Assembly guide

138 × 114 × 68 mm • 13 enclosure parts • sensors, battery, fan and Touch display



Case screw heads extend 2 mm above the roof; the optional wall plate adds 7 mm below the case.

Build the body and roof as separate subassemblies. Complete film removal, tapping and insert installation before adding electronics or soft contact parts.

Order	Work
1	Prepare parts and inserts; fit magnets.
2	Fit USB bulkhead, then sensors and battery cradle.
3	Build the fan and display roof module; adjust four soft contacts.
4	Route the extension, close the case and check the actual mounting surface.

Parts and hardware are listed on pages 2–3. Assembly steps follow on pages 4–12, with checks and mounting coordinates on pages 13–14. Dimensioned views, the exploded assembly and hardware key are on pages 15–22. Coordinates use +X toward the east USB face, +Y toward the fan and +Z toward the roof.

Enclosure parts

One of each part is included. The exact supplied STL filenames below identify the parts used in this assembly.

STL file	Part
PETG_body.stl	Body
PETG_lid.stl	Roof / lid
PETG_display_retainer.stl	Flat display holder
PETG_battery_cradle.stl	Battery cradle
PETG_fan_backing_ring.stl	Fan backing ring
PETG_wall_mount_plate.stl	Optional wall plate
TPU_battery_pad.stl	0.5 mm battery pad
TPU_fan_gasket.stl	1.6 mm fan spacer
TPU_mcu_border_gasket.stl	Continuous display border
TPU_mcu_contact_cap1.stl	Contact cap 1
TPU_mcu_contact_cap2.stl	Contact cap 2
TPU_mcu_contact_cap3.stl	Contact cap 3
TPU_mcu_contact_cap4.stl	Offset contact cap 4

The body has the centered east USB opening. Keep the four contact caps identified: cap 4 has a distinct offset nose. The exploded parts key on page 21 identifies all 13 enclosure parts.

The USB rear clamp and its two shims are obsolete and are not part of this set. The optional wall plate is included in the 13 parts; omit it from the assembly when using direct magnetic mounting.

Hardware & tools

Location	Screws	Inserts / washers
C2 / SCD41	4 × M2 × 6	4 × SHORT M2 × 3; 4 washers
C3 / SGP30	3 × M2 × 6	3 × SHORT M2 × 3; 3 washers
C4 / humidity board	3 × M2 × 6	3 × SHORT M2 × 3; 3 washers
C5 / BME680	3 × M2 × 6	3 × SHORT M2 × 3; 3 washers
Battery cradle	4 × M2 × 6	4 × SHORT M2 × 3
Fan	4 × M2 × 16	4 × SHORT M2 × 3
Holder, six mounts	4 × M3 × 6; 2 × M2 × 6	4 × SHORT M3 × 3; 2 × SHORT M2 × 3
Display adjusters	4 × M2 × 10	Direct M2 × 0.4 taps; no inserts
Case closure	4 × M3 × 8	4 × SHORT M3 × 3
USB bulkhead	2 × supplied M3 pan screws	Uses OEM threaded ears
Optional wall plate	2 × M5 × 8	2 × SHORT M5 × 5.8

Full inventory: 39 screws, 33 inserts and 13 washers; no loose nuts. Inserts total 23 M2 × 3, eight M3 × 3 and two M5 × 5.8. Washers are OD 5 / ID 2.2 / thickness 0.5.

Also prepare 16 Ø6 × 3 magnets, compatible adhesive, two soft 9 mm battery straps, the 51.7 × 33.85 × 10.3 battery, four sensors, Touch LCD, 30 mm fan and one AAOTOKK USB extension. The model’s cable pieces and adhesive regions are not extra purchased objects.

Tools: matching drivers / keys, heat-set tool, M2 × 0.4 tap, caliper and cleanup tools. Sensor-driver working shaft: at least 20 mm exposed below its handle. Controller passages need a slim tool. No installation temperature or tightening torque is specified.

Prepare for assembly

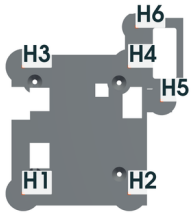
1. Clear ten temporary films

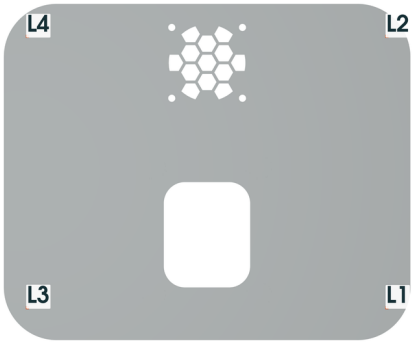
Open all six 0.2 mm mounting-bore films in the display holder and all four case-screw films in the lid. Preserve bearing faces and counterbores; remove chips.

Part	Heat-set inserts to install
Body	13 sensor M2 + 4 battery M2 + 4 case M3 + 2 wall M5 = 23
Lid underside	4 holder M3 + 2 controller M2 = 6
Fan backing ring	4 M2 = 4
Total	33 inserts; finish flush with the intended mounting faces

2. Tap four adjuster pilots

Tap the holder’s four Ø1.6 pilots M2 × 0.4, keeping the tool straight. Modeled thread engagement is 3.2 mm. These four stations use direct threads, not heat-set inserts.

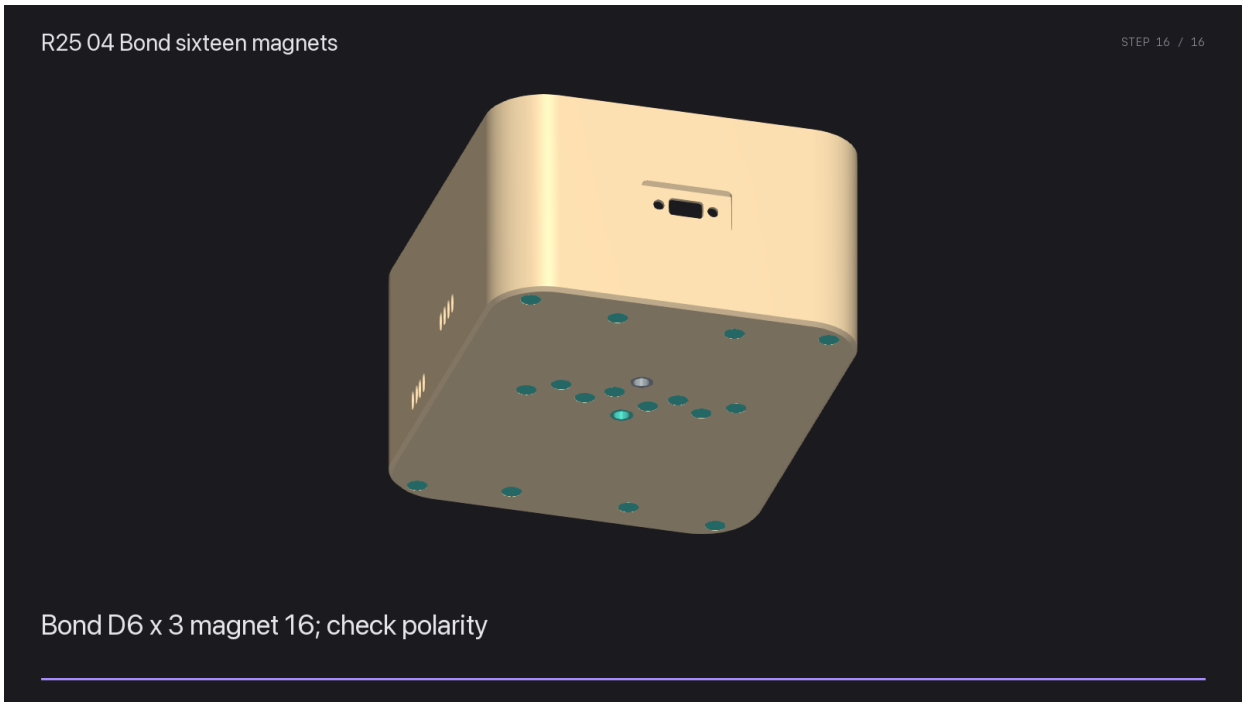




Remove films H1–H6 on the holder and L1–L4 on the lid. H1–H4 are M3 passages; H5–H6 are M2 passages. The four adjuster pilots are tapped separately.

Support each part during insert installation. Finish all hot work and remove swarf before adding the display, sensors, battery, magnets or soft contact parts. Trial-fit the correct screws with electronics absent.

Magnets & rear mounting



Underside arrangement: eight staggered center magnets, four corner magnets and four side magnets. The two larger central openings serve the optional M5 wall plate.

1. Dry-fit all 16 Ø6 × 3 magnets

Use the Ø6.3 × 3.2 seats. The 0.15 mm radial and rear allowances are adhesive space. Check polarity and the actual steel contact before applying adhesive; let it cure fully.

2. Choose the mounting mode

For direct magnetic mounting, remove the wall plate AND both M5 screws. For wall mounting, attach the plate using its two M5 × 8 screws before hanging it on appropriate wall hardware. Wall anchors are not specified.

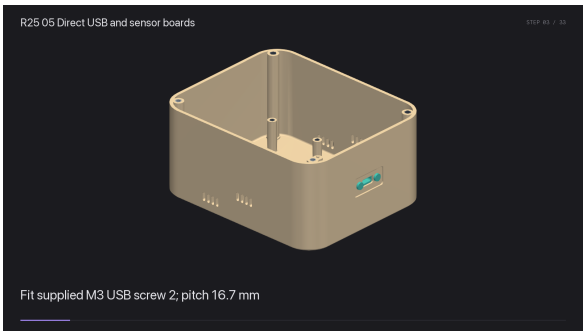
> Test pull-off, sliding and vibration resistance on the real surface with the completed unit. The CAD does not establish magnetic holding force or adhesive strength.

Positions: center X alternates 6 / 12 at Y = −31.5, −22.5, −13.5, −6, 6, 13.5, 22.5, 31.5. Corners: (±61, ±46). Sides: (±57, ±18).

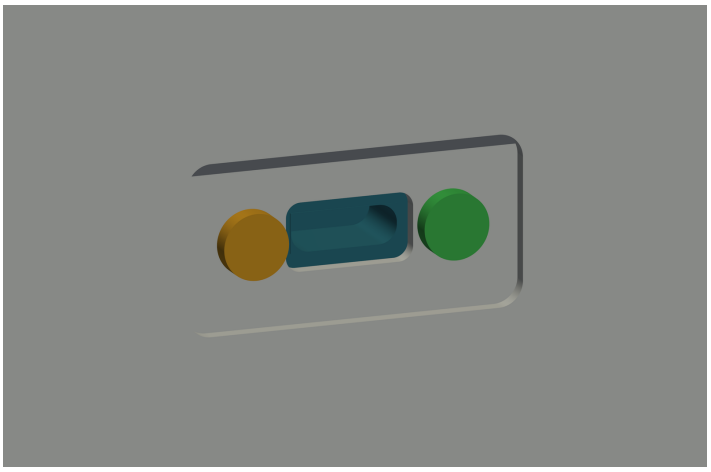


Optional wall mode: fit the plate with both M5 × 8 screws. Remove the plate and BOTH screws for direct magnetic mounting.

Mount the USB bulkhead



The socket is centered on the clear east face at (69, 0, 34). All ventilation slots remain on their original faces.



Two Ø3.4 holes on the measured 16.7 mm pitch. The flange backs a 1.2 mm recessed mounting face; its roof has 45° relief.

1. Seat the female flange from inside

Seat the flange against the east inner wall at X = 66.6, centered on Y = 0, Z = 34. Its rear cable exit is (33.6, 0, 34); the socket faces outward toward +X.

2. Use the two supplied M3 pan screws

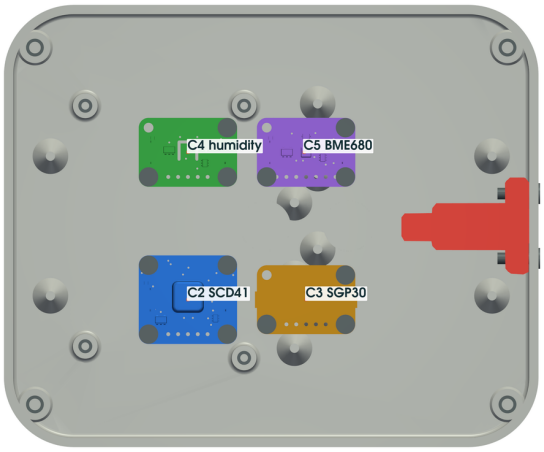
Insert them from outside (+X) through the holes at Y = ±8.35, Z = 34 into the OEM threaded ears. Tighten evenly only until seated, checking neither screw bottoms first. No rear clamp, shims or case inserts are needed.

3. Dry-fit the actual external plug now

Confirm full mating and clearance from both heads while the case is open. The supplied photographs do not define the screw depth or fully seated external plug projection.

> For the modeled 12 × 7 overmold, its shoulder needs about 3 mm forward of the female face to clear the estimated heads. This is a fit condition to check, not a measured property of your plugged-in cable.

Install the four sensors



Four sensor stations. Keep the battery cradle off while fastening boards and connecting the low sensor plugs.

Board	Fasteners	Fourth station
C2 / SCD41	4 × M2 × 6 + 4 washers	Screw at every corner
C3 / SGP30	3 × M2 × 6 + 3 washers	Hole 3 on locating pin
C4 / humidity	3 × M2 × 6 + 3 washers	Hole 3 on locating pin
C5 / BME680	3 × M2 × 6 + 3 washers	Hole 3 on locating pin

1. Fit the lower boards, then the higher boards

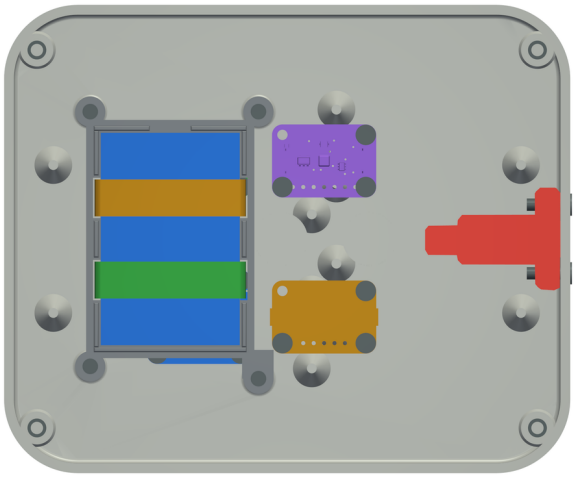
C2 and C4 sit at Z = 6; C3 and C5 sit at Z = 17. Lower pinned boards straight onto all four supports. Put one washer under each screw head; start all screws before seating them evenly.

2. Use a long enough working shaft

Use at least 20 mm of exposed shaft before the driver handle. Keep the cradle removed. A shorter handle clearance can hit the battery posts even though the screw itself is accessible.

C4 uses supplied SHT40 CAD as the reference for the requested SHT45 board. Confirm your actual board fits. Keep sensor ports and connector routes clear; do not force a bowed or rocking board flat.

Fit the battery cradle



Battery subassembly on four posts. The flat pad supports the pouch; the two soft straps provide retention.

1. Prepare the cradle before bolting it down

Thread both 9 mm soft straps through the four cradle slots. Connect the low sensor plugs while they remain accessible.

2. Secure the empty cradle

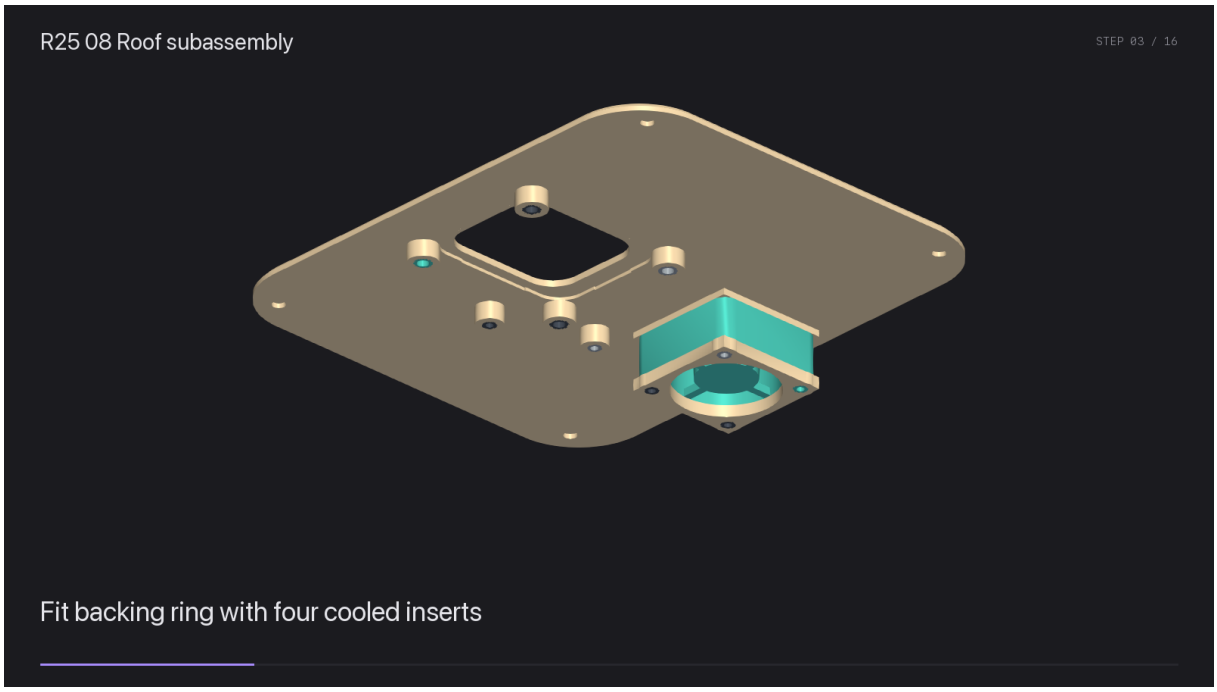
Use four M2 × 6 screws into its four SHORT M2 × 3 inserts. The supports are at (−48, −31), (−48, 31), (−7, −34) and (−7, 31).

3. Fit the pad, battery and straps

Seat the single 0.5 mm pad in the cradle recess, then place the measured 51.7 × 33.85 × 10.3 pack on it. Keep leads out of slots and screw paths; use the rear guide opening only if it matches the actual lead exit. Close the straps without crushing the cell.

Do not stack another pad under this pack. The model does not establish actual battery expansion allowance, lead geometry or strap tension. Controller-tray electronics are not specified by this mechanical design.

Build the fan stack



Fan stack beneath the grille: lid → 1.6 mm spacer → fan → backing ring. Four screws enter from the outer face.

Stack, outside to inside	Part / hardware
1	Lid with grille
2	Fan gasket: 1.6 mm spacer
3	30 × 30 × 10.5 nominal fan
4	Prepared backing ring with four M2 inserts
Through the stack	4 × M2 × 16; no added washers or nuts

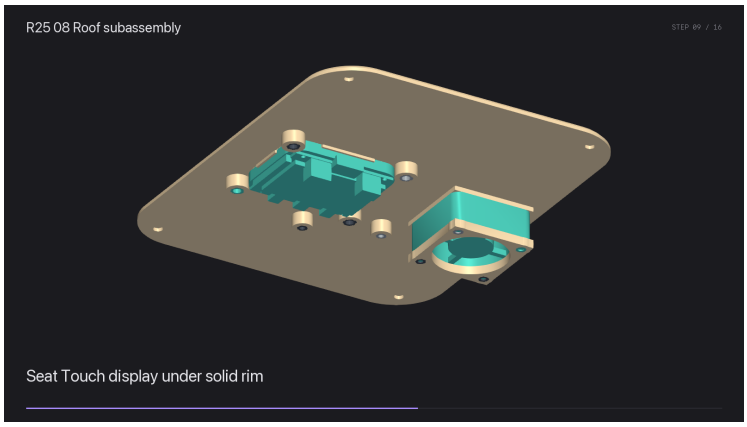
1. Align the four corners

Support the loose fan and ring while starting all four screws. Fan center is (0, 37); screw axes are (±12, 25) and (±12, 49). Check the fan’s real airflow arrow for the intended outward exhaust.

2. Seat the stack evenly

Keep the spacer flat and the grille clear. The four screws have 2.5 mm nominal insert engagement. Route the actual fan lead away from blades and bearing faces; verify free rotation before closing.

Seat display & holder



The lid uses a continuous 1.6 mm solid rim and a continuous 0.5 mm front border. Keep all four side skirts outside the glass edge.

1. Seat the soft border and Touch module

Support the lid by its edges. Place the border in the recess, seat all four skirts and put the display beneath the rim. Do not force glass into the opening. Display center is (0, −20).

2. Prepare the four adjusters

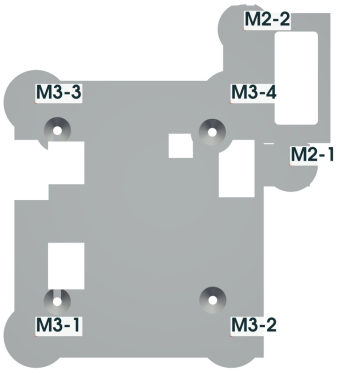
Fit the four soft cups to the M2 × 10 adjuster tips; cap 4 has a distinct offset nose. Start all adjusters retracted. Page 11 identifies the contact points and orientation.

3. Attach the restored flat holder

Use four M3 × 6 and two M2 × 6 screws from the interior side into the six lid inserts. Start all six, then seat the holder on its mounting stops. Never use an adjuster to draw the holder into place.

Mount group	Axes (X, Y)
4 × M3 × 6	(18, −41.5), (−18, −41.5), (18, 1.5), (−18, 1.5)
2 × M2 × 6	(−29, −10), (−20.5, 15)

Work with the roof module off the body. The two controller passages require a slim driver. All six holder inserts have 3 mm modeled engagement.

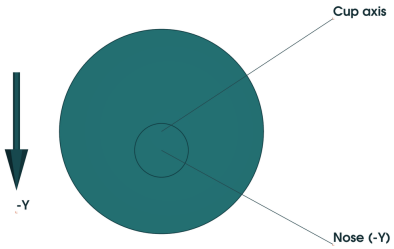


Six holder mounts: four M3 × 6 and two M2 × 6, approached from the interior.

Set four soft contacts



All four M2 adjusters use soft contact cups. Caps 1–3 are centered; cap 4 has an offset nose and must be oriented separately.



Cap 4: its screw/cup axis is at (14.06, −3.70); the nose is at (14.06, −4.05), a 0.35 mm offset toward −Y. The cup sits farther +Y to clear the nearby JST.

1. Check the real contact surfaces

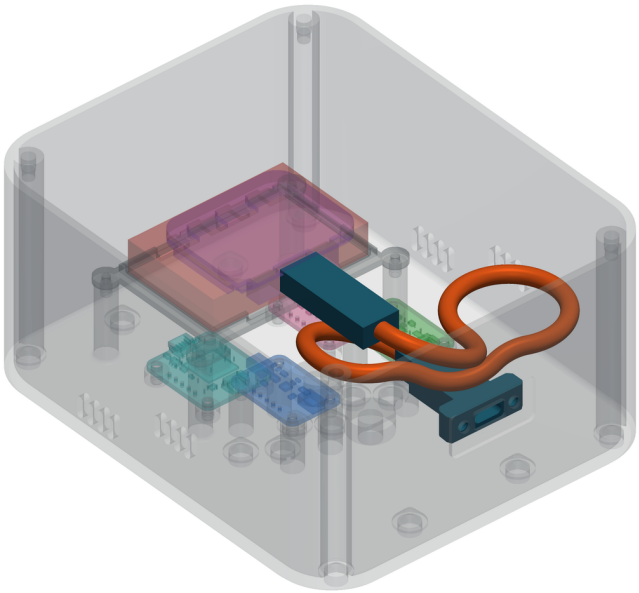
Each soft nose must reach its intended visible corner patch, not a connector or component. Cap 4’s nose points −Y, toward its intended gray patch. The modeled JST clearance is 0.4 mm.

2. Advance gently, alternating corners

Start retracted and advance each adjuster only to FIRST actual contact. Check all four contacts as you alternate corners. Do not compress glass or PCB with torque or a preset preload.

> The photo-derived support plane and PCB thickness are estimates. Maximum unloaded mechanism travel is overtravel once contact is made; it is not a clamping setting. Inspect the actual rear surface if it differs from the reference.

Route the cable & close



The route connects the MCU to the centered east-wall socket. Translucent context exposes the middle loop above the lower components.

1. Connect with the roof open

Connect the extension from the MCU exit at (48, −20, 59.5) to the female rear exit at (33.6, 0, 34). Arrange service slack and keep cable clear of the fan, sensor plugs, battery straps, screw passages and lid seam.

2. Check the actual flexibility

The model represents Ø5 cable with 234 mm estimated flexible length and 15.2 mm minimum radius. These are planning dimensions, not a manufacturer bend rating. Do not force a stiff cable into the drawn curve.

3. Lower and fasten the roof

Lower the roof without pinching wires. Fit the four M3 × 8 screws at (±61, ±46); start all four before seating them evenly. Their heads intentionally stand 2 mm proud—do not force them flush.

Nominal case insert engagement is 3 mm and blind-tip clearance is 0.4 mm. The completed case envelope is 138 × 114 × 68; screw heads reach Z = 70.

Check & service



Completed enclosure. Check the physical assembly before relying on mounting or display retention.

Check	Confirm
Assembly	Ten films removed; no loose chips; all inserts and four tapped adjusters installed.
Electronics	Boards flat on supports; no screw or washer missing; ports and plugs accessible.
Display	Border and skirts seated; all four contacts correct; no forced glass/PCB preload.
USB / cable	Flange seated; supplied screws do not bottom; external plug mates fully; cable has slack.
Closure / fan	No pinched wires; fan rotates freely; four case heads remain 2 mm proud.
Mounting	Actual adhesive cured and holding tested; wall plate and both M5 screws removed for magnetic mode.

To open: disconnect power, remove four case screws and lift only as far as the actual harness slack allows. Disconnect known connectors before separating the roof. To service sensors, remove the battery and cradle first. Support the display before removing its holder; support the fan/ring before releasing its screws.

Check the actual components, cable flexibility, connector seating and mounting before use. No electrical wiring pinout is supplied.

Mounting reference

Coordinates use the fixed CAD frame: +X toward the east USB face; +Y toward the fan; +Z toward the roof. Rotate the physical part for access, but keep these feature IDs.

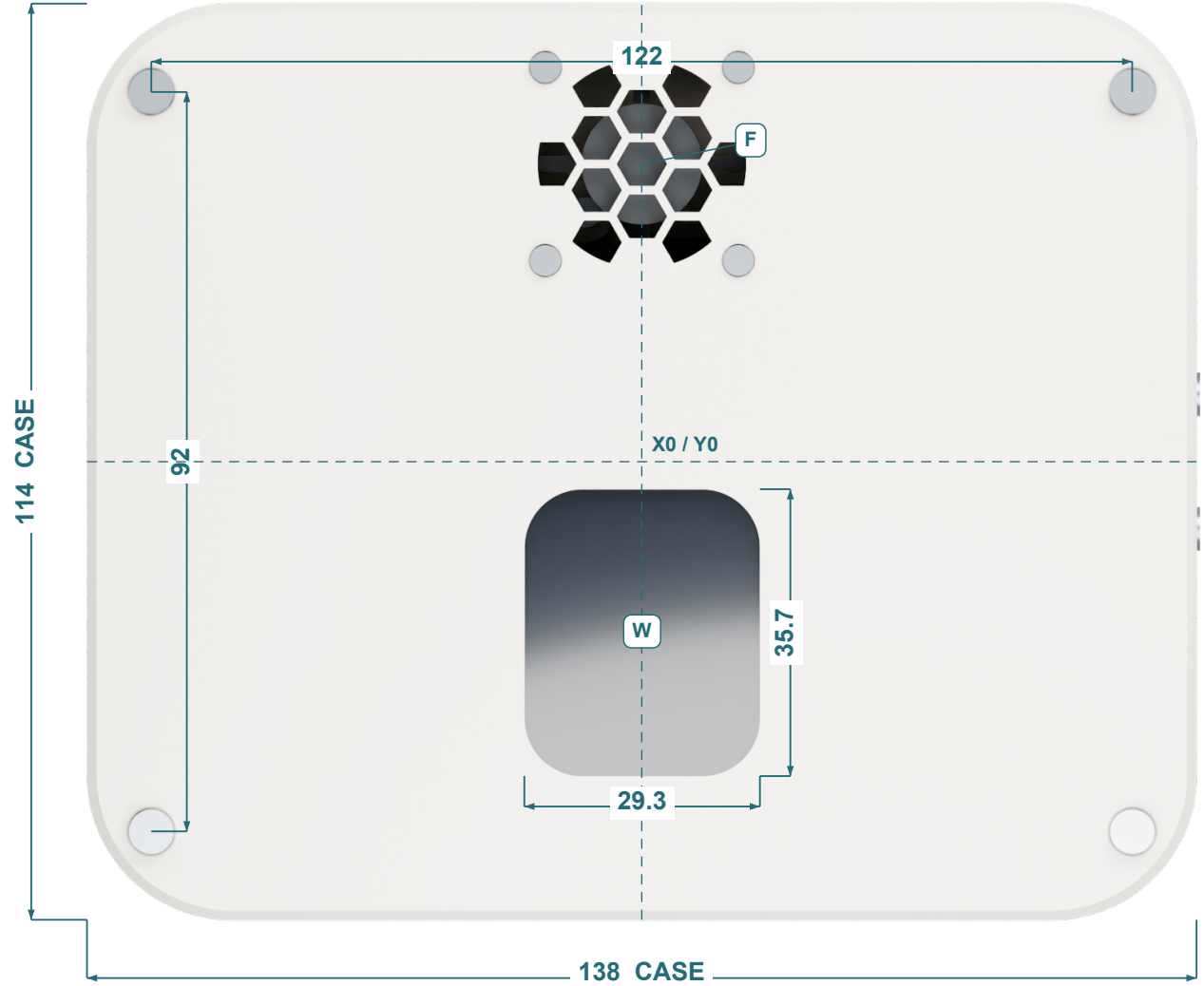
Board / hole	X, Y	Seat Z	Hardware
C2 / 1	-31.66, -27.89	6	M2 × 6 + washer
C2 / 2	-11.34, -27.89	6	M2 × 6 + washer
C2 / 3	-31.66, -10.11	6	M2 × 6 + washer
C2 / 4	-11.34, -10.11	6	M2 × 6 + washer
C3 / 1	-1.16, -25.35	17	M2 × 6 + washer
C3 / 2	19.16, -25.35	17	M2 × 6 + washer
C3 / 3	-1.16, -12.65	17	Locating pin
C3 / 4	19.16, -12.65	17	M2 × 6 + washer
C4 / 1	-31.66, 12.65	6	M2 × 6 + washer
C4 / 2	-11.34, 12.65	6	M2 × 6 + washer
C4 / 3	-31.66, 25.35	6	Locating pin
C4 / 4	-11.34, 25.35	6	M2 × 6 + washer
C5 / 1	-1.16, 12.65	17	M2 × 6 + washer
C5 / 2	19.16, 12.65	17	M2 × 6 + washer
C5 / 3	-1.16, 25.35	17	Locating pin
C5 / 4	19.16, 25.35	17	M2 × 6 + washer

Group	Axes / contact centers
Four adjuster cups	1 (−14.61, −35); 2 (14.10, −35.27); 3 (−14.52, −4); 4 (14.06, −3.70)
Cap 4 nose	(14.06, −4.05): 0.35 mm toward −Y from cup
Fan / case	Fan: (±12, 25), (±12, 49). Case: (±61, ±46).
USB M3	Y = ±8.35; Z = 34; screw axes point along X, entered from +X.
Wall plate M5	(−1.5, 0) and (20, 0); fit from underside.

The supplied STL filenames are listed on page 2. Dimensioned face views, the exploded parts key and the hardware station key follow on pages 15–22.

TOP / LID & DATUMS

View from +Z · +X right / +Y up
Case outline dimensions exclude USB head protrusion



Window and display-module centers differ. All locations use the same case-centered X/Y datums.

01 LID FIXINGS

4 × M3 × 8 case screws
Centers: X ±61 / Y ±46
Pitch: 122 × 92
Heads: 2 proud of lid

02 DISPLAY WINDOW

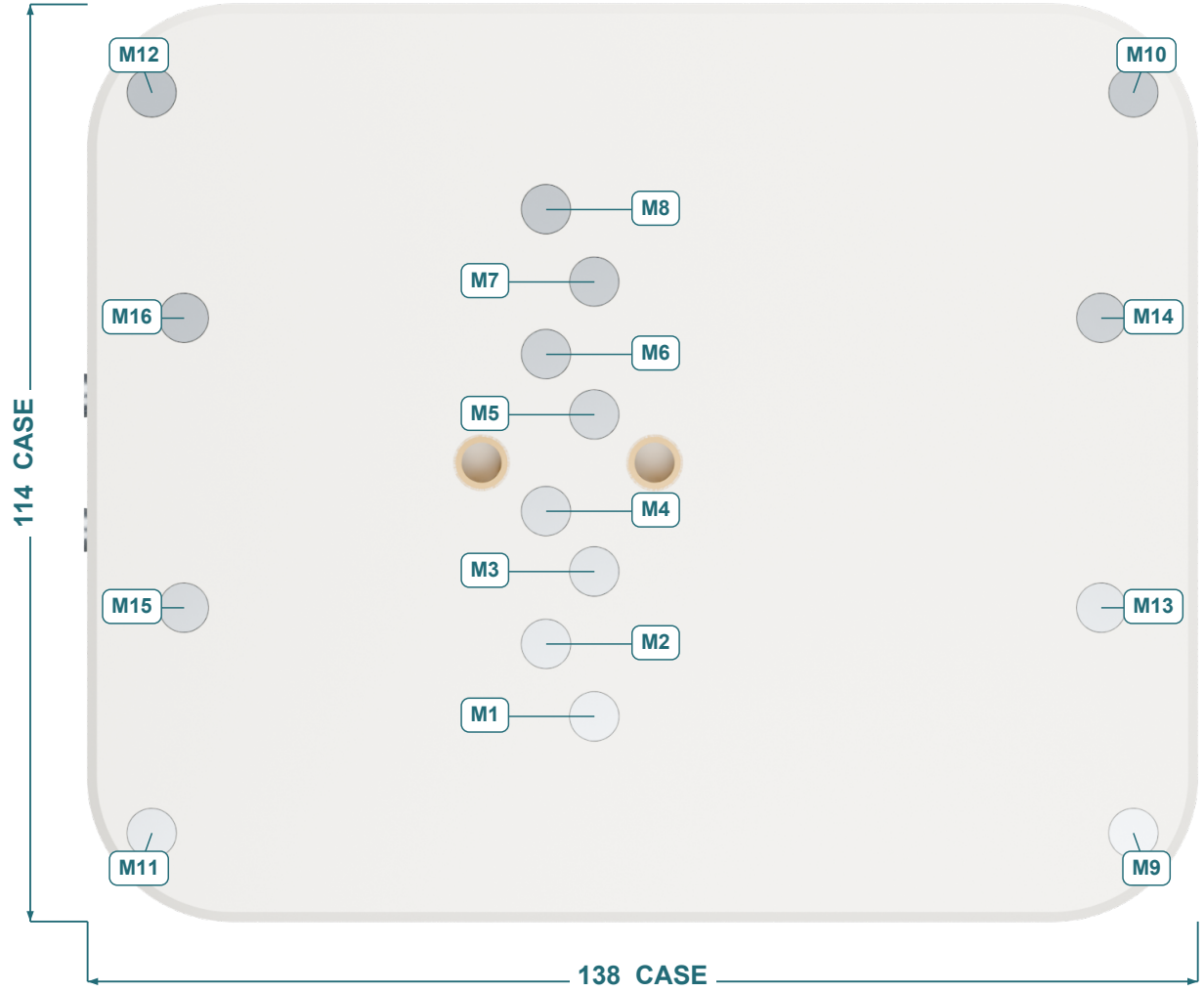
29.3 × 35.7 / R7.2
W center: X +0.0454
Y −21.2711 (CAD datum)
Module center: (0, −20)

03 FAN STATION

F center: (0, +37)
30 mm fan / 24 × 24 pitch
4 × M2 × 16 screws
4 short M2 inserts in ring

BOTTOM / MAGNET ARRAY

View from −Z · −X right / +Y up
Magnetic mounting state: wall plate and both M5 screws removed



Magnet IDs match the coordinate table. Check polarity before bonding; wall plate is a separate mounting option.

16 × Ø6 × 3 MAGNETS

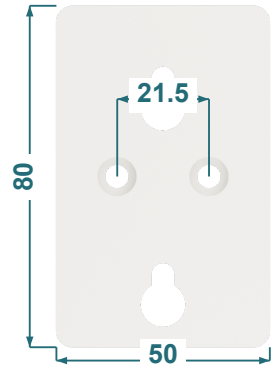
Centers (X,Y), viewed from below

M01 6, -31.5	M09 -61, -46
M02 12, -22.5	M10 -61, 46
M03 6, -13.5	M11 61, -46
M04 12, -6	M12 61, 46
M05 6, 6	M13 -57, -18
M06 12, 13.5	M14 -57, 18
M07 6, 22.5	M15 57, -18
M08 12, 31.5	M16 57, 18

Seats: Ø6.3 × 3.2 deep

8 central + 4 corner + 4 side

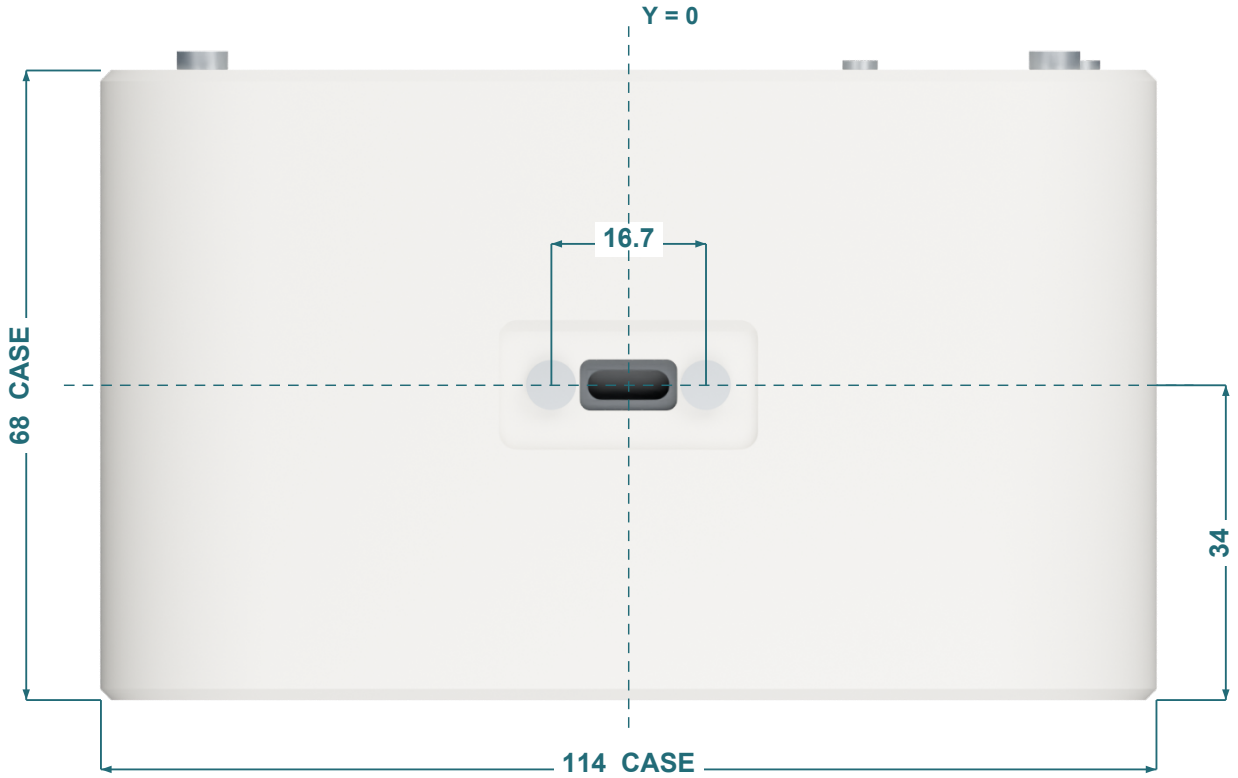
OPTIONAL WALL PLATE



7 thick · 2 × M5 × 8 · short M5 inserts

EAST / USB FACE

View from +X toward the enclosure · +Y to the right
+Z upward · Optional wall plate omitted



01 CENTERED MOUNT

Center: Y 0 / Z 34
Outer face: X +69
2 × Ø3.4 clearances
Hole centers: Y ±8.35

02 OPENING

10.6 × 5.6 / R1.2
Recess: 28 × 14 / R2
Local face: 1.2 thick
Surrounding wall: 2.4

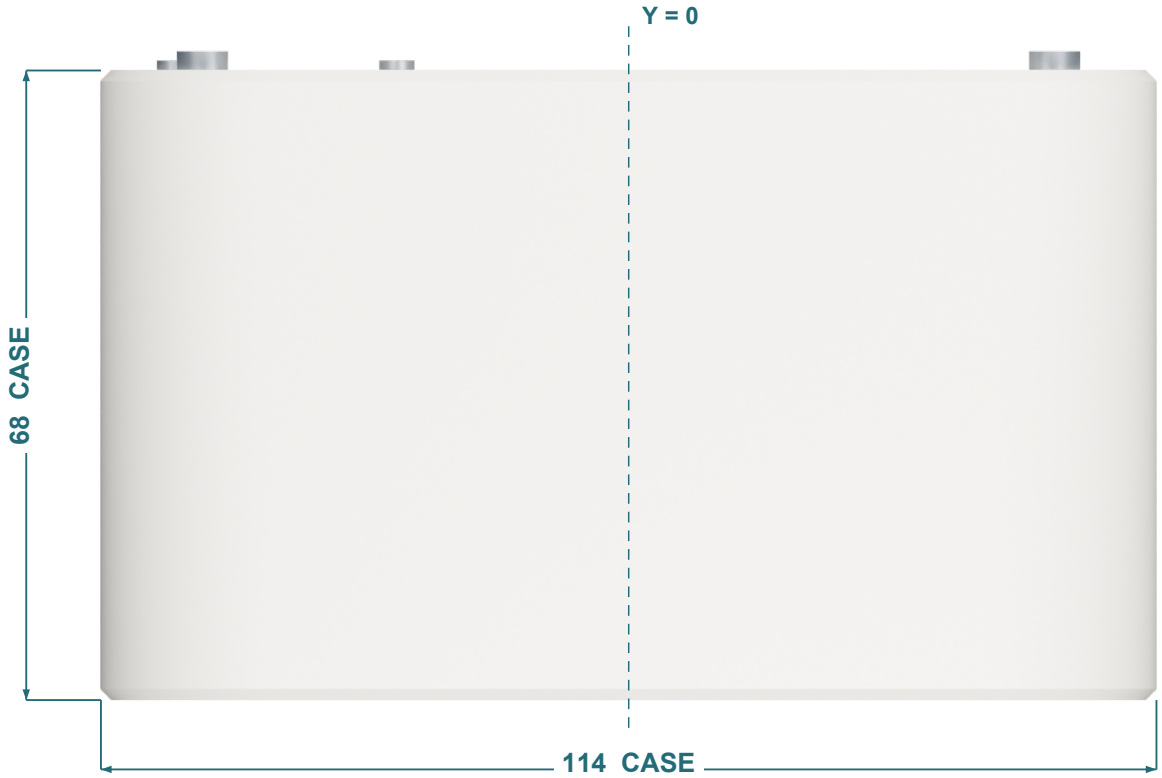
03 HARDWARE

2 supplied M3 screws
16.7 center-to-center
Fit into USB flange
No clamp or inserts

68 is enclosure height. Top screw heads reach Z70; optional plate reaches Z−7 (77 total).

WEST / PLAIN FACE

View from −X toward the enclosure · −Y right / +Z up
Optional wall plate omitted



01 CLOSED ENCLOSURE

Case: 138 × 114 × 68
West face: no port
USB is on east (+X)
Both vent faces retained

02 HEIGHT DATUMS

Bottom: Z 0
Lid exterior: Z 68
Case-screw heads: Z 70
Optional plate: Z −7

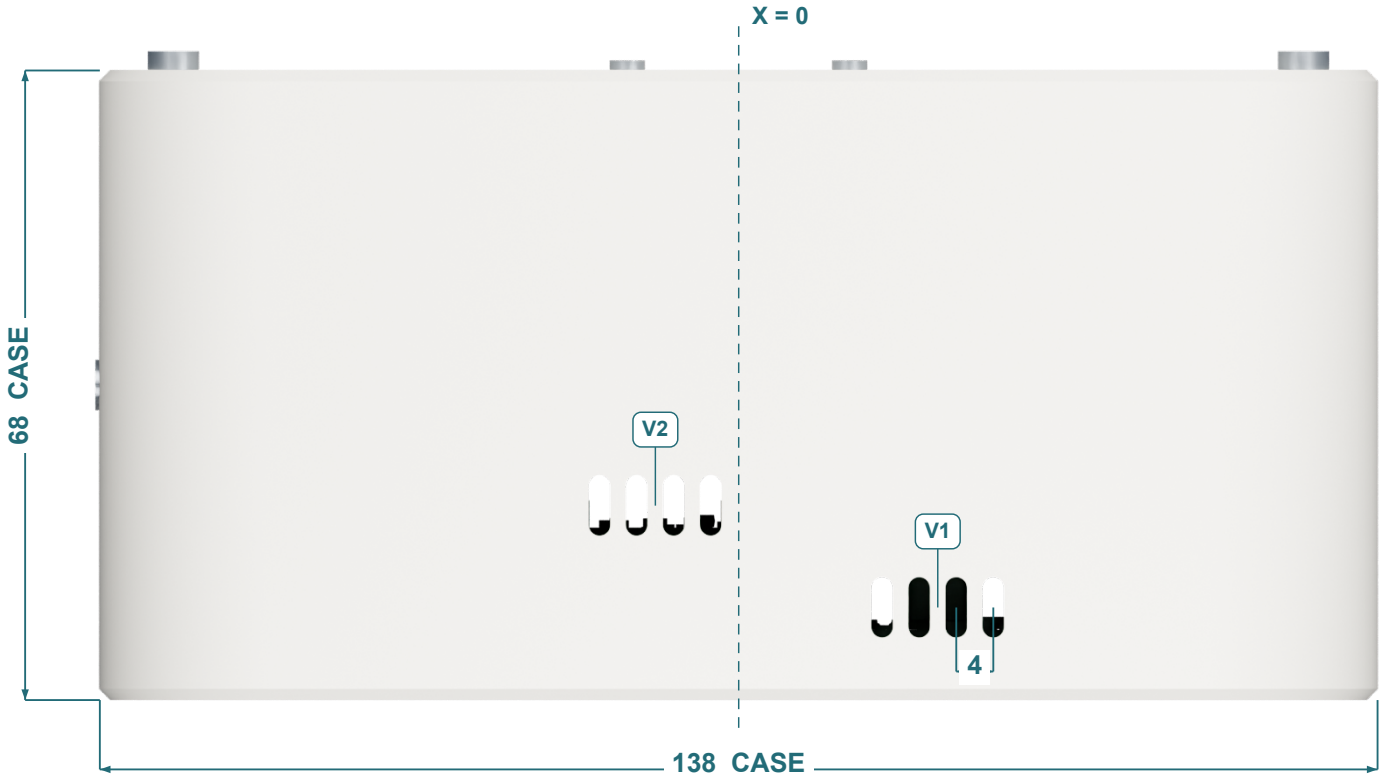
03 BODY DETAILS

Nominal wall: 2.4
Plan corner radius: R18
4 top case fasteners
4 short M3 case inserts

77 total height applies only with the optional wall plate and proud case-screw heads included.

NORTH / VENT FACE

View from +Y · −X right / +Z up
8 ventilation slots on this face



01 VENT PATTERN

2 banks × 4 slots
Each slot: 2.4 × 6.6
Capsule ends: R1.2
4 center-to-center pitch

02 SLOT LOCATIONS

V1 center: X −21.5 / Z10
V2 center: X +9 / Z21
Four offsets per bank:
−6, −2, +2, +6 in X

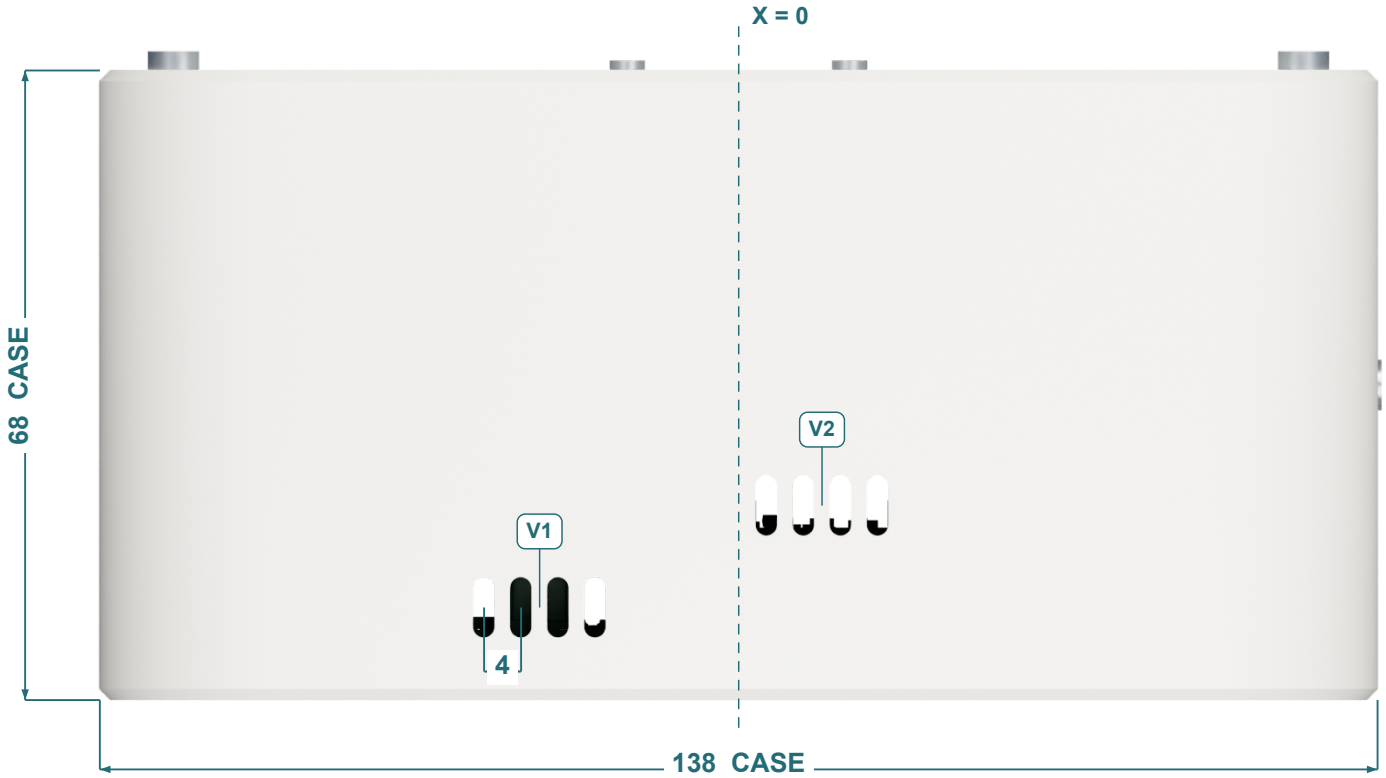
03 FACE STATUS

North and south match
8 slots on each face
16 slots around enclosure
No USB cut on this face

Slot center coordinates are case datums; the left-to-right order reverses when viewing the opposite face.

SOUTH / VENT FACE

View from −Y · +X right / +Z up
8 ventilation slots on this face



01 VENT PATTERN

2 banks × 4 slots
Each slot: 2.4 × 6.6
Capsule ends: R1.2
4 center-to-center pitch

02 SLOT LOCATIONS

V1 center: X −21.5 / Z10
V2 center: X +9 / Z21
Four offsets per bank:
−6, −2, +2, +6 in X

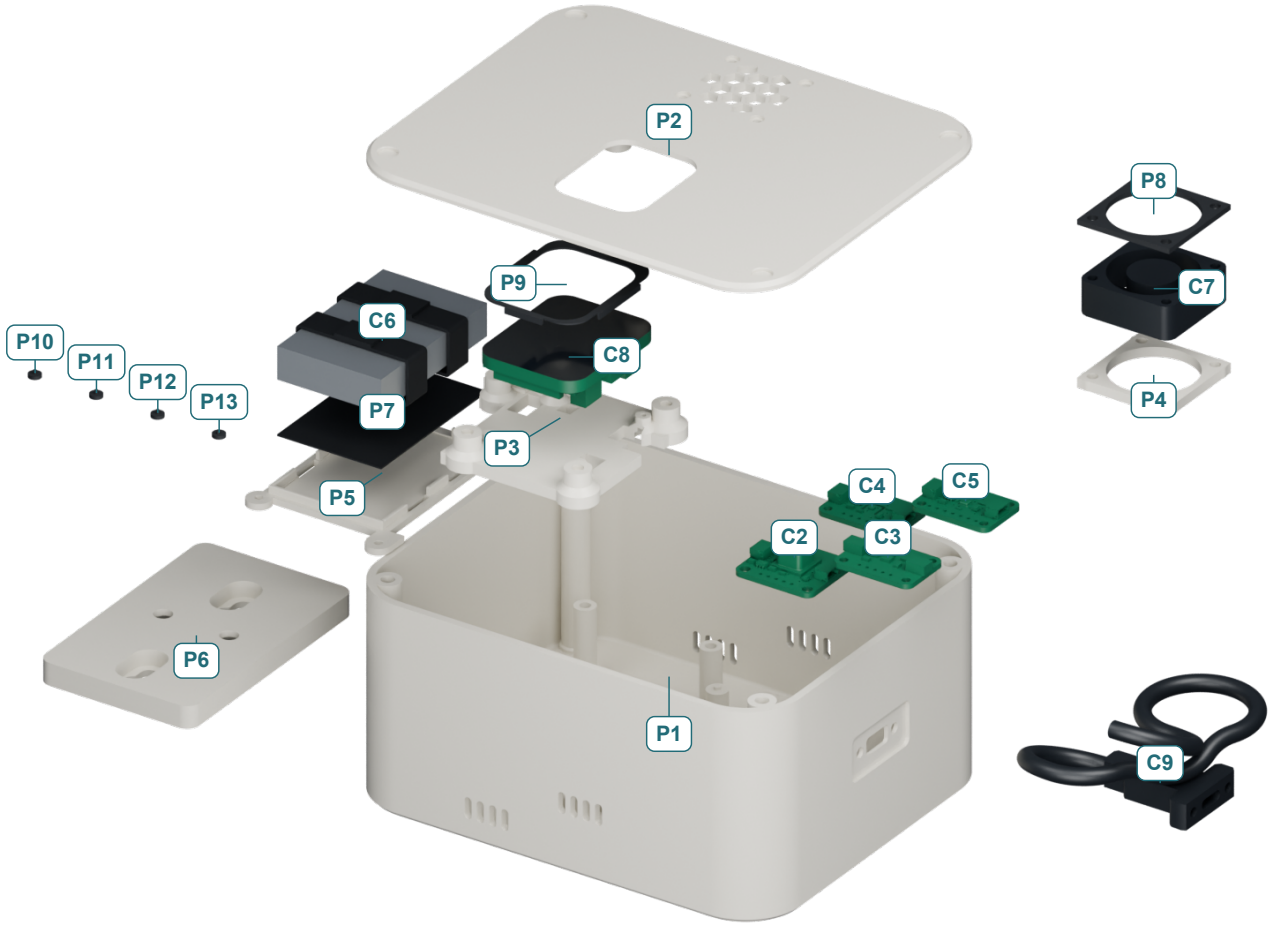
03 FACE STATUS

North and south match
8 slots on each face
16 slots around enclosure
No USB cut on this face

Slot center coordinates are case datums; the left-to-right order reverses when viewing the opposite face.

EXPLODED / PART IDENTIFICATION

13 individually keyed enclosure parts + major components · Hardware station groups are on Drawing 8
Presentation offsets only; follow the assembly sequence



PART KEY / 13 FILES

P01 Body
P02 Lid
P03 Display holder
P04 Fan backing ring
P05 Battery cradle
P06 Optional wall plate
P07 Battery pad
P08 Fan spacer
P09 Display border
P10 Contact cap 1
P11 Contact cap 2
P12 Contact cap 3
P13 Cap 4 / −Y 0.35 mm

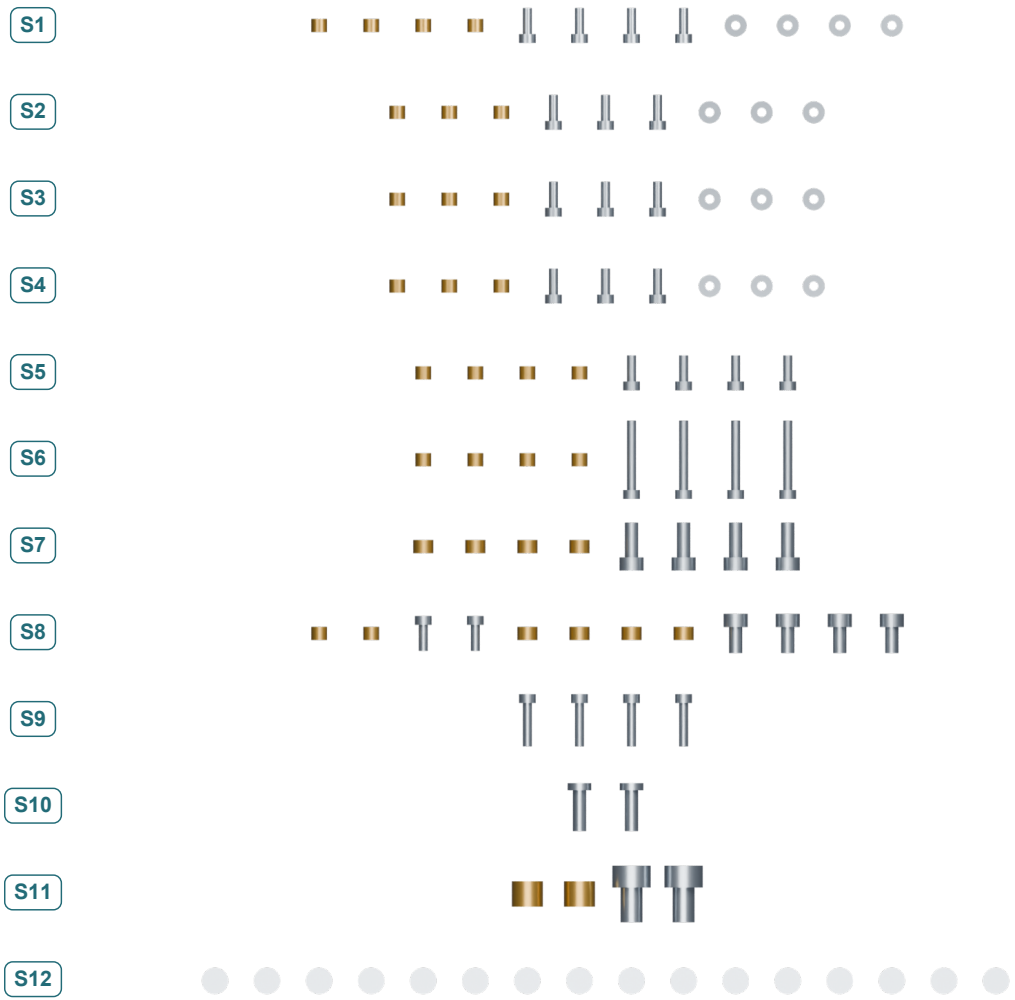
COMPONENT KEY

C2 SCD41 sensor
C3 SGP30 sensor
C4 Humidity sensor
C5 BME680 sensor
C6 Battery + 2 soft straps
C7 30 mm fan
C8 Touch display
C9 USB + flexible extension

Caps are spread apart for identification. Cable shape is a planning reference; exploded offsets are not assembly paths.

HARDWARE / STATION KEY

39 screws / 33 inserts / 13 washers / 16 magnets · No loose nuts
Every hardware instance shown once in its keyed station row



S1 C2 SCD41
4 M2 × 6 + 4 short M2 × 3 inserts + 4 washers

S2 C3 SGP30
3 M2 × 6 + 3 short M2 × 3 inserts + 3 washers

S3 C4 humidity
3 M2 × 6 + 3 short M2 × 3 inserts + 3 washers

S4 C5 BME680
3 M2 × 6 + 3 short M2 × 3 inserts + 3 washers

S5 Battery cradle
4 M2 × 6 + 4 short M2 × 3 inserts

S6 Fan
4 M2 × 16 + 4 short M2 × 3 inserts

S7 Case closure
4 M3 × 8 + 4 short M3 × 3 inserts

S8 Holder mounts
4 M3 × 6 + 2 M2 × 6; 4 M3 × 3 + 2 M2 × 3 inserts

S9 Adjusters
4 M2 × 10 into tapped M2 × 0.4 pilots; no inserts

S10 USB
2 supplied OEM M3 pan screws; measured pitch 16.7

S11 Optional wall plate
2 M5 × 8 + 2 short M5 × 5.8 inserts

S12 Magnets
16 magnets Ø6 × 3; seats Ø6.3 × 3.2 + adhesive

Washers: Ø5 / Ø2.2 / 0.5 thick. USB uses its supplied screws; the unmeasured OEM thread depth is not a stock-length specification.