

# Sauna Token Dispenser — Housing Design

Azkoyen Hopper U-II + Wemos D1 | Countertop Freestanding Unit

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## 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 x 130 x 95 mm (base)	~0.8 kg empty	Bowl adds ~50mm height
Azkoyen Hopper U-II (Medium)	~193 x 130 x 95 mm (base)	~1.0 kg empty	Higher token capacity
Wemos D1 Mini	34 x 25 x 7 mm	<10 g	Needs WiFi signal
Protoboard + components	~70 x 50 x 20 mm	~30 g	Voltage dividers, transistor
12V DC Power Supply	~90 x 55 x 30 mm (meanwell)	~150 g	Or external brick + DC jack
Wiring harness	Flexible	—	Molex 2x5 to hopper
Token chute/guide	~80 x 30 x 20 mm	Custom	From hopper exit to tray
Collection tray	~120 x 80 x 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 x 200 x 180 mm (L x W x H)  
**RECOMMENDED:** 300 x 220 x 200 mm (allows comfortable access & airflow)

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

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

# Internal Layout — Side Cross-Section

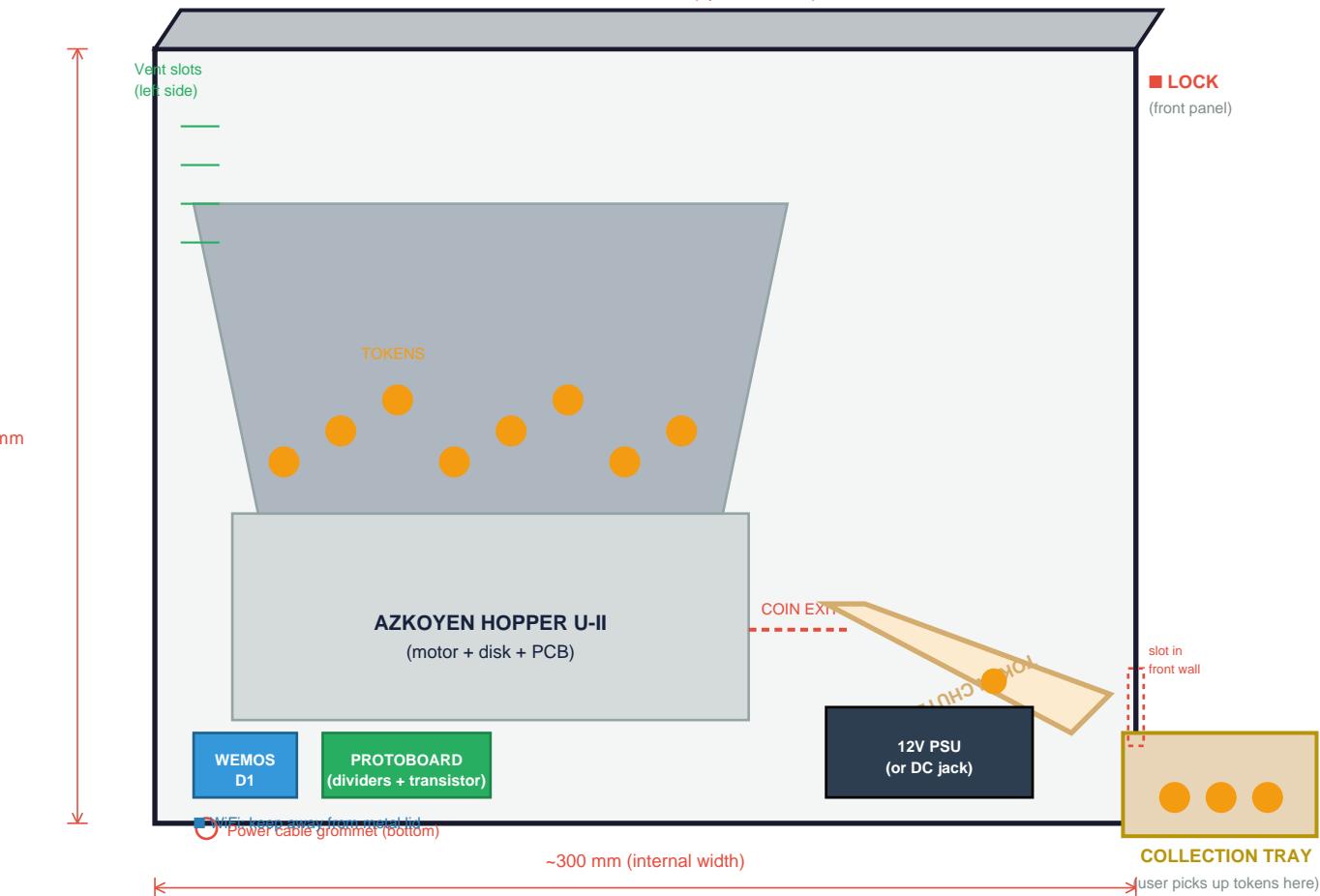
Component placement and token flow path

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## SIDE CROSS-SECTION VIEW

(Front of enclosure is on the RIGHT)

↑ HINGED LID (opens for refill)



# Housing Options — Three Approaches

Off-the-shelf, custom build, or repurposed enclosure

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## 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 (300x200x150mm, ~€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

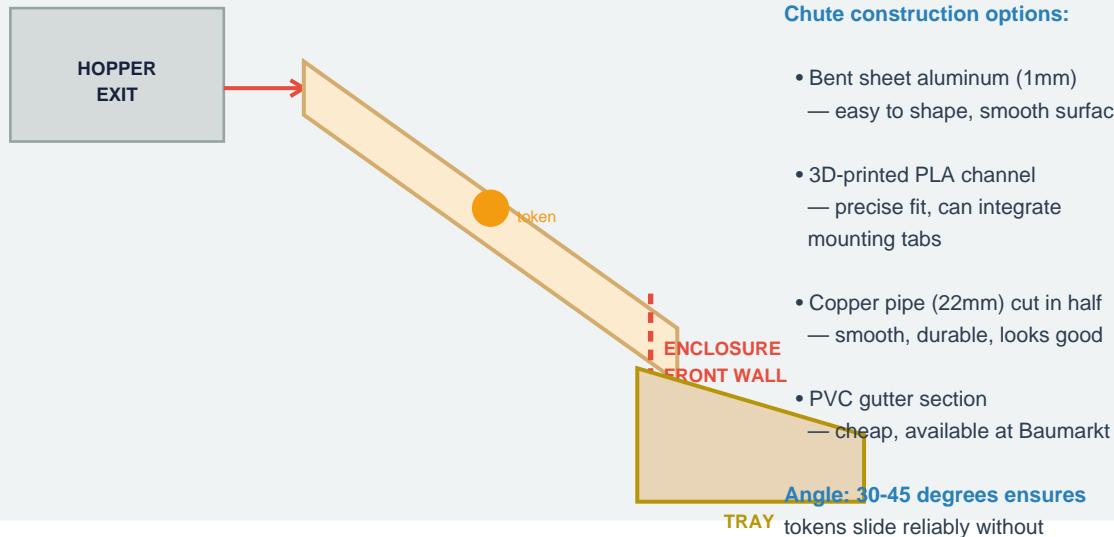
**Cons:** May need significant modification, unpredictable dimensions

# Token Chute Design & Assembly Checklist

Construction details and final integration steps

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## 4. TOKEN CHUTE — DETAIL DESIGN



## 5. ASSEMBLY CHECKLIST

### ENCLOSURE PREP

- Cut token exit slot in front wall (~30mm x 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)