

1. CONCEPT OVERVIEW

A compact countertop unit that dispenses sauna tokens on command from the POS system. The Azkoyen Hopper U-II sits inside a lockable enclosure with a token chute guiding dispensed tokens into a front-facing collection tray. The Wemos D1 provides WiFi-based control, receiving dispense commands via HTTP API from the FRGS POS terminal.

Key requirements:

- Top-loading access for token refill (hinged lid or removable top panel)
- Front token tray where dispensed tokens collect for the user
- Lockable enclosure to prevent theft/tampering
- Adequate ventilation for 12V PSU and hopper motor
- WiFi-transparent housing (avoid fully sealed metal or add antenna window)

2. COMPONENT DIMENSIONS & SPACE BUDGET

Component	Dimensions (LxWxH)	Weight	Notes
Azkoyen Hopper U-II (Small)	~120 × 130 × 95 mm (base)	~0.8 kg empty	Bowl adds ~50mm height
Azkoyen Hopper U-II (Medium)	~193 × 130 × 95 mm (base)	~1.0 kg empty	Higher token capacity
Wemos D1 Mini	34 × 25 × 7 mm	<10 g	Needs WiFi signal
Protoboard + components	~70 × 50 × 20 mm	~30 g	Voltage dividers, transistor
12V DC Power Supply	~90 × 55 × 30 mm (meanwell)	~150 g	Or external brick + DC jack
Wiring harness	Flexible	—	Molex 2x5 to hopper
Token chute/guide	~80 × 30 × 20 mm	Custom	From hopper exit to tray
Collection tray	~120 × 80 × 25 mm	Custom	Recessed or attached front

3. MINIMUM ENCLOSURE SIZE

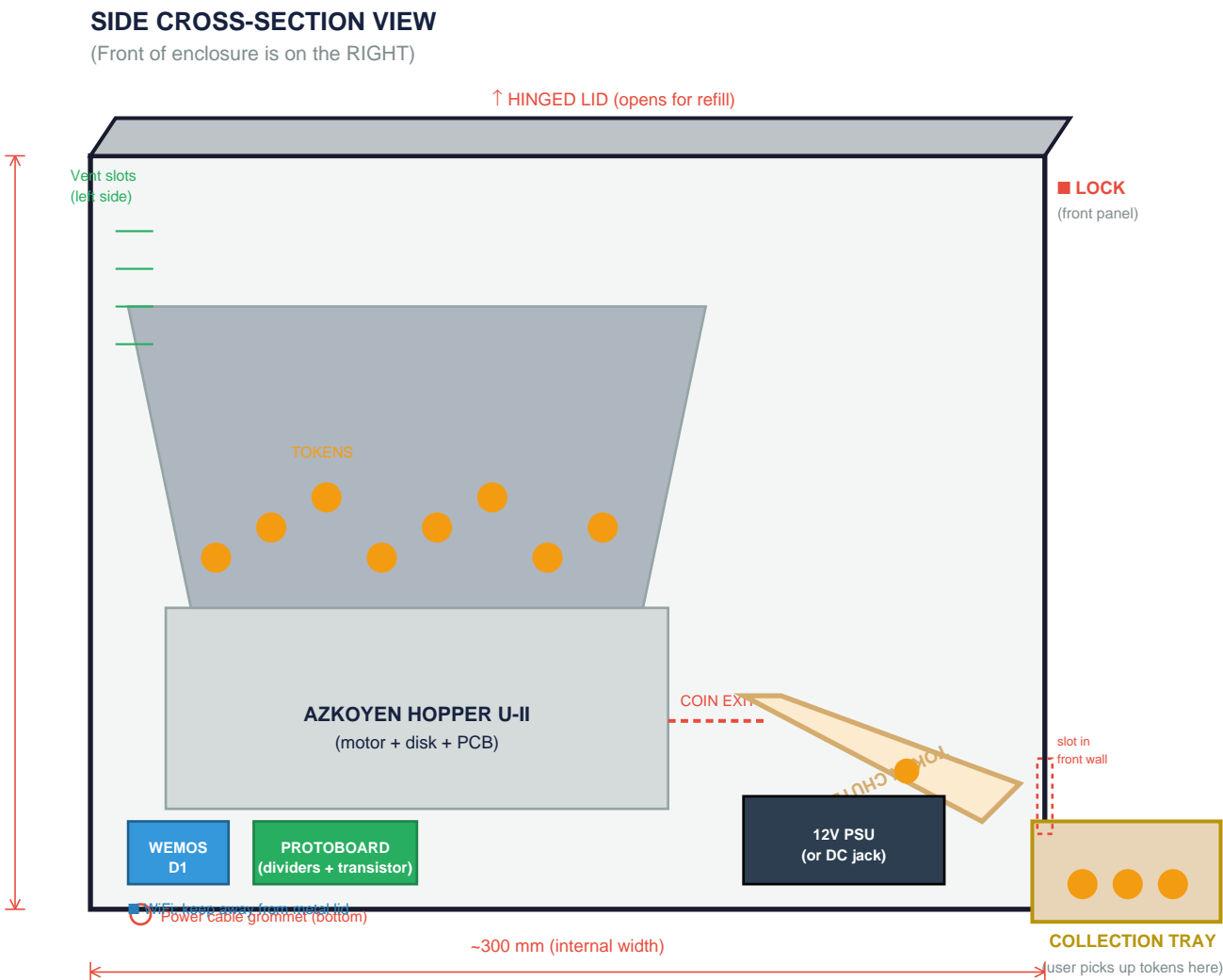
Based on the Small hopper variant plus electronics and chute routing:

MINIMUM INTERNAL: 250 × 200 × 180 mm (L × W × H)
RECOMMENDED: 300 × 220 × 200 mm (allows comfortable access & airflow)

If using the Medium hopper (higher capacity, recommended for busy sauna use):

MINIMUM INTERNAL: 300 × 200 × 180 mm (L × W × H)
RECOMMENDED: 350 × 230 × 200 mm

mm



OPTION A: Off-the-Shelf Metal Enclosure (Fastest)

Buy a standard IP65 metal junction box and modify it:

Recommended size: 300 × 200 × 150 mm (e.g., KWONONG, Ordentlich, or similar)

Available on Amazon.de for ~€25-40

Modifications needed:

1. Cut a slot in the right side wall for the token chute exit (~30 × 15 mm)
2. Drill a hole in the bottom for the power cable grommet
3. Add ventilation holes or slots on the back/sides
4. Optional: Replace solid lid with hinged version or add piano hinge
5. Mount a small L-bracket or cup on the outside below the slot as token tray

Pros: Quick, sturdy, lockable (most come with latch), weather-resistant

Cons: Need metalworking tools (Dremel, step drill), box may be too shallow
— check 150mm internal height is enough for hopper + bowl clearance

OPTION B: Custom Wood/Metal Fabrication (Best Fit)

Build a custom box from plywood (12-15mm) or sheet metal (1-2mm steel/aluminum):

Design: Box with hinged top lid, front token slot, integrated tray

Can match the club interior / branding with paint or vinyl wrap

Materials (wood version): ~€15 plywood + €5 piano hinge + €3 latch + €2 screws

Materials (metal version): ~€30-50 depending on sheet + bending/welding

Construction tips:

- Use 12mm plywood for the base and sides, 9mm for the lid
- Line the inside of the token chute with felt or rubber to dampen noise
- Route the chute exit through a slot in the front panel, 25mm from the bottom
- Screw a small stainless steel cup/bowl to the front as token tray
- Add rubber feet to prevent sliding

OPTION C: Repurposed Cash Box / Vending Component (Cheapest)

Repurpose an existing enclosure designed for coin mechanisms:

Good candidates:

- Used cash register drawer housing (eBay/Kleinanzeigen, ~€10-20)
- Decommissioned change machine cabinet (coin-op laundry/arcade surplus)
- Steel tool box or cash box (300×200×150mm, ~€15-25 at Baumarkt)
- Old printer/NAS enclosure gutted and repurposed

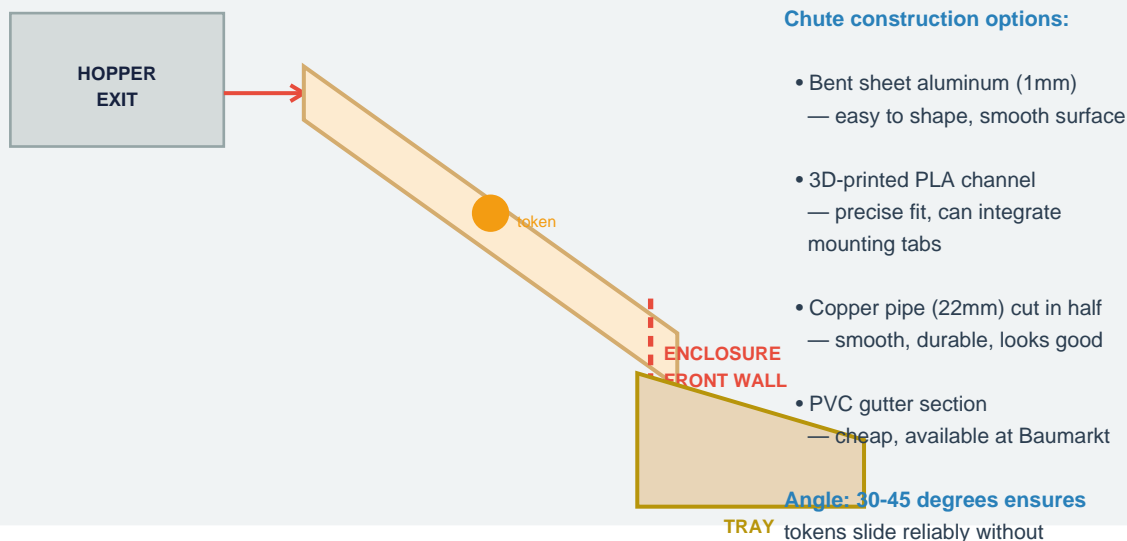
Search terms for eBay Kleinanzeigen:

"Münzwechsler Gehäuse", "Kassenschublade", "Tresor klein",
"Geldkassette", "Münzautomat Gehäuse"

Pros: Often already has coin slots, sturdy, lockable

Cons: May need significant modification, unpredictable dimensions

4. TOKEN CHUTE — DETAIL DESIGN



5. ASSEMBLY CHECKLIST

ENCLOSURE PREP

- ☐ Cut token exit slot in front wall (~30mm × 15mm, positioned to align with hopper exit height)
- ☐ Drill cable grommet hole in bottom or back (for mains cable, ~10mm)
- ☐ Add ventilation slots/holes on back panel (4-6 holes, 8mm diameter)
- ☐ Install piano hinge on top lid for refill access
- ☐ Install lock/latch on front panel
- ☐ Add rubber feet to bottom (4 pcs)

INTERNAL MOUNTING

- ☐ Screw/bolt hopper base to enclosure floor (use existing hopper mounting holes)
- ☐ Mount Wemos D1 + protoboard with standoffs (M3, keep away from hopper motor)
- ☐ Secure 12V PSU with double-sided tape or bracket (or use external PSU + DC jack)
- ☐ Route Molex cable from protoboard to hopper connector
- ☐ Secure all wires with cable ties — keep clear of the hopper disk!

TOKEN CHUTE

- ☐ Align chute inlet with hopper coin exit point
- ☐ Secure chute with hot glue, screws, or mounting bracket
- ☐ Test: manually trigger hopper — does token slide to tray reliably?
- ☐ Add felt/rubber lining if tokens make too much noise

EXTERNAL

- ☐ Mount collection tray/cup below the front slot (screws or strong adhesive)
- ☐ Optional: Add FRGS logo / label / instructions sticker
- ☐ Optional: Add status LED visible from outside (green = ready, red = empty)

TESTING

- ☐ Power on, verify Wemos connects to WiFi
- ☐ Send dispense command from POS → tokens should exit into tray
- ☐ Test hopper empty detection
- ☐ Test refill procedure (open lid, pour tokens, close lid, resume)