Toolwell

North American Manufacturer's Rep for JUNG machine skates

SAFETY CONSIDERATIONS

TECHNICAL DOCUMENT

Risk Assessment & Contingency Plan for High-Stakes Move

Standard Operating & Emergency Recovery Protocols for Critical Loads and Nuclear Material Transport

Equipment Focus: Battery-Powered Machine Skates

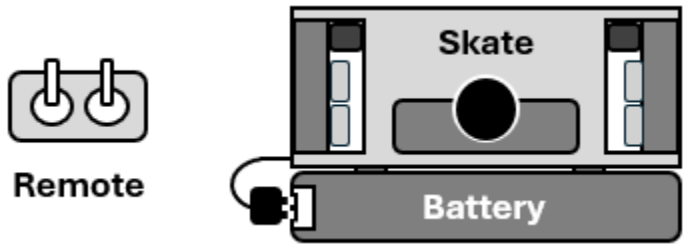
Document ID:	Date:	Classification:
TW-CP-2026-05	**May 28, 2026**	**SAFETY CRITICAL**

Purpose: This document outlines risks and recovery protocols for equipment failure during the transport of critical loads (e.g., nuclear materials).

Disclaimer: The content herein aims to provide an understanding of potential failure points and discusses *possible* remedial actions. This is not a universal guide. Users must adapt these strategies to the specific constraints of each application and conduct a full risk assessment prior to each move.

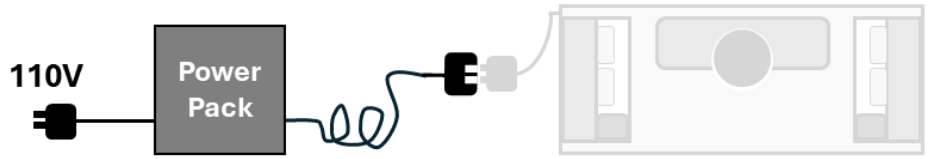
Components

The system consists of three primary components: **The Remote Control**, **The Power Skate**, and **The Battery**.

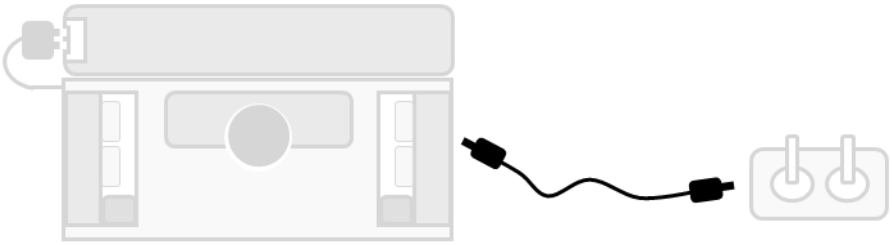


Optional Accessories

PowerPack powers the skate via a 110V wall outlet (replaces battery)



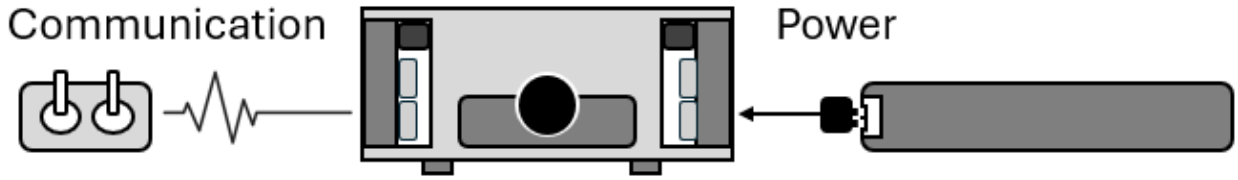
Remote cable converts wireless remote into cable remote, and disables radio frequency



How the System Works

The remote control communicates via radio frequency with the receiver in the skate. The receiver then activates the left and right motors in the skate.

The battery provides power to the motors and the receiver in the skate. The receiver reads the battery charge level and communicates it to the remote display.



Failures & Recovery

Each potential failure point below is provided for risk assessment. However, for simplicity, if any failure occurs, the operating team can jump directly to the *one-solution-fits-all* Critical Recovery Procedure at the bottom, replacing the entire system with a backup unit.

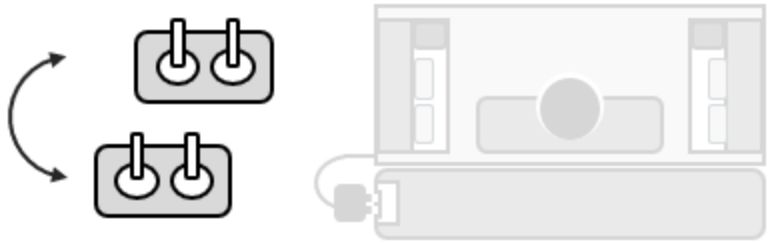
Also see the Step-by-Step Diagnostic path at the end of this document to quickly identify the failed component.

Remote Control Failure

Problem: By default, remotes are programmed to unique frequency channels to allow for multi-unit operation.

Pre-emptive Strategy: Keep a factory programmed secondary backup remote set to the same frequency channel as the primary. This makes the remote controls interchangeable.

Recovery: If the primary remote fails, power it down. Power-up the backup remote to resume operation.



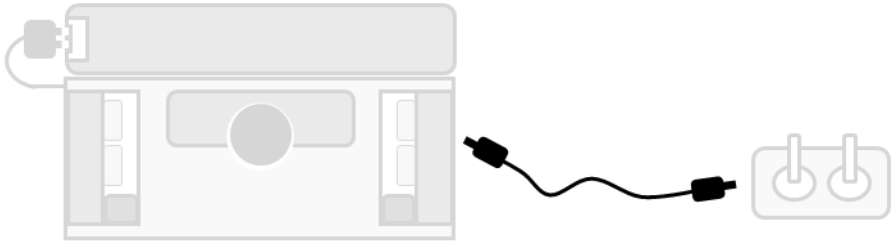
Consideration: If a complete second skate system is to travel with the primary system as a backup in proximity, the remote controls will need to be on separate channels. This backup plan would hence not work, or a third remote would be required.

Loss of Signal

Problem: Frequency interference can cause the remote control to lose communication with the receiver (in the skate).

Recovery: Connect the remote control to the skate using a remote cable (optional accessory) which turns the *wireless* remote into a *wired* cable remote. This feature disables radio frequency communication.

Resume operation.

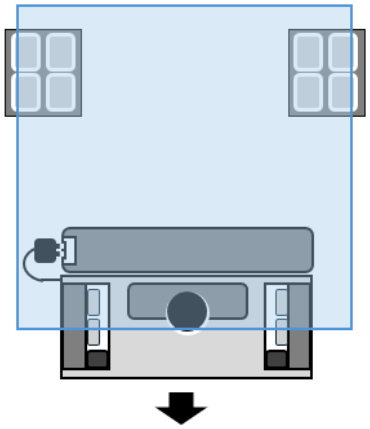


Consideration: An operator will need to walk with the load and manage the cable from being run over by the skate. The cable will also prevent 360 degrees rotation of the skate.

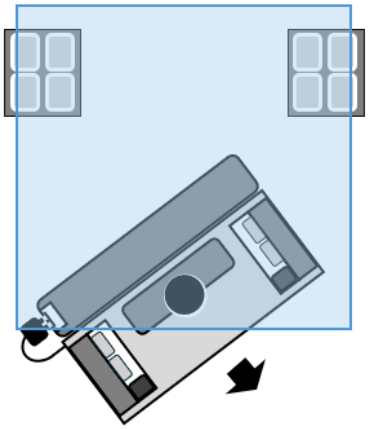
Battery Failure

Problem: The skate is outfitted with automatic parking brakes that engage at standstill. Without power, the wheels remain locked, preventing the skate from being pulled out manually.

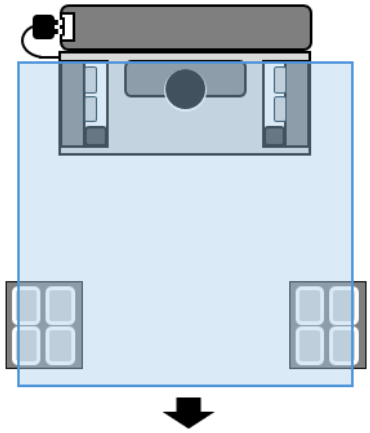
A battery could fail with the skate in 3 different positions.



Battery Inaccessible
In most cases, the powered skate drives the unit from the front. The battery is then entirely under the load and inaccessible.



Battery Cable Accessible
The battery is inaccessible, but the connection cable is accessible. Such may be the case if the load is narrow or during turns.



Battery Fully Accessible
If the load is driven with the powered skate from behind, the battery is accessible.

Recovery Methods by Access Level:

- **Fully accessible**: Unplug the failed battery and swap it with a charged backup.
- **Cable Only Accessible**: Disconnect the failed battery and connect a backup battery. (Placing the backup battery onto a dolly will assist with the next step.) Alternatively connect the 110V PowerPack (optional accessory) but verify that a 26A outlet is available. Power up the unit and rotate the skate in place until the failed battery becomes accessible (Diagram A and B). Then swap the battery with the backup battery.
- **Battery and cable not accessible:** Move on to *Critical* Recovery Method below.

Diagram A – with 2nd Battery

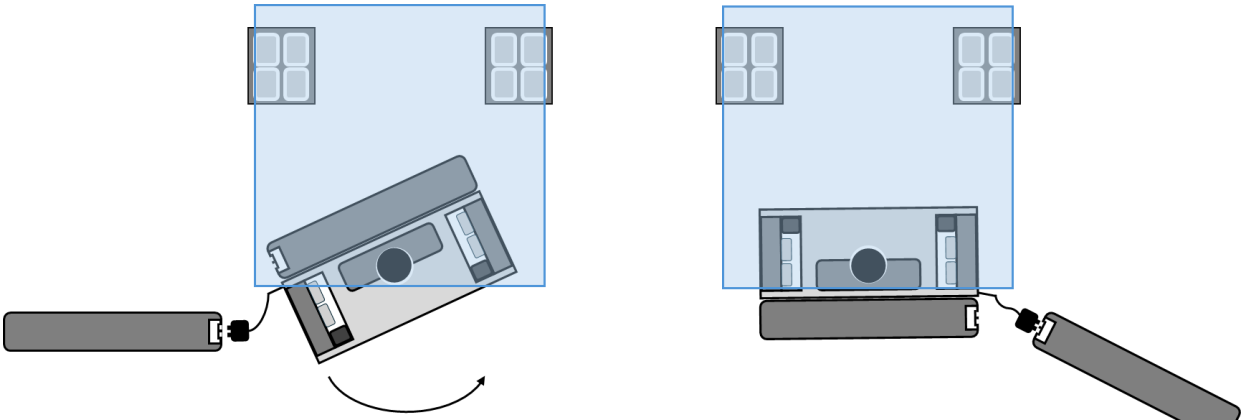
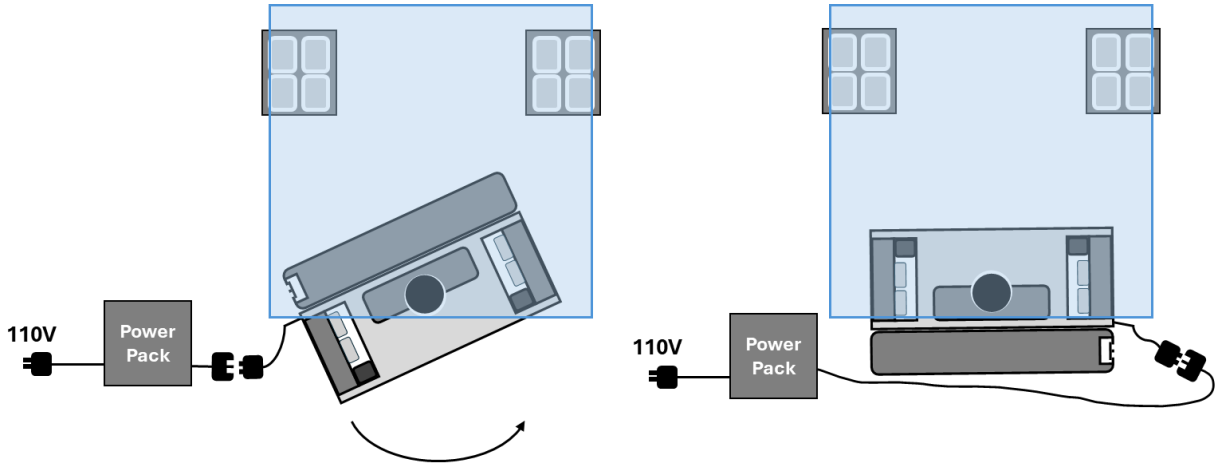


Diagram B – with PowerPack

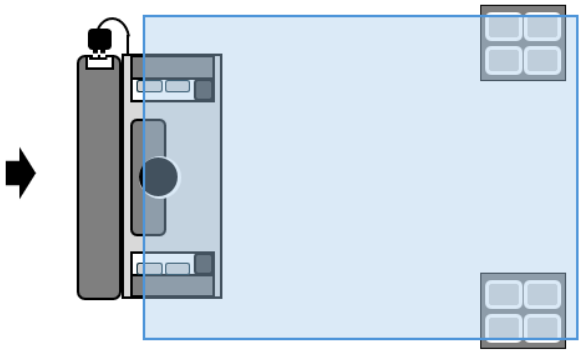


[!WARNING] **Danger to Human Life:** Do not crawl under a lifted and blocked load to attempt a battery swap

User Alert: The battery goes into Sleep Mode after 60 minutes of inactivity to prevent battery drainage. The green button must be pressed on the battery to wake. Consequently, do not park skate with battery inaccessible.

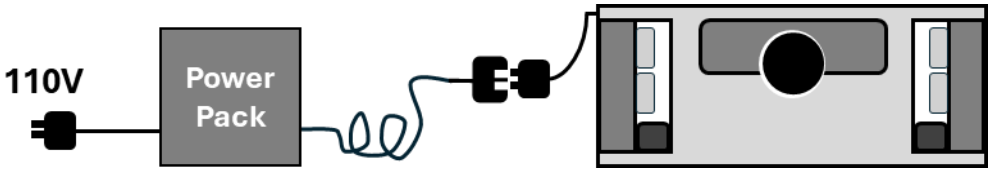
Prevention Strategy: Avoiding Inaccessible Battery

Positioning the powered skate under the rear of the load and pushing the load from behind will keep the battery mostly exposed except in turns. This will allow the battery to be swapped easily. It requires a more skilled remote-control operator. It is comparable to maneuvering a car in reverse.



Operation WITHOUT Battery

The skate can be operated via the **110V PowerPack**, eliminating the battery from the system. An operator will need to walk with the load and manage the cable from being run over by the skate. Note that the cable will prevent 360 degrees rotation of the skate.



Problems and Recovery:

The cable will be destroyed if run over and will require replacement. If crushed under the skate, a short circuit in the cable could cause:

A - The PowerPack to fail. Recovery: Swap PowerPack with a backup PowerPack.

B - The circuit breaker of the 110V outlet to blow. Recovery: Reset

C - The skate to fail (fuse blows). Recovery: Move on to *Critical* Recovery method below.

Skate Failure – Motor Problems

Problems with Partial Motor Failure. If only one of the two motors fails, the skate will pull to one side and move in circles.

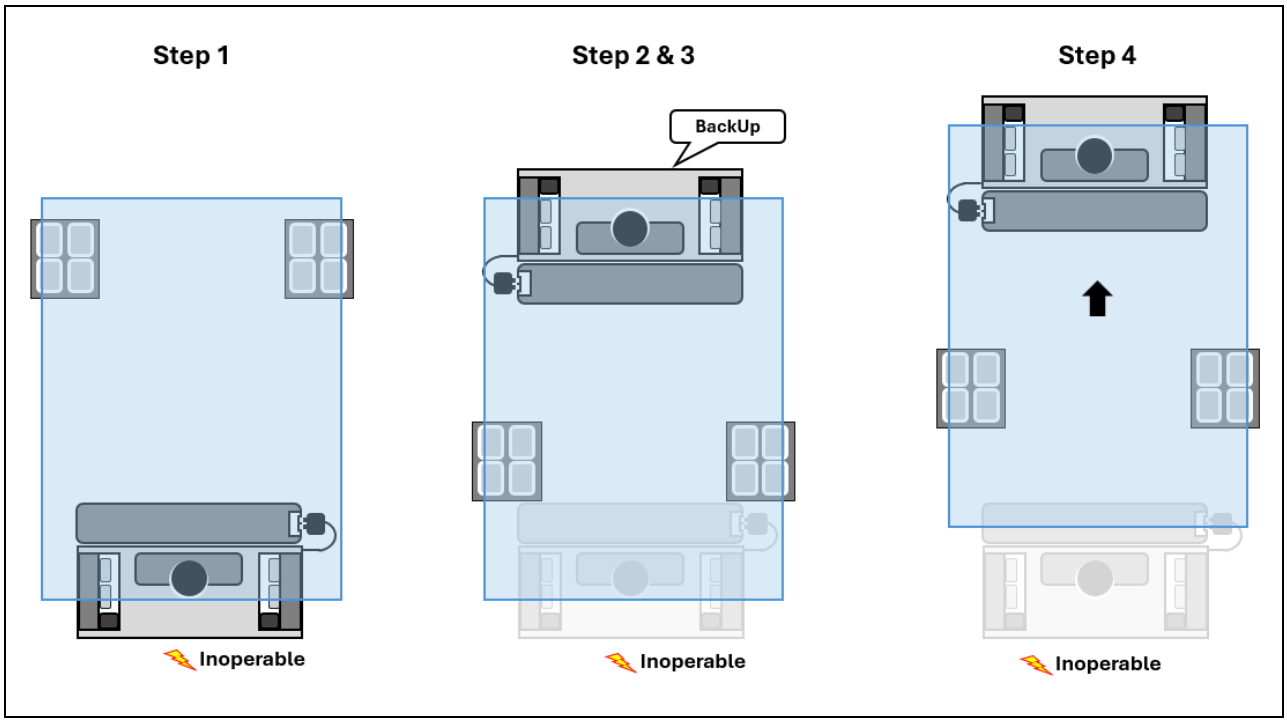
Recovery: Use toe jacks to lift the load approximately 0.5 inches off the powered skate. Drive the defective skate out and replace it with a backup unit.

TOTAL System Failure

Skate Inoperable. If the skate is completely unresponsive, the parking brakes will prevent movement. **Warning:** Dragging the skate with a forklift or tugger will cause severe wheel damage and should only be a last resort.

CRITICAL Recovery:

1. **Separate:** Use toe jacks, to lift the load 1.5 inches above the inoperable skate.
2. **Support:** Place backup straight-line skates (or block and reposition existing ones) near the failed unit.
3. **Shim:** Add wood or rubber spacer plates to the backup skates so they sit higher than the failed powered skate.
4. **Extract:** Position a backup **powered** skate at the rear of the load. Drive the load backward to clear the failed unit. Continue operation after repositioning new skates and circumnavigate the failed skate.
5. **Removal:** Use the lifting eyes on the skate and slings (or three toe jacks) to lift the failed skates onto dollies or pallet jack to remove the defective unit from the path.



Step-by-Step Diagnostic Guide and Recommended Recovery Actions

Follow these steps in sequence:

If the skate doesn't hold course and wants to move in a circle:

1. One motor has failed. Replace the skate using the recovery method under Partial Motor Failure.

If the system stops and becomes unresponsive:

2. Check the remote control's display. If it has gone dark, the remote has failed. Switch out the remote.
3. If the remote display shows the frequency symbol crossed out, the signal was lost. This may have occurred because of a power loss, so
4. Look under the load and check if the green light on the battery is ON. If it is OFF, press the green button if accessible. If not, proceed as if the battery has failed.
5. If the battery is ON, reboot the remote.
6. If the remote's display says, "Logging in…" and it does not connect, switch out the remote.
7. If that does not fix the problem, replace the skate using the Critical Recovery procedure