

RPS-100 Room Booking Sign – Assembly Guide

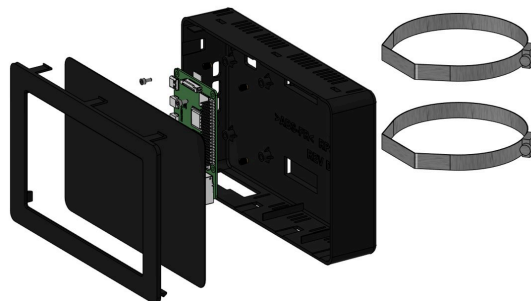
5 Oct 2026 (rev. 7 Oct 2026) · Author: Opus 5.5

Not released for manufacturing. This guide, the drawings, the BOM and the CAD data were generated by an AI model (Opus 5.5) and have not yet been finally reviewed by an engineer. Have every document reviewed and approved by a qualified person before using it for quoting, ordering or manufacturing.

Overview

RPS-100 is a pole-mounted meeting-room booking sign: a Raspberry Pi 4 drives a 7-inch Raspberry Pi Touch Display 2 inside a two-part injection-moulded ABS housing, clamped to a Ø100 mm pole with two hose clamps. Assembly takes about 20 minutes plus the adhesive dwell time.

The bottom part (rear shell RPS-100-02) carries the Pi, every I/O cut-out, the vents and the pole saddle. The top part (front bezel RPS-100-01) holds the display glass and snaps onto the shell with eight hooks, so no screws are visible.



Pos	Part	Qty
1	Front bezel RPS-100-01, ABS FR (Polylac PA-765)	1
2	Rear shell RPS-100-02, ABS FR (Polylac PA-765)	1
3	Raspberry Pi 4 Model B	1
4	Raspberry Pi Touch Display 2, 7" (SC1635) incl. FFC and GPIO power cable	1
5	microSD card 32 GB	1
6	USB-C power supply 15 W	1
7	Heat-set insert ruthex RX-M2.5x5.7	4
8	Socket head cap screw ISO 4762 M2.5 × 6, A2-70	4
9	Hose clamp DIN 3017, 90–110 mm × 12 mm, W4	2
10	3M VHB 5925 tape strip, 8 mm wide	4

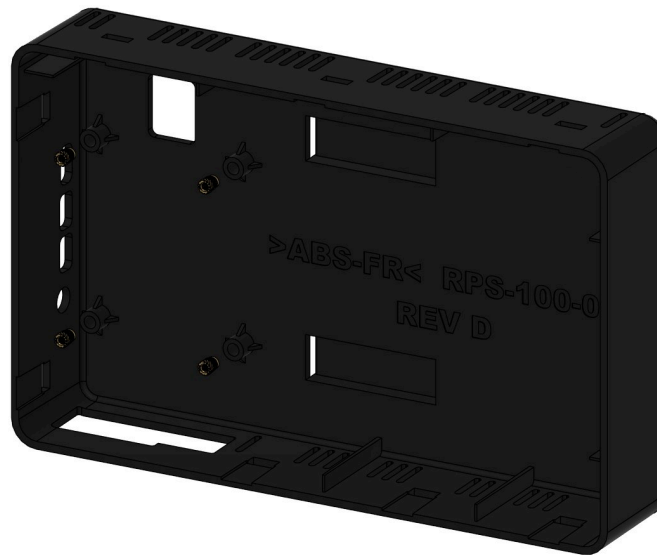
Supplier part numbers and buy links are in the BOM workbook RPS-100_BOM.xlsx. Dimensions are in RPS-100_Manufacturing_Drawings.pdf (5 A3 sheets) and in the overview drawing set RPS-100_Drawing_Set.pdf (4 A3 sheets). STEP files for the Protolabs quote are in the STEP folder.

Tools and consumables

- Soldering iron (temperature-controlled) with an M2.5 heat-set insert tip, set to approx. 230 °C for ABS
- Hex key / bit 2 mm (ISO 4762 M2.5) and a torque screwdriver set to 0.3 N·m
- 7 mm nut driver or flat screwdriver for the hose clamps (2–3 N·m)
- Small flat screwdriver, 2–3 mm blade, for releasing the snap hooks
- Isopropyl alcohol (IPA) and lint-free wipes
- 3M VHB 5925 tape, 0.64 mm, cut into 4 strips 8 mm wide: 2 × 186 mm and 2 × 103 mm
- ESD wrist strap when handling the Raspberry Pi and display

Step 1 – Install the heat-set inserts

Four ruthex RX-M2.5x5.7 brass inserts go into the four bosses on the inside of the rear shell; they must end flush with the boss tops ($z = 9.0\text{ mm}$), because the Pi rests on those faces.

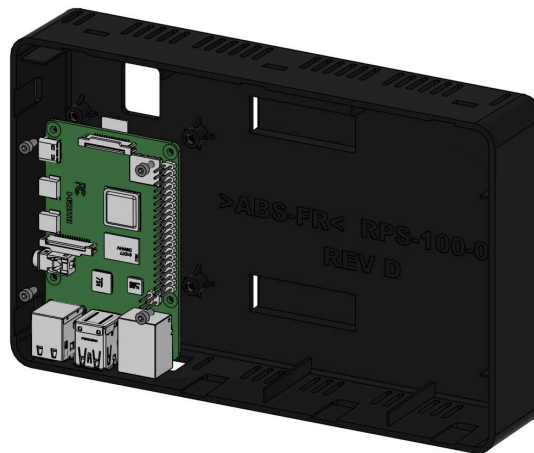


1. Place the rear shell face up on a flat, heat-resistant surface.
2. Set an insert on a boss hole ($\varnothing 4.0\text{ mm}$ moulded hole, 6.2 mm deep), knurled end down.
3. Press it in with the heated tip, perpendicular to the floor, in one smooth stroke of 3–5 s. Do not twist.
4. Stop when the insert top is flush with the boss top (0 to -0.1 mm). Flatten it with a cold flat tool while the plastic is still soft.
5. Repeat for all four bosses and let the shell cool for 2 minutes.

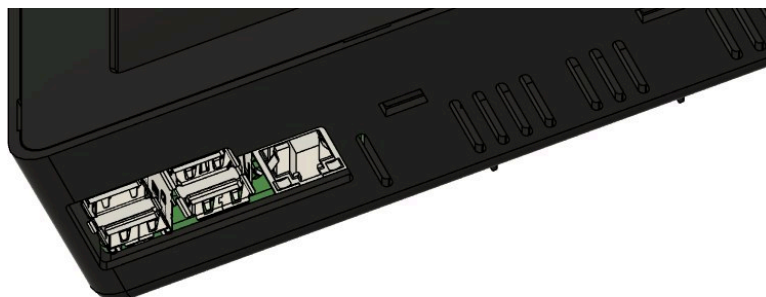
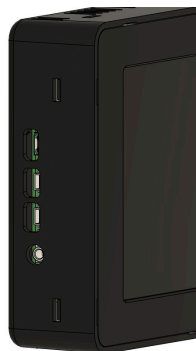
Check: the bosses are 7.2 mm OD, leaving the 1.6 mm minimum wall ruthex specifies around the insert. A cracked or bulging boss means the tip was too hot or pressed at an angle.

Step 2 – Prepare and mount the Raspberry Pi 4

The Pi sits in the lower-left corner on the four inserts. Its USB and Ethernet ports face the bottom wall, and USB-C, micro-HDMI and audio face the left wall. Four ISO 4762 M2.5 × 6 screws (2 mm hex) fix it at 0.3 N·m.



1. Flash the microSD card with the OS and booking app, then insert it into the Pi.
2. Plug the 15-way to 15-way FFC cable (supplied with the display) into the Pi's DISPLAY connector, contacts facing the USB/Ethernet ports. Lock the latch.
3. Plug the 3-pin GPIO power cable onto the header: red to pin 2 (5 V), black to pin 6 (GND).
4. Lower the Pi into the shell so its ports slide into the openings, then rest it on the bosses.
5. Fit the four screws and tighten crosswise to 0.3 N·m. Each screw engages 4.2 mm of thread in its insert.



Step 3 – Bond the display into the front bezel

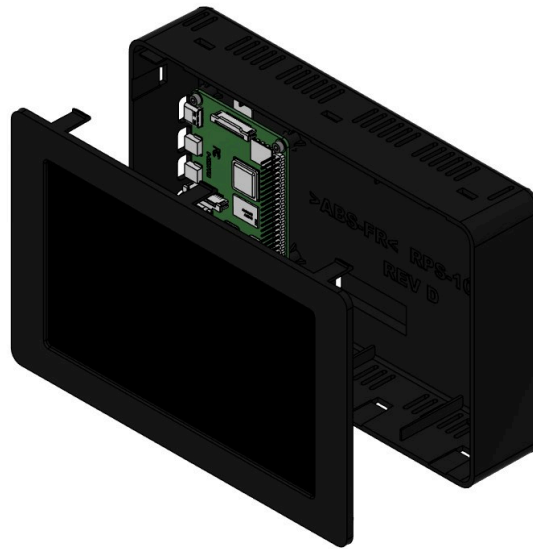
The Touch Display 2 cover glass is bonded from behind to the bezel's 2 mm front plate with 0.64 mm VHB tape. The bezel lip covers the black glass border, so the glass cannot leave through the front even if the tape ages.



1. Wipe the inside face of the bezel plate and the black glass border with IPA; let it flash off for 1 minute.
2. Apply the four 8 mm VHB strips to the bezel plate, along the inside of the glass-locating skirt. Keep them outside the display window (158.6 × 90.9 mm).
3. Remove the liners. Lower the display glass-first into the skirt with the wide glass border (driver side) to the right. On the left, the three small ribs centre the glass.
4. Press the glass border evenly (at least 15 N/cm², about 1.2 kg per cm of 8 mm strip) for 30 s. Do not press on the active area.
5. Plug the other end of the FFC cable and the GPIO power cable into the display. Let the bond rest 20 min before closing (full strength after 72 h).

Step 4 – Connect and snap the housing closed

The bezel-and-display unit snaps into the rear shell with eight cantilever hooks: three on the top edge, three on the bottom, two on the left. Each hook latches with 0.9 mm engagement into a window in the shell wall and takes about 15 N to snap.

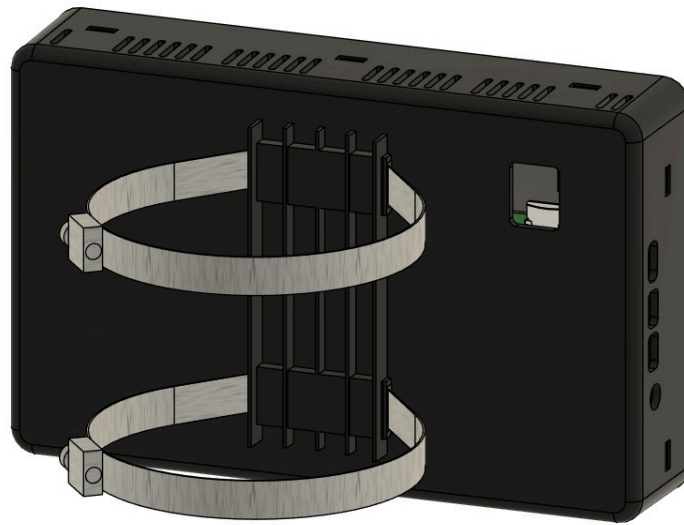


1. Hold the bezel unit above the shell and plug the FFC and power cable leads in; fold the FFC once so it lies flat over the Pi.
2. Align the hooks with the 10 mm lead-in grooves in the shell walls (they show as slightly wider gaps at the rim).
3. Press the bezel down evenly: left edge first, then top and bottom, until all eight hooks click.
4. Check that the bezel front sits flush with the shell rim all round (gap 0.3 mm). The glass border now rests on the seven support ribs inside the shell.

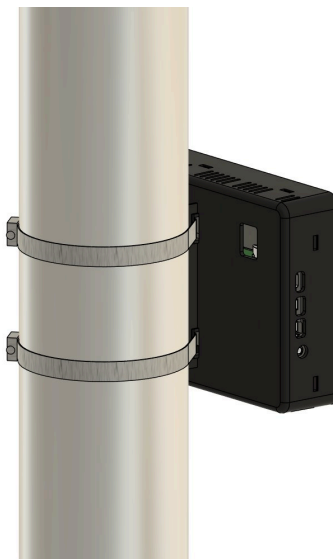


Step 5 – Mount on the Ø100 mm pole

Two DIN 3017 worm-drive clamps (90–110 mm, 12 mm band, W4 stainless) run through the two band tunnels on the back of the shell and around the pole. The band loop needed is 322 mm, equivalent to Ø102.6 mm, mid-range for the clamp.



1. Open both clamps fully by unscrewing until the band end leaves the worm housing.
2. Thread each band end sideways through one tunnel (upper tunnel centred 35 mm above, lower 35 mm below the sign centre).
3. Hold the sign against the pole so the five concave saddle ribs sit on the pole, display vertical and at the desired height.
4. Wrap the bands around the pole, feed the ends into the worm housings and turn them so the housings sit at the side of the pole, reachable with a nut driver.
5. Tighten both clamps alternately to 2–3 N·m. Tension pulls the tunnel roofs, and the sign with them, straight against the pole. The saddle takes the load in compression, so the bridges are not bent.
6. Route the USB-C (left side) and LAN cable (bottom) down the pole and fix them with cable ties.



Service and disassembly

The housing opens without tools beyond a small screwdriver, and the hooks are designed for repeated opening (peak strain 1.41 %, below the roughly 1.5 % limit for repeated use in ABS).

- **Open the housing:** unplug power. Push each hook lip inward through its window in the shell wall with a 2–3 mm flat screwdriver, starting with the two left hooks, and lift that edge of the bezel. Then release the top and bottom hooks. Unplug the FFC and power leads at the display.
- **Swap the microSD card:** with the sign off the pole, reach the card through the 16 × 20 mm service window in the back wall (top left, behind the Pi). Slide the card upward out of its socket with tweezers. Or open the housing.
- **Replace the Pi:** remove the four M2.5 screws. The brass inserts take repeated reassembly; keep 0.3 N·m.
- **Replace the display:** heat the bezel front evenly to about 60 °C (heat gun, low), then peel the glass off slowly from the left edge with a plastic wedge. Fit new VHB strips.

Design for injection moulding

Both parts are designed for Protolabs injection moulding in Polyac PA-765 (ABS, flame-retardant, UL94 5VA, black), which Protolabs lists as a stocked ABS grade ([materials](#)). Every rule in the table below is met.

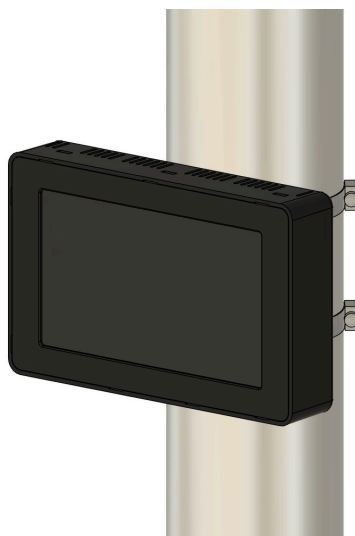
Rule (Protolabs)	Guideline	Rear shell RPS-100-02	Front bezel RPS-100-01
Wall thickness, ABS	1.14–3.56 mm	2.5 mm uniform	2.0 mm plate, 3.3 mm max. at skirt
Draft, vertical faces	min. 0.5°, 1–2° typical	1° walls, gussets, rib ends, lead-in grooves, microSD window, saddle-rib ends and band bridges; 0.5° bosses and insert holes; 0.57° glass-rib flanks; 0.5–1° text; side actions: 1° on every wall opening in the slide direction	1° on every face parallel to the pull: outer rim, skirt, glass locators, hooks, lip lands, display window
Draft, shut-offs	min. 3°	3° on both band-tunnel pass-throughs	none needed
Ribs	max. 60 % of wall	glass-support ribs 1.5 mm root (60 %), saddle ribs 1.5 → 1.0 mm, gussets 1.2 mm	glass locators 1.2 mm (60 %)
Bosses	wall 60–70 % of nominal, cored, gusseted	OD 7.2 mm / hole Ø4.0 mm, wall 1.6 mm (64 %), 4 gussets each	none
Inside radii	≥ 0.5 × wall	R1.5 back edges, R6 corners	R5.7 corners
Text	> 20 pt, 0.25–0.38 mm deep	7 mm Arial Black, 0.3 mm deep, inside back	none
Max. size / depth	480 × 751 mm, 101 mm depth	204 × 129 × 49 mm	200 × 127 × 18 mm

Tooling concept. The bezel is straight-pull: every hook lip projects beyond the plate outline, so the A-side forms the latch faces with a stepped parting line. It runs along the rear edge of the outer rim and steps down the hook outer edges to the latch edges. Every bezel face parallel to the pull has 1° draft toward the mould half that forms it: the A-side forms the outer rim and the hook outer faces; the B-side forms the skirt, glass locators, hook sides and lip lands. The shell needs three side actions: top wall (exhaust vents and snap windows), bottom wall (USB/Ethernet opening, intake vents, snap windows) and left wall (USB-C, HDMI, audio, snap windows). Each stays inside Protolabs' side-core limits of 213.8 mm width and 60.4 mm height. The two hose-clamp tunnels use pass-through cores from the inside, so the back (pole) side needs no side action. Every shell face has draft toward the tool part that forms it: the core for the inside (walls, bosses, ribs, gussets, lead-in grooves, microSD window, text), the cavity for the back with saddle ribs and band bridges, and each side action for the openings in its wall.

Finish and gating. Specify PM-F1 or SPI-B2 outside. A PM-T1 bead-blast texture would need 3° draft on the outer walls (currently 1°). Suggested gates: one at the shell back centre under the saddle (hidden by the pole) and a tab gate on the bezel's left skirt; confirm with the Protolabs moldability analysis.

Sources: [Protolabs injection moulding design guidelines](#), [Protolabs boss design](#), [Protolabs ribs and gussets](#).

Technical data



Item	Value
Housing outer size	203.7 × 129.4 × 40.6 mm; 49.3 mm incl. pole saddle
Moulded part mass (ABS, 1.06 g/cm ³)	rear shell 128.7 g, front bezel 24.3 g
Display window / active area	158.6 × 90.9 mm / 154.6 × 86.9 mm (landscape)
Accessible I/O	left: USB-C power, 2× micro-HDMI, 3.5 mm AV; bottom: 2× USB 3.0, 2× USB 2.0, Gigabit Ethernet; back: microSD service window
Connectivity	built-in dual-band Wi-Fi 802.11ac and Bluetooth 5.0; only the USB-C power cable is required
Ventilation	15 intake slots (bottom) and 26 exhaust slots (top), 2.2 × 14 mm each, 1,263 mm ² total open area
Pole interface	Ø100 mm, 5 concave saddle ribs, 2 band tunnels 14 × 2.5 mm, clamps DIN 3017 90–110 mm × 12 mm
Environment	indoor only (no sealing, IP20)

CAD sources of purchased parts: [Raspberry Pi 4 Model B STEP](#), [Touch Display 2 7 in STEP](#), [ruthex RX-M2.5x5.7 STEP](#), [ISO 4762 M2.5 × 6 STEP](#). The hose clamp is modelled to the DIN 3017 envelope because vendor CAD requires a login.