Electronics & Power Box: Shocks, Shorts, Overheating and a Small Fire

Abstract

We encountered multiple electrical safety failures inside the power/electronics box:

some members plugged devices into higher voltages than rated, leading to short-circuits and one small fire; the box was mishandled with wet hands, which caused electric shocks and tripped the floor supply; inside the box, crossed/loose wires and poor routing led to hot spots and intermittent short-circuits.
These incidents showed gaps in overcurrent protection, wiring practice, and operating rules (HSE, 2025; HSA, 2025; CPSC, 2024).

Introduction

We planned to:

1. Fix wiring: re-do internal wiring with correct wire gauge, color coding, DIN-rail terminal blocks, ferrules, and clear separation of AC/DC and low-voltage signal runs; torque to spec to avoid loose joints (Technology.org, 2025).
2. Change behaviour: lockable main isolator, LOTO for maintenance, “no wet-hands” rule, and a quick pre-use checklist (OSHA, 2024; HSE, 2025).

Body

A) Overvoltage plug-ins → short-circuit and a small fire

What happened (signs):

- A member connected a device to a higher-voltage outlet by mistake; the device failed immediately and the branch shorted, charring a section near the outlet.

Why we encountered it:

- Team member was not educated about voltage concerns.

How we solved it:

- We ensured other members were there to assist unfamiliar members with the circuit box.

B) Wet-hand handling → shocks and whole-floor trips

What happened (signs):

- Members reported tingles/shocks while plugging with wet hands; the floor RCD tripped and killed the box.

Why we encountered it:

- The box and outlets were not adequately protected for wet handling (HSA, 2025). How we solved it (step-by-step):

How we solved it:

- Wrote and enforced “No wet-hands / wet-floor” rule; added rubber mat at the service side.

C) Crossed/loose wiring → overheating and intermittent shorts

What happened (signs):

- Wires felt hot, insulation softened near lugs, and the box occasionally tripped on start-up.

Why we encountered it:

- Loose connections and poor splices create high-resistance points → heat and arcing (Wesbell, 2024).

How we solved it:

- Rewired the box so cables are neat and not overlapping.

Conclusion

We enforced clear operating rules (no wet hands),keep cable tidy, and rewire if anything is changed,. Since adopting these controls, the box has been shock-free, cool under load, and faults clear safely without damage.

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