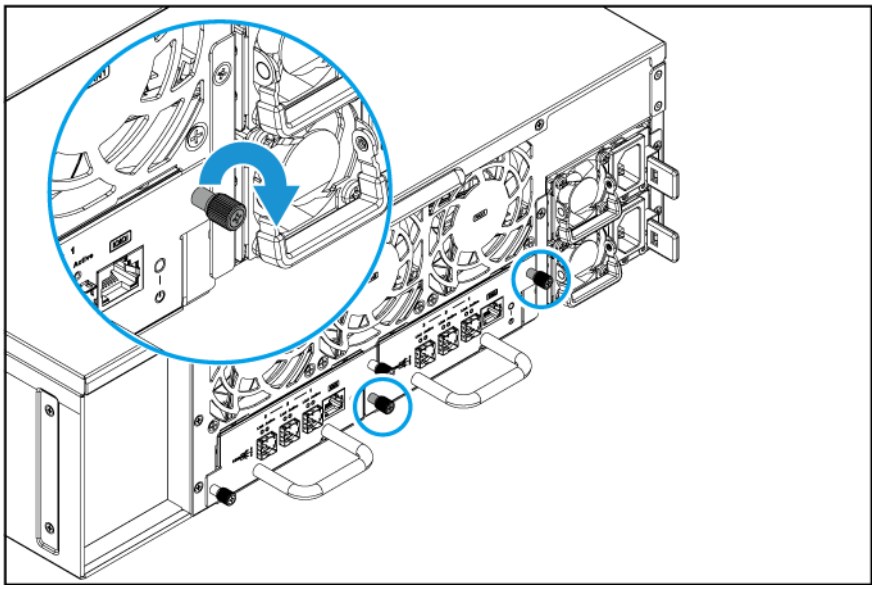


安装控制器

1. 将控制器装入 JBOD 设备。
   a. 将控制器插入机箱。



2. 拧紧螺丝。



3. 连接所有线缆和外接部件。
4. 启动设备。

硬盘安装

TL-R1620Sdc 兼容 3.5 英寸硬盘、2.5 英寸硬盘以及 2.5 英寸固态硬盘。

在 3.5 英寸托盘上安装 3.5 英寸硬盘

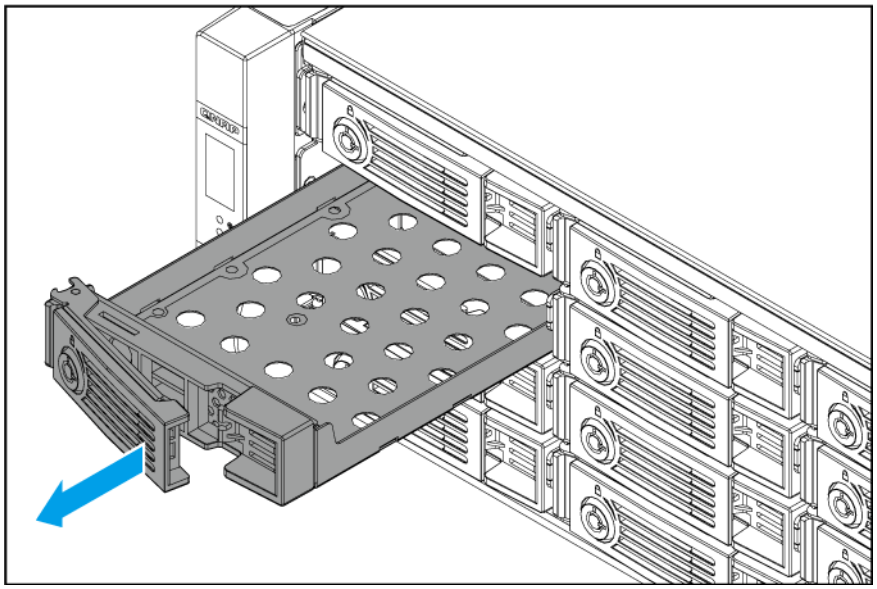
警告

- 安装硬盘将删除硬盘上的所有数据。
- 请执行静电放电 (ESD) 规程，以避免组件损坏。
-

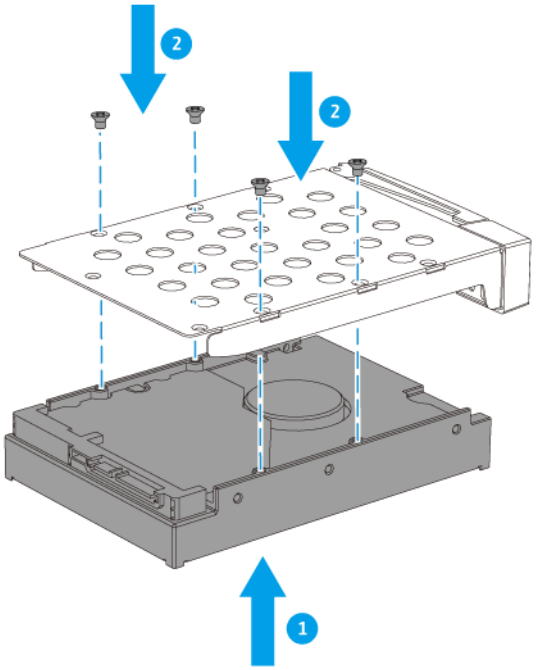
  转动的风扇叶片：使您的双手和身体其他部位远离正在转动的风扇叶片。
-

  其他运动的组件：使您的双手和身体其他部位远离正在运动的其他组件。

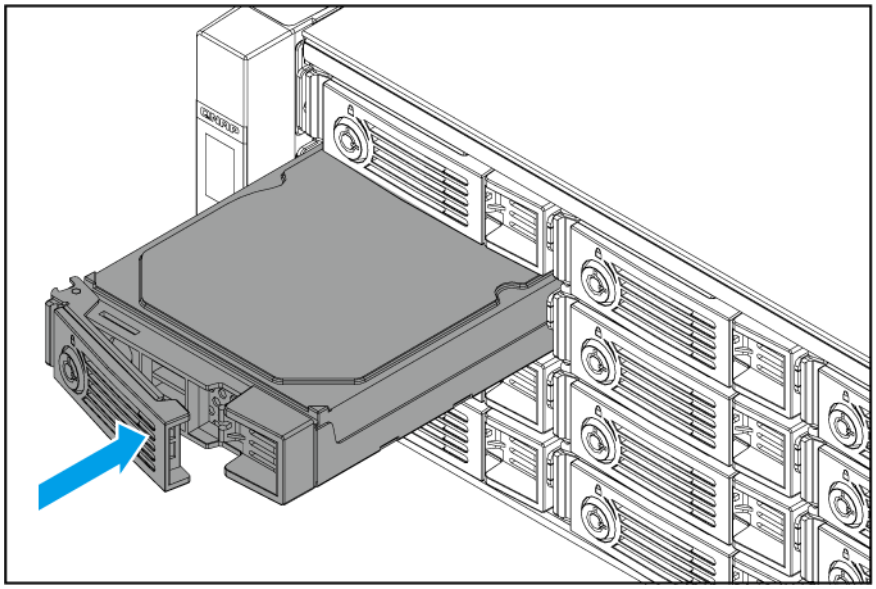
1. 关闭 JBOD 设备电源。
2. 取下硬盘托盘。
   a. 拉动手柄以松开托盘。
   b. 拉出托盘。



3. 将硬盘安装到托盘上。
   a. 将硬盘放在托盘上，使硬盘底部的孔与托盘底部的孔对齐。
   b. 安装螺丝。



4. 将托盘装入硬盘架。
   a. 将托盘插入硬盘架。
   b. 推动手柄。



5. 启动 JBOD 设备电源。

注
JBOD 设备最长可能需要 30 秒才能检测到新设备。

在 3.5 英寸托盘上安装 2.5 英寸硬盘或固态硬盘

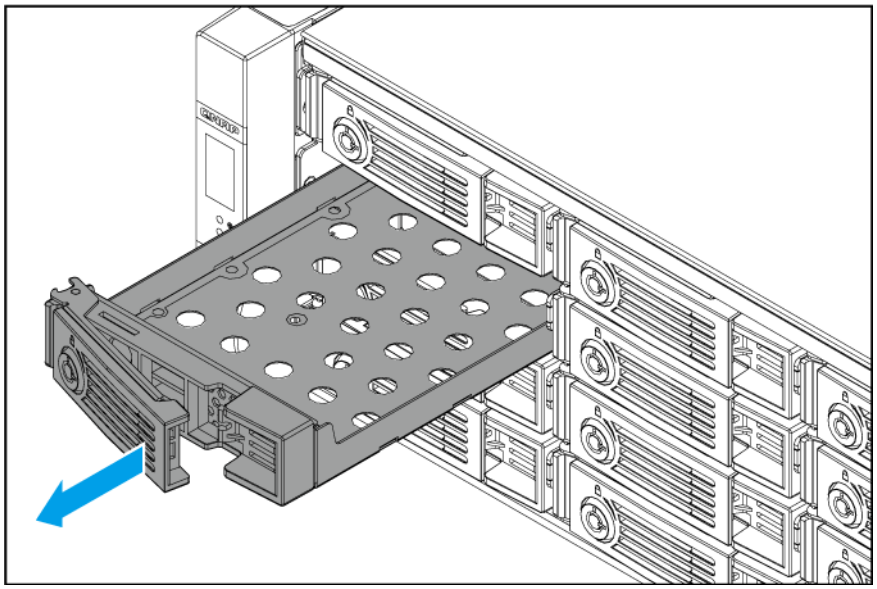
警告

- 安装硬盘将删除硬盘上的所有数据。
- 请执行静电放电 (ESD) 规程，以避免组件损坏。
-

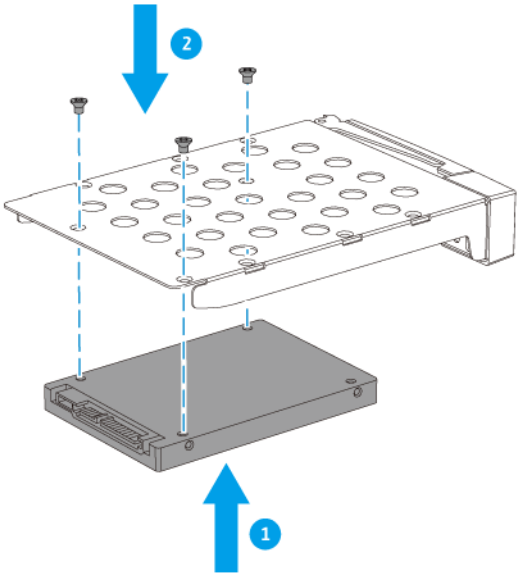
  转动的风扇叶片：使您的双手和身体其他部位远离正在转动的风扇叶片。
-

  其他运动的组件：使您的双手和身体其他部位远离正在运动的其他组件。

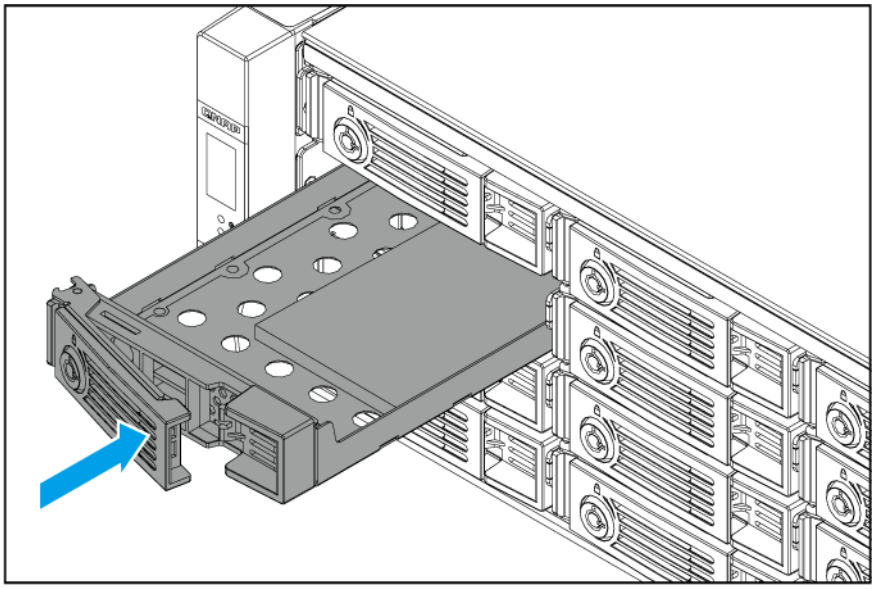
1. 关闭 JBOD 设备电源。
2. 取下硬盘托盘。
   a. 拉动手柄以松开托盘。
   b. 拉出托盘。



3. 将硬盘安装到托盘上。
   a. 将硬盘放在托盘上，使硬盘底部的孔与托盘底部的孔对齐。
   b. 安装螺丝。



4. 将托盘装入硬盘架。
   a. 将托盘插入硬盘架。
   b. 推动手柄。



5. 启动 JBOD 设备电源。

注
JBOD 设备最长可能需要 30 秒才能检测到新设备。

JBOD 连接

本章提供有关 JBOD 设备的多个连接的信息。

将 TL-R1620Sdc 连接到 NAS

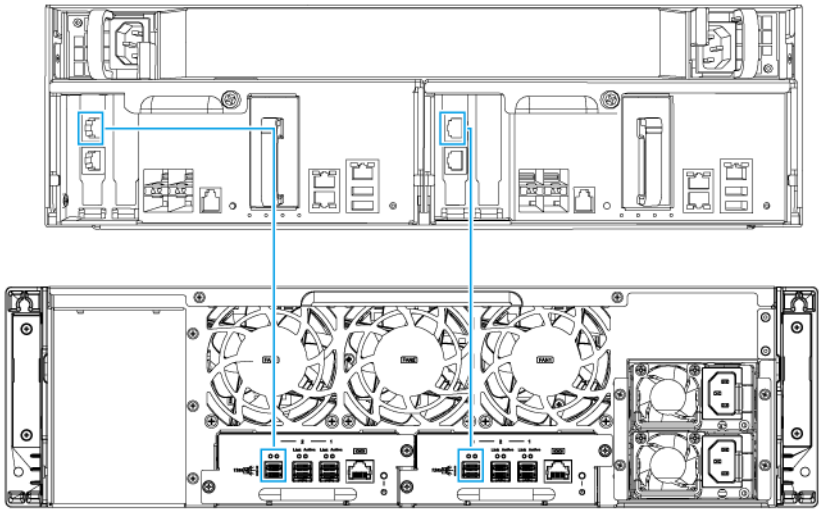
NAS 必须运行 QES 2.1.1（或更高版本），并且需要 Mini-SAS HD 端口 (SAS 12Gb/s SFF-8644)、Mini-SAS 端口 (SAS 6Gb/s SFF-8088) 或安装具有所述端口类型（SAS-12G2E、QXP-820S-B3408 或 QXP-1620S-B3616W）的 SAS 扩展卡。

有关 NAS 所支持的最大扩展单元数量的详细信息，请转到 https://www.qnap.com/go/compatibility-expansion。

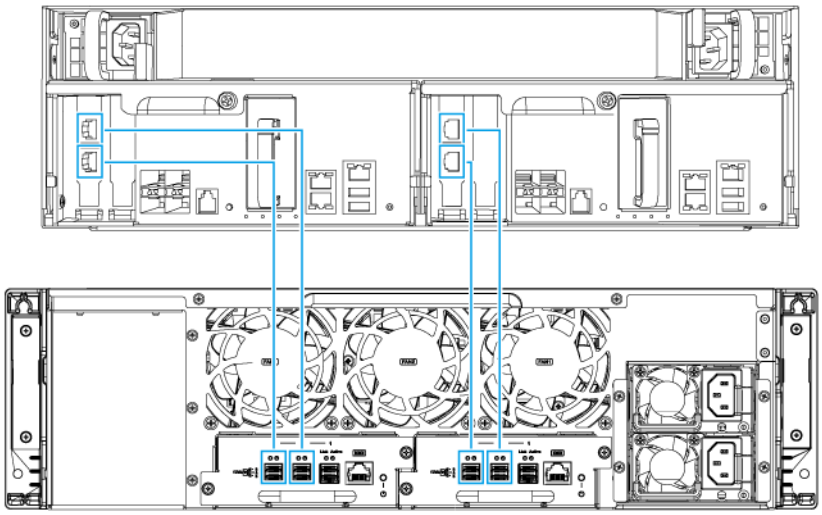
重要
为了您的安全，请确保 NAS 和 JBOD 设备在启动前均已关机。

1. 将 JBOD 设备连接到 NAS。
   a. 将一条或多条 SFF-8644 连接器线缆连接到 JBOD 设备上的 SFF-8644 端口。
   b. 将一条或多条 SFF-8644 或 SFF-8644-至-SFF-8088 连接器线缆连接到安装在 NAS 中的主机总线适配器上的 SFF-8644 或 SFF-8088 端口。

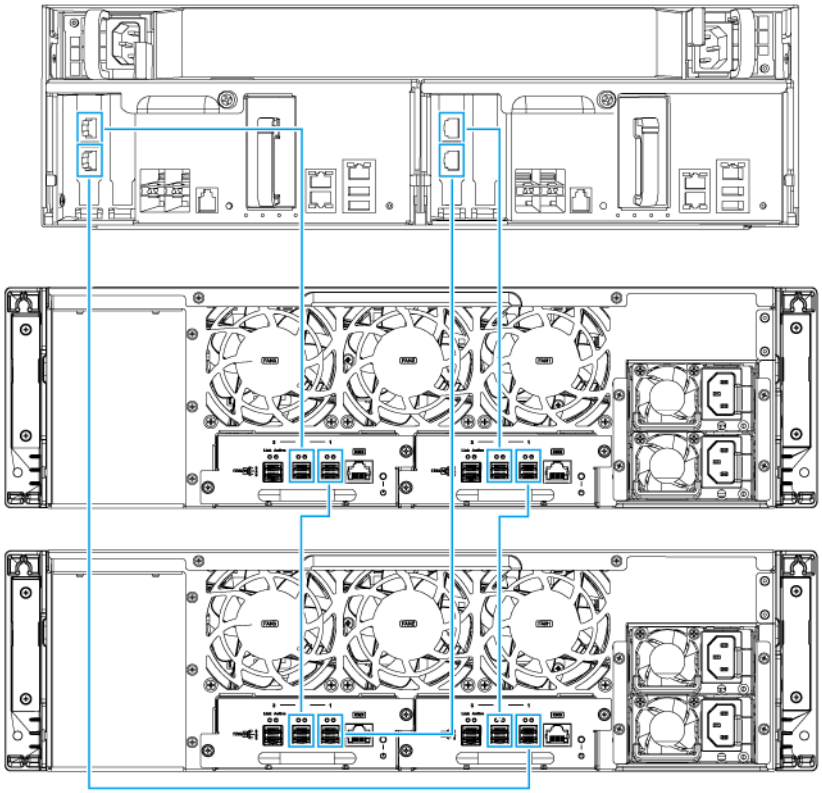
注
请参阅 NAS 用户指南的硬件安装部分，了解安装扩展卡的说明。



单通道配置



单通道链路聚合配置



双通道配置

2. 启动 JBOD 设备电源。
3. 启动 NAS 电源。
4. 确认 NAS 能够识别 JBOD 设备。
   a. 以管理员身份登录 QES。
   b. 转到**主菜单** > **存储空间总管** > **概述** > **系统**。
   c. 确认扩展单元已列出。

将 TL-R1620Sdc 连接到服务器

重要
为了您的安全，请确保服务器和 JBOD 设备在启动前均已关机。

1. 将 JBOD 设备连接到服务器。
   a. 将一条或多条 SFF-8644 连接器线缆连接到 JBOD 设备上的 SFF-8644 端口。
   b. 将一条或多条 SFF-8644 连接器线缆连接到服务器上的 SFF-8644 端口。

注
有关有效连接配置的说明，请参见将 TL-R1620Sdc 连接到 NAS。

c. 将其他 JBOD 设备连接到服务器。

2. 启动 JBOD 设备电源。
3. 启动服务器电源。
4. 确认服务器能够识别该 JBOD 设备。

a. 转到服务器的磁盘管理实用程序或在 Windows 或 Linux 中打开 QNAP External RAID Manager。

注
要下载 QNAP JBOD Manager，请转到 https://download.qnap.com。

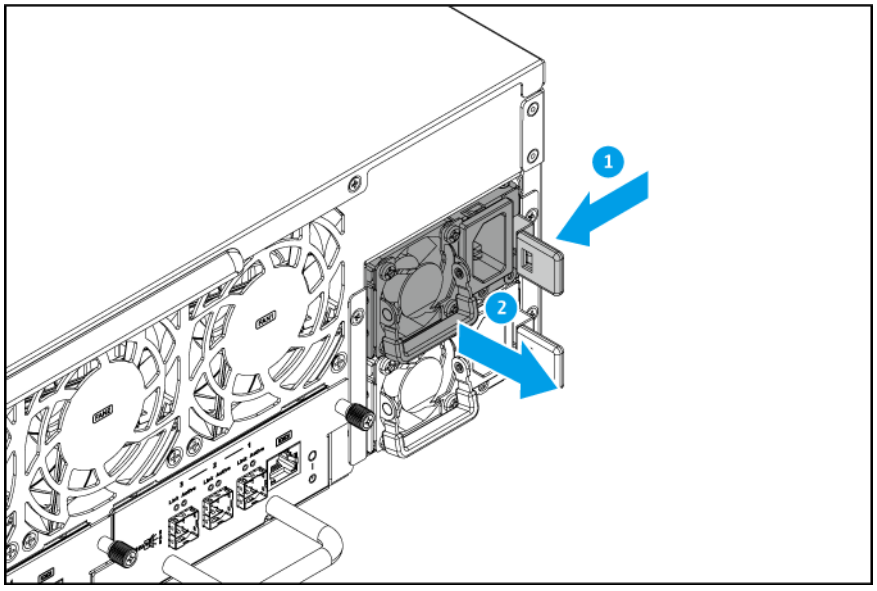
b. 确认 JBOD 设备已列出。

热插拔冗余电源单元

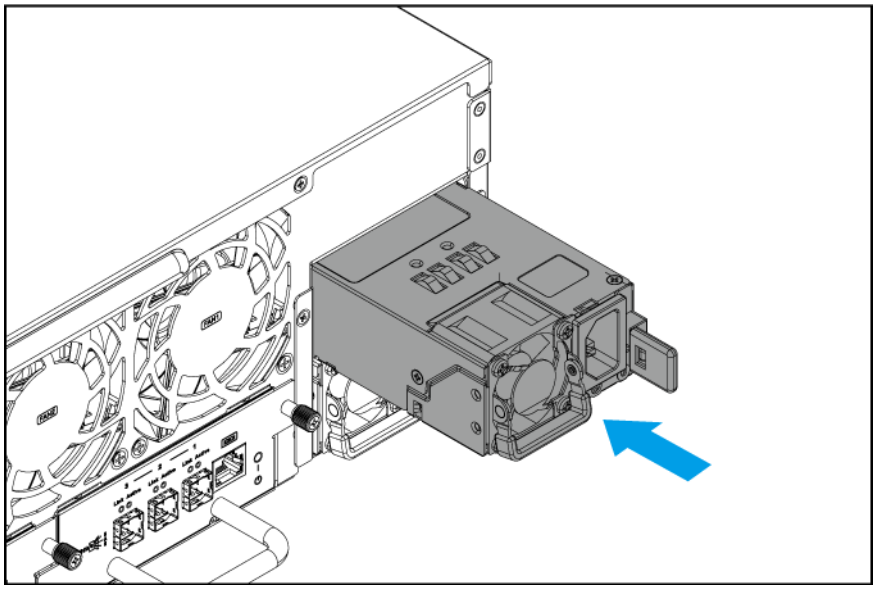
警告

NAS 可能有一条或多条冗余电源单元 (PSU) 线。为避免受到严重伤害，安装或更换系统组件前，必须由经培训的维修技师拔下所有 PSU 线。

1. 关闭 JBOD 设备电源。
2. 从插座和要更换的电源单元 (PSU) 上拔下电源线。
3. 向手柄方向紧按闩锁并拉出 PSU。



4. 插入新 PSU。



5. 将电源线连接到 PSU 和插座。
6. 启动 JBOD 电源。

导轨套件

导轨套件未随 NAS 提供，必须单独购买。有关详细信息，请联系授权经销商或转到 http://shop.qnap.com。

型号	兼容的导轨套件
TL-R1620Sdc	RAIL-B02

安装信息位于导轨套件包中。

4. 故障排除

本章介绍基本故障排除信息。

强制存储空间总管或 QNAP JBOD Manager 识别 JBOD 设备

如果"存储空间总管"或 QNAP JBOD Manager 在运行期间找不到 JBOD 设备，则硬盘或数据可能有故障。

1. 关闭 JBOD 设备电源。
2. 取下所有硬盘。
3. 启动 JBOD 设备电源。
4. 使用"存储空间总管"或 QNAP JBOD Manager 找到 JBOD 设备。
5. 重新插入硬盘。
6. 继续操作。

热插拔故障硬盘

连接到 QES NAS 时，JBOD 设备支持在以下情况下热插拔硬盘：

RAID 类型	磁盘数量	情形
RAID 1	2	一个成员硬盘有故障。
RAID 5	3 至 16	一个成员硬盘有故障。
RAID 6	5 至 16	一个或两个成员硬盘有故障。
RAID 10	4 至 16（创建） 2 至 16（扩充）	处于两个不同对中的一个或两个成员硬盘有故障。
RAID 50	3 至 16	每个子组的一个磁盘有故障。
RAID 60	5 至 16	每个子组的两个磁盘有故障。
三重镜像	3 的倍数。（例如，3、6、9、12 个磁盘等。）	一个或两个成员硬盘有故障。
RAID-TP	8 至 16	一个、两个或三个成员硬盘有故障。

注
QES 最多只支持每个 RAID 组 16 个成员硬盘。

1. 登录 QES。
2. 转到**主菜单** > **存储空间总管** > **存储** > **磁盘**。
3. 找到发生故障的硬盘。
4. 准备一个与故障硬盘具有相同或更大容量的新硬盘。
5. 从设备中取下故障硬盘。
6. 等待 20 秒或设备发出两声提示音。
7. 从硬盘托盘中取下故障硬盘。
8. 将新硬盘插入硬盘托盘中。

9. 安装新硬盘。
   JBOD 设备发出两次提示音。
10. 等待 30 秒或 JBOD 设备发出两次提示音。
11. 转到**主菜单** > **存储空间总管** > **存储空间**。
12. 找到新硬盘并确认其状态。

支持和其他资源

QNAP 提供了以下资源：

资源	URL
文档	https://download.qnap.com
兼容性列表	https://www.qnap.com/compatibility
NAS 迁移兼容性	https://www.qnap.com/en/nas-migration
扩展单元兼容性	http://www.qnap.com/go/compatibility-expansion
服务门户	https://service.qnap.com
产品支持状态	https://www.qnap.com/en/product/eol.php
下载	https://download.qnap.com
社区论坛	https://forum.qnap.com
QNAP 配件商店	https://shop.qnap.com

5. 术语表

QES

QNAP NAS 操作系统

QNAP JBOD Manager

适用于 Windows、Linux 和 macOS 的软件实用程序，可用于查看和配置 QNAP JBOD 设备

存储空间总管

可用于查看和配置连接到 QNAP NAS 的 QNAP 外部存储设备的 QES 实用工具

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Version 3, 29 June 2007

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6. Conveying Modified Source Versions.
You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

   a. The work must carry prominent notices stating that you modified it, and giving a relevant date.

   b. The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to “keep intact all notices”.

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7. Conveying Non-Source Forms.
You may convey a covered work in object code form under the terms of sections 4 and 5, provided that you also convey the machine-readable Corresponding Source under the terms of this License, in one of these ways:

   a. Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.

   b. Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.

   c. Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.

   d. Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to

find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.

e. Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.
A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.
A "User Product" is either (1) a "consumer product", which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, "normally used" refers to a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.
"Installation Information" for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.
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