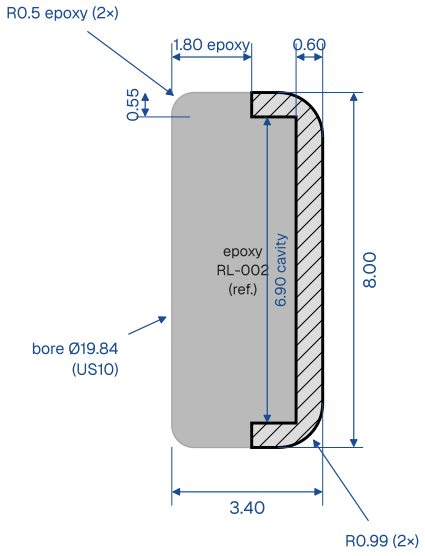
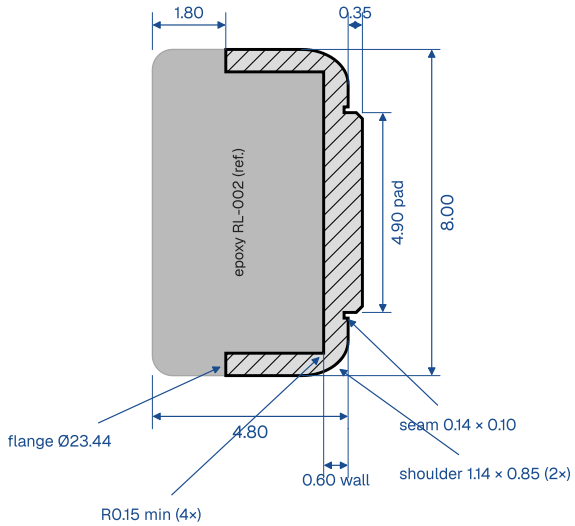
SECTION X–X band (θ 180°), 5.9:1



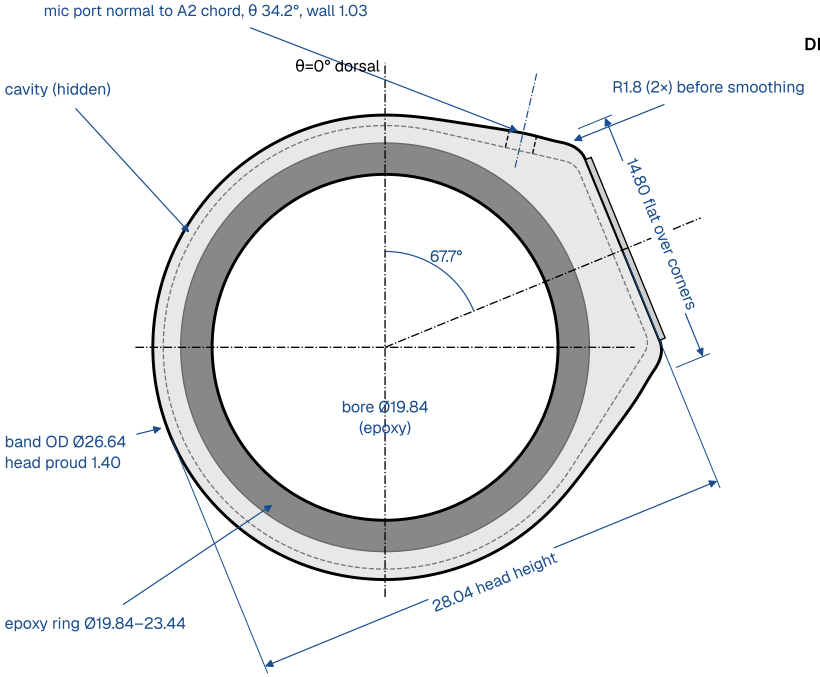
SECTION H–H head centre (θ 67.7°), 5.4:1



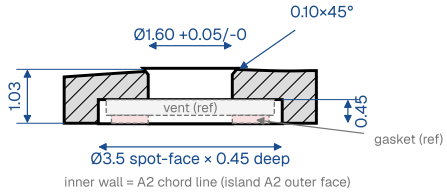
NOTES

1. Material: yttria-stabilised zirconia (3Y-TZP), ≥99.5% theoretical density, white (black option), pigmented body, not coated.
2. Process: ceramic injection moulding (CIM) + sinter; allow ~20% linear sinter shrink in tooling. Green-machine mic port and vent spot-face if not moulded. The pad seam groove is the moulded parting line.
3. External surfaces polished Ra ≤ 0.05; pad top lapped flat within 0.02. Cavity surfaces as-sintered, Ra ≤ 1.6, no glaze (epoxy bond).
4. Datum A = bore axis. Datum B = side face (–Z). Datum C = head flat, normal at θ 67.7° (US10; per size on sheet 6).
5. C-section open to the bore: flanges end at Ø23.44. Epoxy RL-002 forms the bore and the black ring on both side faces (Ø bore .. Ø23.44); bore Ø tolerance set by the potting mandrel.
6. Outer outline = convex hull of the band Ø and the head flat (corner R1.8), smoothed outside the flat; STEP governs. Inspect the front profile on an optical comparator ±0.05.
7. Wall over the cavity 0.60 ±0.04 on the band and under the flat (≤ 0.65 under the pad: touch sensitivity). Flank walls thicken to 1.14 max by the outline. Zirconia ≥ 0.40 everywhere incl. shoulders.
8. Outer shoulders elliptical, varying round the ring: 0.99 on the band, up to 1.58 × 1.22 (radial × axial) on the flanks, 1.14 × 0.85 on the flat. Blend smoothly.
9. Mic port Ø1.60 +0.05/-0, axis normal to the island A2 chord (not radial), through the 1.03 flank wall; chamfer 0.10 × 45° outside. Spot-face Ø3.5 × 0.45 deep on the inner wall holds gasket + vent; floor flat, Ra ≤ 0.8.
10. Raised stadium touch pad 11.20 × 4.90 (R2.45 ends), 0.35 proud of the flat, edge break 0.15; seam groove 0.14 wide × 0.10 deep round it. Centred on the flat and Z = 0.
11. No sharp internal corners in the cavity: R0.15 min at the flange root. Flange inner faces flat within 0.03 (potting mould seal).
12. 100% visual + go/no-go head height + wall thickness (ultrasonic or sectioned sample per lot) + 1.2 m drop onto granite ×3 (sample).

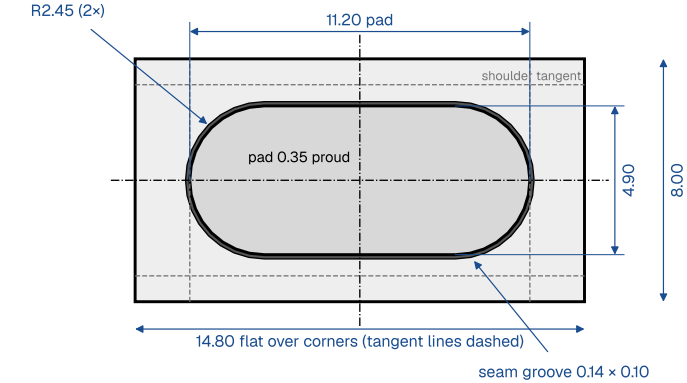
FRONT VIEW from +Z, 2.3:1: θ from dorsal toward thumb (clockwise)



DETAIL D: mic port, section along port axis (6.9:1)

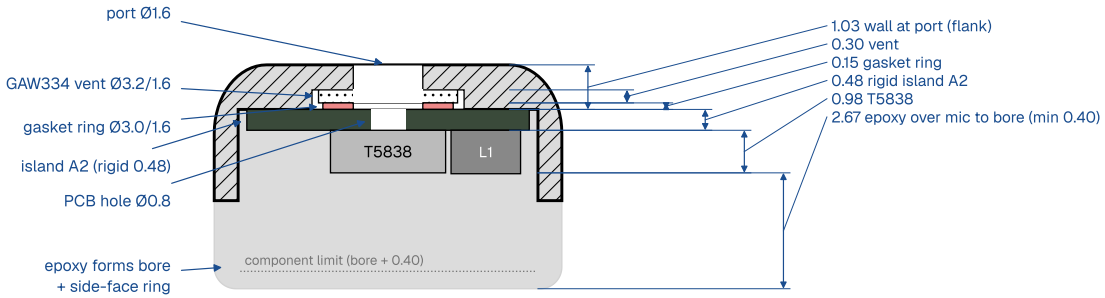


VIEW P: on the head flat (along –u), 4.0:1; v along flat →, Z ↑



flowsXR **Ringlet**	PART / DRAWING **RL-001 Shell zirconia (US10 nominal)**	REV / DATE B 2026-10-29
TITLE **Zirconia shell: sections, front view, details**	SCALE / UNITS as noted mm	SHEET 1 / 6

SECTION M–M through mic port (θ 34.2°, axis normal to A2 chord), 5.7:1

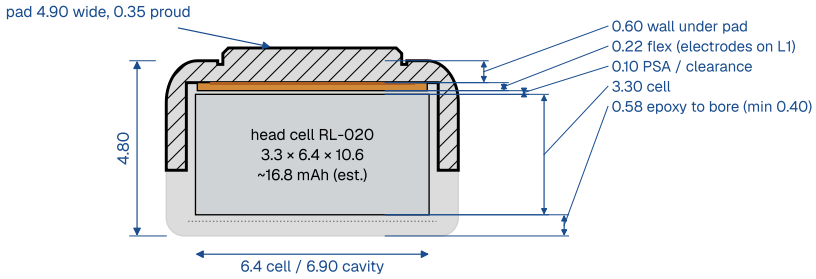


in spot-face: vent 0.3 + gasket 0.15 = 0.45 (pocket 0.45); below wall: rigid 0.48 + mic 0.98 = 1.46 of 3.73 available (wall to bore liner along the port axis)

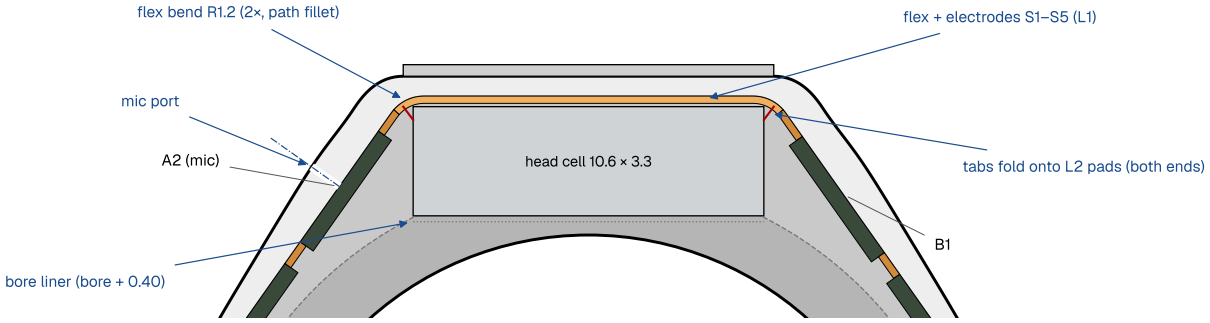
NOTES

1. Section M–M lies in the plane of the mic port axis, normal to the island A2 chord (A2 sits on a straight flank run of the flex path, so the chord sagitta is 0).
2. Acoustic path: shell port Ø1.6 → Gore GAW334 vent (PSA to the spot-face floor, pressure-roll ≥ 2 N for 3 s) → gasket ring 0.15 free / 0.15 installed → PCB hole Ø0.8 → T5838 bottom port.
3. Vent + gasket sit entirely in the Ø3.5 × 0.45 spot-face; gasket compression is set by island A2 seating flat on the cavity wall (straight flank, PSA). Zirconia left on the port axis 0.58 (≥ 0.40).
4. Section H–H through the head centre: pad, 0.60 wall, flex with touch electrodes S1–S5 on L1 (shell side), 0.10 PSA/clearance, head cell RL-020 (3.3 × 6.4 × 10.6), epoxy to the bore.
5. Head cell is flat, between the bore liner (bore + 0.40) and the flex under the flat; tabs fold onto L2 pads at both ends of the flat. Same cell for every size.
6. Minimum epoxy over any component to the bore surface: 0.40. Measured by X-ray/section on first articles.
7. Flex is bonded to the cavity outer wall with 50 µm PSA (3M 9471LE or ODM equivalent) before potting; islands on flank runs are flat on the wall.

SECTION H–H head centre (θ 67.7°), 4.8:1

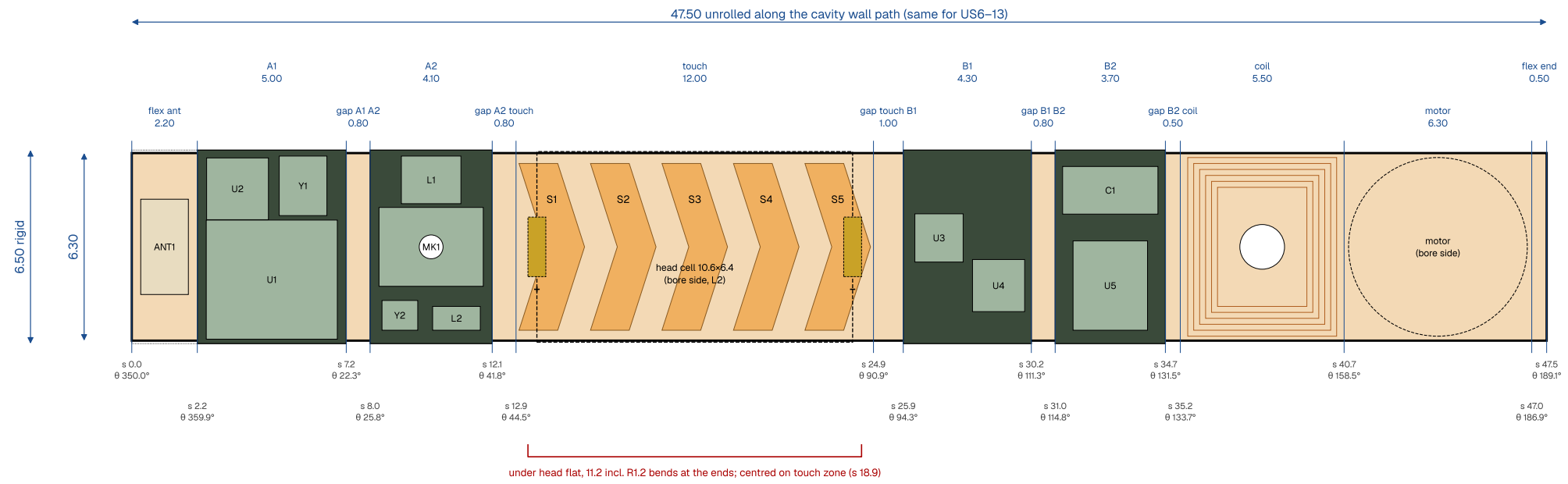


HEAD REGION from +Z, rotated head-up (4.4:1)



flows XR **Ringlet**	PART / DRAWING **RL-000 Assembly (US10)**	REV / DATE B 2026-10-29
TITLE **Assembly sections: mic stack and head**	SCALE / UNITS as noted mm	SHEET 2 / 6

UNROLLED VIEW (5.0:1) from the SHELL side (L1). Component side faces the bore; bore-side items dashed. Components for position only.



STACK-UP (bore side at bottom, shell side at top of each stack)

FLEX zones (0.22 + 0.05 PSA)

PSA to shell	50 µm
coverlay (shell side)	28 µm
Cu L1 (electrodes, coil)	18 µm
PI core	25 µm
Cu L2 (components, shield, cell pads)	18 µm
coverlay (bore side)	28 µm

Σ 0.17 mm (nominal)

RIGID islands (0.48)

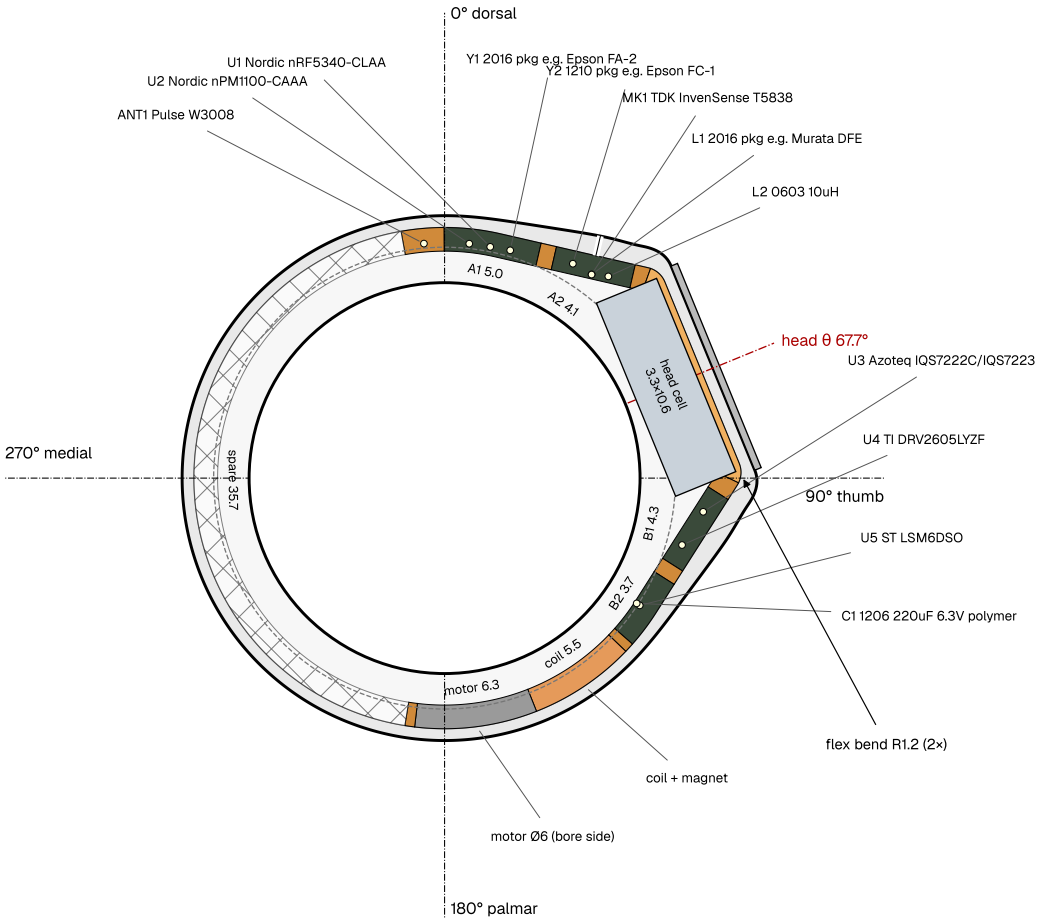
soldermask	20 µm
Cu L3 (outer, shell side)	35 µm
no-flow prepreg	90 µm
Cu L1	18 µm
PI core	25 µm
Cu L2	18 µm
no-flow prepreg	90 µm
Cu L4 (components)	35 µm
soldermask	20 µm

Σ 0.35 mm (nominal)

NOTES

1. Rigid-flex, ONE part for every size: 47.5 long, no cut-to-size. Antenna end at θ 350°; zones are lengths along the cavity wall path, so the head (touch zone) angle shifts with size (sheet 6). The rest of the band arc stays empty (epoxy).
2. Flex: 2-layer, 25 µm PI core, 12 µm Cu (18 after plating), coverlay 12.5 µm PI + 15 µm adhesive both sides → 0.22 ±0.03. ENIG.
3. Rigid islands: 4-layer, flex core + 2 outer layers on no-flow prepreg, 0.48 ±0.05 total. Laser microvia L1–L2, no through-via under WLCSP (via-in-pad filled+capped).
4. Layer facing the SHELL (L1): touch electrodes (chevron), charging coil, hatched ground guard around electrodes (25% hatch). Layer facing the BORE (L2 / L4): components, cell tab pads, driven-shield plane under electrodes (L2).
5. Electrodes: 5 self-capacitance chevron segments over the 12.0 touch zone, 0.20 gap, 5.60 wide; centred under the 11.2 raised pad. Keep 0.35 Cu-free margin to the flex edge. No stiffener under electrodes.
6. Head cell 3.3 × 6.4 × 10.6 bonded on the bore side under the touch zone; tab pads (VBAT+ / GND) 0.6 × 2.0 at both cell ends, NTC on island A1. Run VBAT/GND 0.3 traces on L2 back to A1.
7. Coil: 6 turns/layer × 2 layers, 0.10 trace / 0.10 space, series-connected through 2 vias; Ø1.5 Cu-free hole at centre for the alignment magnet (bonded to shell).
8. Antenna zone: 0.10 PI stiffener under ANT1; Cu keep-out per Pulse W3008 datasheet (ground only on the SoC side).
9. Bend zones (gaps, and the corners where the path leaves the flat): no vias, traces perpendicular to bend, teardrops; min bend radius after assembly 2.0 (static).
10. Test/programming pads (SWD, UART, VBAT, GND, TOUCH_TEST): 6 × Ø0.6 on L4 of island B2, bore side; potted after test.
11. Deliver: Gerber X2 + ODB++, stackup drawing, netlist, pick-and-place, 3D STEP of islands (from the rev B assembly STEP).

flowsXR **Ringlet**	PART / DRAWING **RL-010 Rigid-flex (one length, all sizes)**	REV / DATE B 2026-10-29
TITLE **Rigid-flex: unrolled outline and zones**	SCALE / UNITS as noted mm	SHEET 3 / 6



NOTES

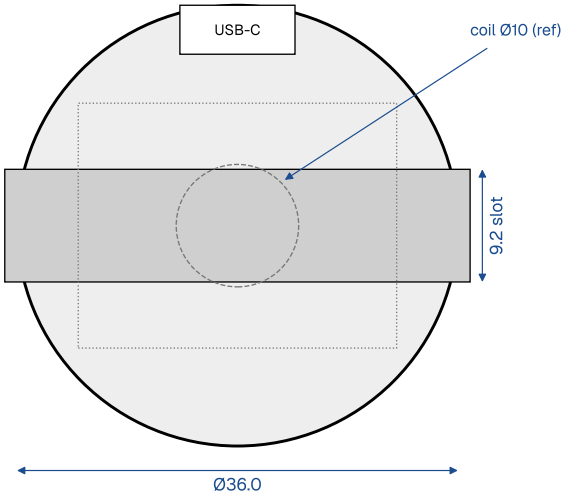
1. Plan view from +Z (finger tip toward viewer for a right index finger). θ from dorsal (0°) toward the thumb side (+X).
2. The signet head faces the thumb at θ 67.7° (US10); the raised pad (grey strip on the flat) sits over the touch electrodes and the head cell.
3. Zones are lengths along the cavity wall path (round in the band, flat under the pad, straight tangent runs on the flanks), starting at the antenna end θ 350°. The flex (47.5) is the same part for every size.
4. The spare arc (no flex) is epoxy only; its length grows with size (sheet 6).
5. Islands A2 and B1 sit on the straight flank runs; the mic port is normal to A2.
6. The path is filleted R1.2 at both ends of the flat (flex bend radius ≥ 5× flex thickness); no vias or parts in the bends.

zone	kind	s0	s1	len	start°	end°	wall
flex_ant	flex	0.0	2.2	2.20	350.0	359.9	0.60
island_A1	rigid	2.2	7.2	5.00	359.9	22.3	0.66
gap_A1_A2	flex	7.2	8.0	0.80	22.3	25.8	0.91
island_A2	rigid	8.0	12.1	4.10	25.8	41.8	1.10
gap_A2_touch	flex	12.1	12.9	0.80	41.8	44.5	1.07
touch	touch	12.9	24.9	12.00	44.5	90.9	0.60
gap_touch_B1	flex	24.9	25.9	1.00	90.9	94.3	1.10
island_B1	rigid	25.9	30.2	4.30	94.3	111.3	1.09
gap_B1_B2	flex	30.2	31.0	0.80	111.3	114.8	0.87
island_B2	rigid	31.0	34.7	3.70	114.8	131.5	0.68
gap_B2_coil	flex	34.7	35.2	0.50	131.5	133.7	0.60
coil	coil	35.2	40.7	5.50	133.7	158.5	0.60
motor	motor	40.7	47.0	6.30	158.5	186.9	0.60
flex_end	flex	47.0	47.5	0.50	186.9	189.1	0.60
spare	spare	47.5	83.2	35.72	189.1	350.0	0.60

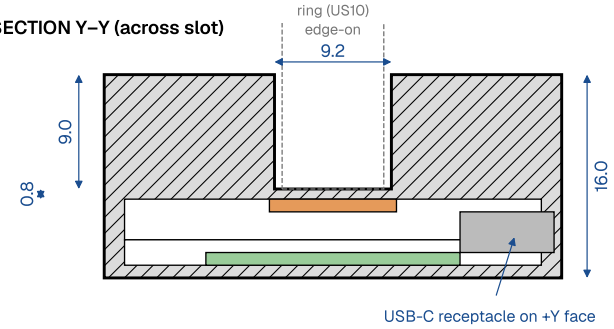
s = mm along the cavity wall path from the antenna end; wall = outer wall at zone mid.

flowsXR Ringlet	PART / DRAWING RL-000 Layout	REV / DATE B 2026-10-29
TITLE Layout map along the flex path (US10)	SCALE / UNITS as noted mm	SHEET 4 / 6

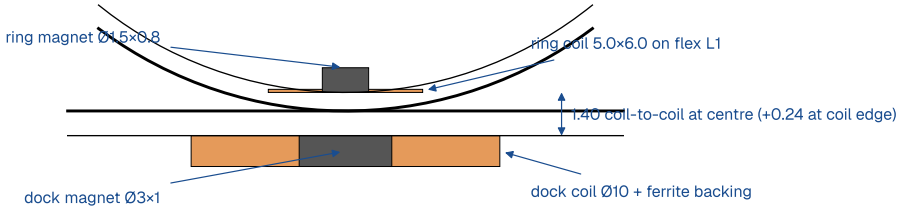
TOP VIEW



SECTION Y–Y (across slot)



DETAIL C: inductive coupling at slot floor (8:1)



NOTES

1. Dock is a two-part PC/ABS housing (base + top), matte black soft-touch, 4 self-tapping M1.4 screws from below under a silicone foot pad.
2. Ring stands on edge in the slot, outer face down. Alignment magnet in the dock (Ø3 × 1 NdFeB) under the slot floor attracts the ring's Ø1.5 magnet so the ring self-rotates to put its coil over the dock coil.
3. Slot 9.2 wide × 9.0 deep, through the full diameter; floor wall 0.8 under the slot. Fits every ring size (largest OD 29.1, head 30.5).
4. Charging: 6.78 MHz resonant (AirFuel class-E driver on dock PCB) or 125 kHz Qi-style per ODM preference; ring side is fixed (planar coil + nPM1100 via rectifier/LDO). Dock must stay < 45 °C skin-touch.
5. USB-C receptacle (power only, 5 V, CC pull-downs) on the +Y face, perpendicular to the slot. One white status LED light pipe 1.5 mm on the +Y face next to USB-C.
6. Dock STEP: RL-100_dock_assembly.step (housing envelope + coil/PCB envelopes). ODM to finalise internal ribs, screw bosses and PCB.

flows XR **Ringlet**	PART / DRAWING **RL-100 Dock**	REV / DATE B 2026-10-29
TITLE **Charging dock: envelope**	SCALE / UNITS 2:1 mm	SHEET 5 / 6

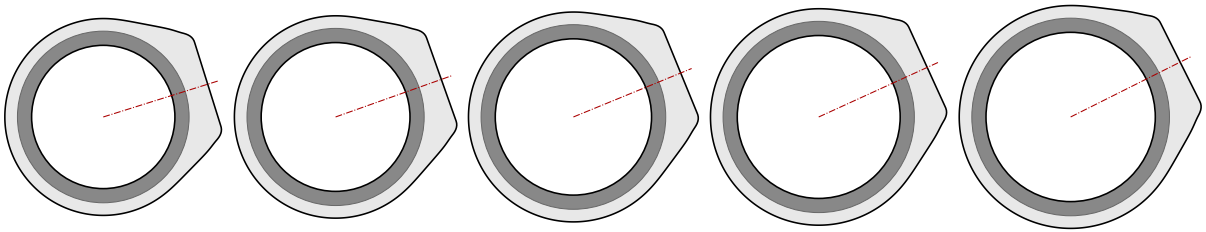
size	bore Ø	band OD	head height	bore circ.	flex len	spare arc mm	θ head °	cell (to quote)	mAh est.	mass g	pilot
US 6	16.51	23.31	24.71	51.9	47.5	25.7	78.2	3.3×6.4×10.6	16.8	5.27	-
US 7	17.35	24.15	25.55	54.5	47.5	28.2	75.3	3.3×6.4×10.6	16.8	5.41	-
US 8	18.19	24.99	26.39	57.1	47.5	30.7	72.6	3.3×6.4×10.6	16.8	5.55	yes
US 9	18.89	25.69	27.09	59.3	47.5	32.9	70.4	3.3×6.4×10.6	16.8	5.67	yes
US 10	19.84	26.64	28.04	62.3	47.5	35.7	67.7	3.3×6.4×10.6	16.8	5.83	yes
US 11	20.68	27.48	28.88	65.0	47.5	38.3	65.4	3.3×6.4×10.6	16.8	5.97	yes
US 12	21.49	28.29	29.69	67.5	47.5	40.7	63.4	3.3×6.4×10.6	16.8	6.11	yes
US 13	22.33	29.13	30.53	70.2	47.5	43.3	61.4	3.3×6.4×10.6	16.8	6.25	-

Mass breakdown US10 (g): shell 3.33, epoxy 1.48, cell 0.47, motor 0.25, flex 0.17, parts 0.11, magnet 0.01, total 5.83

NOTES

1. Bore from ISO 8653 circumference / π. Finished bore is formed by the potting mandrel (epoxy surface).
2. Head height = flat face to the opposite band surface (band OD/2 + flat distance).
3. Pilot run offers US 8–12. The head cell (3.3×6.4×10.6) fits every size US6–13; US6, 7 and 13 are tooling options.
4. One shell tool per size (CIM). Flex: ONE part, 47.5 long, for every size; the spare arc (no flex) is epoxy and grows with size. Potting mandrel per size.
5. θ head moves with size because the zones are fixed lengths from the antenna end at θ 350°; the head is always centred on the touch zone.
6. Cell capacity is an estimate at 0.075 mAh/mm³: Grepow to quote. Mass from model volumes and nominal densities.

Front outlines US8–12 (from +Z, 1.0:1); red = head axis



US8
head 26.39
θ 72.6°

US9
head 27.09
θ 70.4°

US10
head 28.04
θ 67.7°

US11
head 28.88
θ 65.4°

US12
head 29.69
θ 63.4°

Unless otherwise stated: linear ±0.05, angular ±0.5°, surfaces Ra 0.2 (external), break edges R0.1. Third-angle projection.

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flows XR **Ringlet**	PART / DRAWING **RL-000 Sizes**	REV / DATE B 2026-10-29
TITLE **Sizes, head cell, mass**	SCALE / UNITS as noted mm	SHEET 6 / 6