



# **Batteries**

## **E-Series Systems**

NetApp  
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# Batteries

## Requirements for E2800 battery replacement

Before you replace an E2800 battery, review the requirements and considerations.

Each controller canister includes a battery that preserves cached data if the AC power fails.

### Recovery Guru alerts

If the Recovery Guru in SANtricity System Manager reports one of following statuses, you must replace the affected battery:

- Battery Failed
- Battery Replacement Required

From SANtricity System Manager, review the details in the Recovery Guru to confirm that there is an issue with a battery and to ensure no other items must be addressed first.

### Procedure overview

To protect your data, you must replace a failed battery as soon as possible.

The following is an overview of the steps required to replace a battery in an E2800 controller:

1. Prepare for replacement, following the appropriate steps for a duplex or simplex configuration.
2. Remove the controller canister.
3. Remove the failed battery.
4. Install the new battery.
5. Re-install the controller canister.
6. Complete the replacement, following the appropriate steps for a duplex or simplex configuration.

### Duplex or simplex configuration

The steps to replace a battery depend on whether you have one or two controllers, as follows:

If your storage array has...	You must...
Two controllers (duplex)	<ol style="list-style-type: none"><li>1. Take the controller offline.</li><li>2. Remove the controller canister.</li><li>3. Replace the battery.</li><li>4. Replace the controller canister.</li><li>5. Bring the controller online.</li></ol>

If your storage array has...	You must...
One controller (simplex)	<ol style="list-style-type: none"> <li>1. Stop host I/O operations.</li> <li>2. Power down the controller shelf.</li> <li>3. Remove the controller canister.</li> <li>4. Replace the battery.</li> <li>5. Replace the controller canister.</li> <li>6. Apply power to the controller shelf.</li> </ol>

## Requirements for replacing a battery

If you plan to replace a failed battery, you must have:

- A replacement battery.
- An ESD wristband, or you have taken other antistatic precautions.
- Labels to identify each cable that is connected to the controller canister.
- A management station with a browser that can access SANtricity System Manager for the controller. (To open the System Manager interface, point the browser to the controller's domain name or IP address.)

## Prepare to replace E2800 battery

The steps to prepare for battery replacement depend on whether you have a duplex configuration (two controllers) or a simplex configuration (one controller).

- For duplex configurations, see [Place controller offline \(duplex\)](#).
- For simplex configurations, see [Power down the controller shelf \(simplex\)](#).

### Before you begin

- Verify that no volumes are in use or that you have a multipath driver installed on all hosts using these volumes.
- Review the [Requirements for E2800 battery replacement](#).

### Place controller offline (duplex)

If you have a duplex configuration, you must place the affected controller offline so you can safely remove the failed battery. The controller that you are not placing offline must be online (in the optimal state).



Perform this task only if your storage array has two controllers (duplex configuration).

### Steps

1. From SANtricity System Manager, review the details in the Recovery Guru to confirm that there is an issue with a battery and to ensure no other items must be addressed first.
2. From the Details area of the Recovery Guru, determine which battery to replace.
3. Back up the storage array's configuration database using SANtricity System Manager.

If a problem occurs when you remove a controller, you can use the saved file to restore your configuration.

The system will save the current state of the RAID configuration database, which includes all data for volume groups and disk pools on the controller.

- From System Manager:
  - a. Select **Support > Support Center > Diagnostics**.
  - b. Select **Collect Configuration Data**.
  - c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **configurationData-  
<arrayName>-<dateTime>.7z**.

- Alternatively, you can back up the configuration database by using the following CLI command:

```
save storageArray dbmDatabase sourceLocation=onboard contentType=all  
file="filename";
```

#### 4. Collect support data for your storage array using SANtricity System Manager.

If a problem occurs when you remove a controller, you can use the saved file to troubleshoot the issue. The system will save inventory, status, and performance data about your storage array in a single file.

- a. Select **Support > Support Center > Diagnostics**.
- b. Select **Collect Support Data**.
- c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **support-data.7z**.

#### 5. If the controller is not already offline, take it offline now using SANtricity System Manager.

- From SANtricity System Manager:
  - a. Select **Hardware**.
  - b. If the graphic shows the drives, select **Show back of shelf** to show the controllers.
  - c. Select the controller that you want to place offline.
  - d. From the context menu, select **Place offline**, and confirm that you want to perform the operation.



If you are accessing SANtricity System Manager using the controller you are attempting to take offline, a SANtricity System Manager Unavailable message is displayed. Select **Connect to an alternate network connection** to automatically access SANtricity System Manager using the other controller.

- Alternatively, you can take the controllers offline by using the following CLI commands:

**For controller A:** `set controller [a] availability=offline`

**For controller B:** `set controller [b] availability=offline`

#### 6. Wait for SANtricity System Manager to update the controller's status to offline.

#### 7. Go to [Remove E2800 controller canister](#).



Do not begin any other operations until after the status has been updated.

## Power down the controller shelf (simplex)

If you have a simplex configuration, power down the controller shelf so you can safely remove the failed battery.



Perform this task only if your storage array has one controller (simplex configuration).

### Steps

1. Back up the storage array's configuration database using SANtricity System Manager.

If a problem occurs when you remove a controller, you can use the saved file to restore your configuration. The system will save the current state of the RAID configuration database, which includes all data for volume groups and disk pools on the controller.

- From System Manager:
  - a. Select **Support > Support Center > Diagnostics**.
  - b. Select **Collect Configuration Data**.
  - c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **configurationData-  
<arrayName>-<dateTime>.7z**.

- Alternatively, you can back up the configuration database by using the following CLI command:

```
save storageArray dbmDatabase sourceLocation=onboard contentType=all  
file="filename";
```

2. Collect support data for your storage array using SANtricity System Manager.

If a problem occurs when you remove a controller, you can use the saved file to troubleshoot the issue. The system will save inventory, status, and performance data about your storage array in a single file.

- a. Select **Support > Support Center > Diagnostics**.
- b. Select **Collect Support Data**.
- c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **support-data.7z**.

3. Ensure that no I/O operations are occurring between the storage array and all connected hosts. For example, you can perform these steps:
  - a. Stop all processes that involve the LUNs mapped from the storage to the hosts.
  - b. Ensure that no applications are writing data to any LUNs mapped from the storage to the hosts.
  - c. Unmount all file systems associated with volumes on the array.



The exact steps to stop host I/O operations depend on the host operating system and the configuration, which are beyond the scope of these instructions. If you are not sure how to stop host I/O operations in your environment, consider shutting down the host.



**Possible data loss** — If you continue this procedure while I/O operations are occurring, you might lose data.

4. Wait for any data in cache memory to be written to the drives.

The green Cache Active LED on the back of the controller is on when cached data needs to be written to the drives. You must wait for this LED to turn off.

5. From the home page of SANtricity System Manager, select **View Operations in Progress**.
6. Confirm that all operations have completed before continuing with the next step.
7. Turn off both power switches on the controller shelf.
8. Wait for all LEDs on the controller shelf to turn off.
9. Go to [Remove E2800 controller canister](#).

## Remove E2800 controller canister

You need to remove the controller canister from the controller shelf, so you can remove the battery.

When you remove a controller canister, you must disconnect all cables. Then, you can slide the controller canister out of the controller shelf.

### What you'll need

- An ESD wristband, or you have taken other antistatic precautions.
- Labels to identify each cable that is connected to the controller canister.

### Steps

1. Put on an ESD wristband or take other antistatic precautions.
2. Label each cable that is attached to the controller canister.
3. Disconnect all the cables from the controller canister.



To prevent degraded performance, do not twist, fold, pinch, or step on the cables.

4. If the host ports on the controller canister use SFP+ transceivers, leave them installed.
5. Confirm that the Cache Active LED on the back of the controller is off.
6. Squeeze the latch on the cam handle until it releases, and then open the cam handle to the right to release the controller canister from the shelf.

The following figure is an example of an E2812 controller shelf, E2824 controller shelf, or EF280 flash array:



(1) *Controller canister*

(2) *Cam handle*

The following figure is an example of an E2860 controller shelf:





(1) *Controller canister*

(2) *Cam handle*

7. Using two hands and the cam handle, slide the controller canister out of the shelf.



Always use two hands to support the weight of a controller canister.

If you are removing the controller canister from an E2812 controller shelf, E2824 controller shelf or EF280 flash array, a flap swings into place to block the empty bay, helping to maintain air flow and cooling.

8. Turn the controller canister over, so that the removable cover faces up.

9. Place the controller canister on a flat, static-free surface.

10. Go to [Remove failed E2800 battery](#).

## Remove failed E2800 battery

After removing the controller canister from the controller shelf, you can remove the battery.

### Steps

1. Remove the controller canister's cover by pressing down on the button and sliding the cover off.
2. Confirm that the green LED inside the controller (between the battery and the DIMMs) is off.

If this green LED is on, the controller is still using battery power. You must wait for this LED to go off before removing any components.



(1) Internal Cache Active

(2) Battery

3. Locate the blue release latch for the battery.
4. Unlatch the battery by pushing the release latch down and away from the controller canister.



(1) Battery release latch

(2) Battery

5. Lift up on the battery, and slide it out of the controller canister.
6. Follow the appropriate procedures for your location to recycle or dispose of the failed battery.



To comply with International Air Transport Association (IATA) regulations, never ship a lithium battery by air unless it is installed within the controller shelf.

7. Go to [Install new battery](#).

## Install new E2800 battery

After removing the failed battery, you can install the new one.

### What you'll need

- The replacement battery.
- A flat, static-free surface.

### Steps

1. Unpack the new battery, and set it on a flat, static-free surface.



To comply with IATA safety regulations, replacement batteries are shipped with a state of charge (SoC) of 30 percent or less. When you reapply power, keep in mind that write caching will not resume until the replacement battery is fully charged and it has completed its initial learn cycle.

2. Orient the controller canister so that the slot for the battery faces toward you.
3. Insert the battery into the controller canister at a slight downward angle.

You must insert the metal flange at the front of the battery into the slot on the bottom of the controller canister and slide the top of the battery beneath the small alignment pin on the left side of the canister.

4. Move the battery latch up to secure the battery.

When the latch clicks into place, the bottom of the latch hooks into a metal slot on the chassis.



(1) *Battery release latch*

(2) *Battery*

5. Turn the controller canister over to confirm that the battery is installed correctly.



**Possible hardware damage** — The metal flange at the front of the battery must be completely inserted into the slot on the controller canister (as shown in the first figure). If the battery is not installed correctly (as shown in the second figure), the metal flange might contact the controller board, causing damage to the controller when you apply power.

- **Correct** — The battery's metal flange is completely inserted in the slot on the controller:



- **Incorrect** — The battery's metal flange is not inserted into the slot on the controller:



6. Go to [Re-install E2800 controller canister](#).

## Re-install E2800 controller canister

Reinstall the controller canister into the controller shelf after installing the new battery.

### Steps

1. Reinstall the cover on the controller canister by sliding the cover from back to front until the button clicks.
2. Turn the controller canister over, so that the removable cover faces down.
3. With the cam handle in the open position, slide the controller canister all the way into the controller shelf.





(1) Controller canister

(2) Cam handle



(1) *Controller canister*

(2) *Cam handle*

4. Move the cam handle to the left to lock the controller canister in place.
5. Reconnect all the cables.
6. Go to [Complete E2800 battery replacement](#).

## Complete E2800 battery replacement

The steps to complete battery replacement depend on whether you have a duplex configuration (two controllers) or a simplex configuration (one controller).

- For duplex configurations, see [Place controller online \(duplex\)](#).
- For simplex configurations, see [Power up controller \(simplex\)](#).

### Place controller online (duplex)

Place the controller online to confirm the storage array is working correctly. Then, you can collect support data and resume operations.



Perform this task only if your storage array has two controllers.

#### Steps

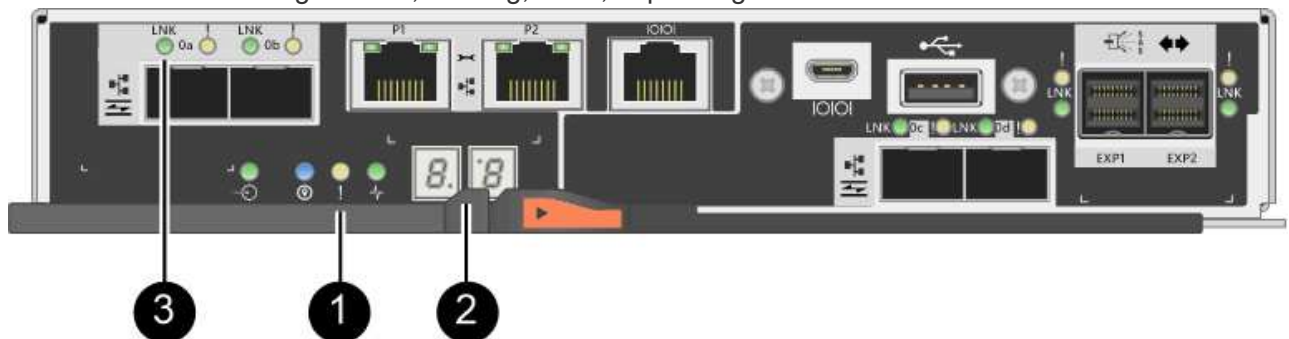
1. As the controller boots, check the controller LEDs and the seven-segment display.



The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.

When communication with the other controller is reestablished:

- The seven-segment display shows the repeating sequence **OS**, **OL**, **blank** to indicate that the controller is offline.
- The amber Attention LED remains lit.
- The Host Link LEDs might be on, blinking, or off, depending on the host interface.



(1) *Attention LED (amber)*

(2) *Seven-segment display*

### (3) Host Link LEDs

#### 2. Bring the controller online using SANtricity System Manager.

- From SANtricity System Manager:
  - a. Select **Hardware**.
  - b. If the graphic shows the drives, select **Show back of shelf**.
  - c. Select the controller you want to place online.
  - d. Select **Place Online** from the context menu, and confirm that you want to perform the operation.

The system places the controller online.

- Alternatively, you can bring the controller back online by using the following CLI commands:

**For controller A:** `set controller [a] availability=online;`

**For controller B:** `set controller [b] availability=online;`

#### 3. When the controller is back online, confirm that its status is Optimal, and check the controller shelf's Attention LEDs.

If the status is not Optimal or if any of the Attention LEDs are on, confirm that all cables are correctly seated, and check that the battery and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the battery.



If you cannot resolve the problem, contact technical support.

#### 4. If needed, collect support data for your storage array using SANtricity System Manager.

- a. Select **Support > Support Center > Diagnostics**.
- b. Select **Collect Support Data**.
- c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **support-data.7z**.

### What's next?

Your battery replacement is complete. You can resume normal operations.

## Power up controller (simplex)

Power up the controller shelf to confirm that it is working correctly. Then, you can collect support data and resume operations.



Perform this task only if your storage array has one controller.

### Steps

1. Turn on the two power switches at the back of the controller shelf.
  - Do not turn off the power switches during the power-on process, which typically takes 90 seconds or less to complete.
  - The fans in each shelf are very loud when they first start up. The loud noise during start-up is normal.



2. As the controller boots, check the controller LEDs and seven-segment display.
  - The seven-segment display shows the repeating sequence **OS**, **Sd**, **blank** to indicate that the controller is performing Start-of-day (SOD) processing. After a controller has successfully booted up, its seven-segment display should show the tray ID.
  - The amber Attention LED on the controller turns on and then turns off, unless there is an error.
  - The green Host Link LEDs turn on.



The figure shows an example controller canister. Your controller might have a different number and a different type of host ports.



- (1) Attention LED (amber)
- (2) Seven-segment display
- (3) Host Link LEDs

3. Confirm that the controller's status is Optimal, and check the controller shelf's Attention LEDs.

If the status is not Optimal or if any of the Attention LEDs are on, confirm that all cables are correctly seated, and check that the battery and the controller canister are installed correctly. If necessary, remove and reinstall the controller canister and the battery.



If you cannot resolve the problem, contact technical support.

4. If needed, collect support data for your storage array using SANtricity System Manager.
  - a. Select **Support** > **Support Center** > **Diagnostics**.
  - b. Select **Collect Support Data**.
  - c. Click **Collect**.

The file is saved in the Downloads folder for your browser with the name, **support-data.7z**.

### What's next?

Your battery replacement is complete. You can resume normal operations.

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