VESC A BOX · PARTS

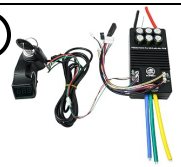
Boat 1 · A7 · v10.5 · the only motor controller · aluminum 11.8 x 8.3 x 3.9 in, floor glued to the hull

A



Box, CXCESNS aluminum
11.8 x 8.3 x 3.9 in. Its floor is the cooling plate
1 · have

B



Flipsky 75200 Pro V2.0
5-1/8 x 2-11/16 in, 1-5/8 in tall
1 · have

C



Power posts, MGI 3/8 in
Each takes 2, 8 and 12 AWG lugs
2 · have

D



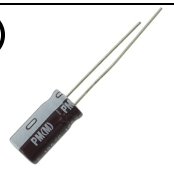
Gap pad, Minus Pad 8
0.04 in, cut 5.1 x 2.7 in, punched at the 4 holes
1 · check shelf

E

flat-head stainless screws

316 flat-heads
4 up into the Flipsky (M3 or M4)
4 · read the parts

F



Capacitors, Nichicon 1,000 uF 63 V
Lying in a row, stripes one way
4 · have

G



WAGO 221-415
One +, one –. Flat, levers up
2 · have

H



Capacitor tails
Butt splice, 18 AWG red or black, 3 to 4 in
8 · have; wire: check

I



12 AWG leads and lugs
WAGO to post, under 6 in. Lugs 3/8 in
2 · have

J



Ring lugs 3/8 in
8 AWG x5 (B+, B–, U, V, W); 2 AWG x2 (feed)
7 · have

K



Neutral-cure silicone
Glues caps and WAGOs down (Permatex Ultra Black, a pick)
1 · buy

L



Glands
PG16 x2 (+, –), PG7 x3 (C, S, U), PG21 x3 (motor)
8 · fitted

M

short stainless bolts

Phase joint hardware
3/8-16 x 1 in 316 bolt, washers, nyloc, 1 in heat-shrink
3 sets · buy bolts

O

3-pin plug with a loop

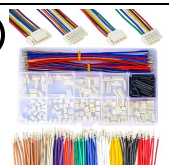
Shorted switch plug
IGNITE joined to BAT+, GND empty
1 · make

P



COMM lead, JST-PH 8
Pre-crimped leads
1 · have

Q



CAN lead, JST-GH 5
CANH, CANL, GND only
1 · have

R

3-pin lead

Servo plug lead, 3-pin
PPM and GND. JST-PH 2 mm
1 · have

S

heavy red and black cable

2 AWG tinned feed
Red, black, twisted. 5 to 6 ft or about 10 ft
2 runs · have

T



Resistors 10k, 20k
10k pull-up; 10k, 20k on sin and on cos
5 · have (check 20k)

U



Desiccant pack
The floor runs near sea temperature
1 · check shelf

V

6-pin lead

Sensor plug lead, 6-pin
TEMP and GND. JST-PH 2 mm
1 · have

W



Metri-Pack 150, 8-way
Mates the motor's grey sensor pigtail
1 · check (no mail)

X

small multi-core cable

Sensor harness cable
Six wires. Not named; length open
1 · open

Y



Micro-C cords, cut
C (CAN drop) and U (Pi A cable)
2 · count shelf

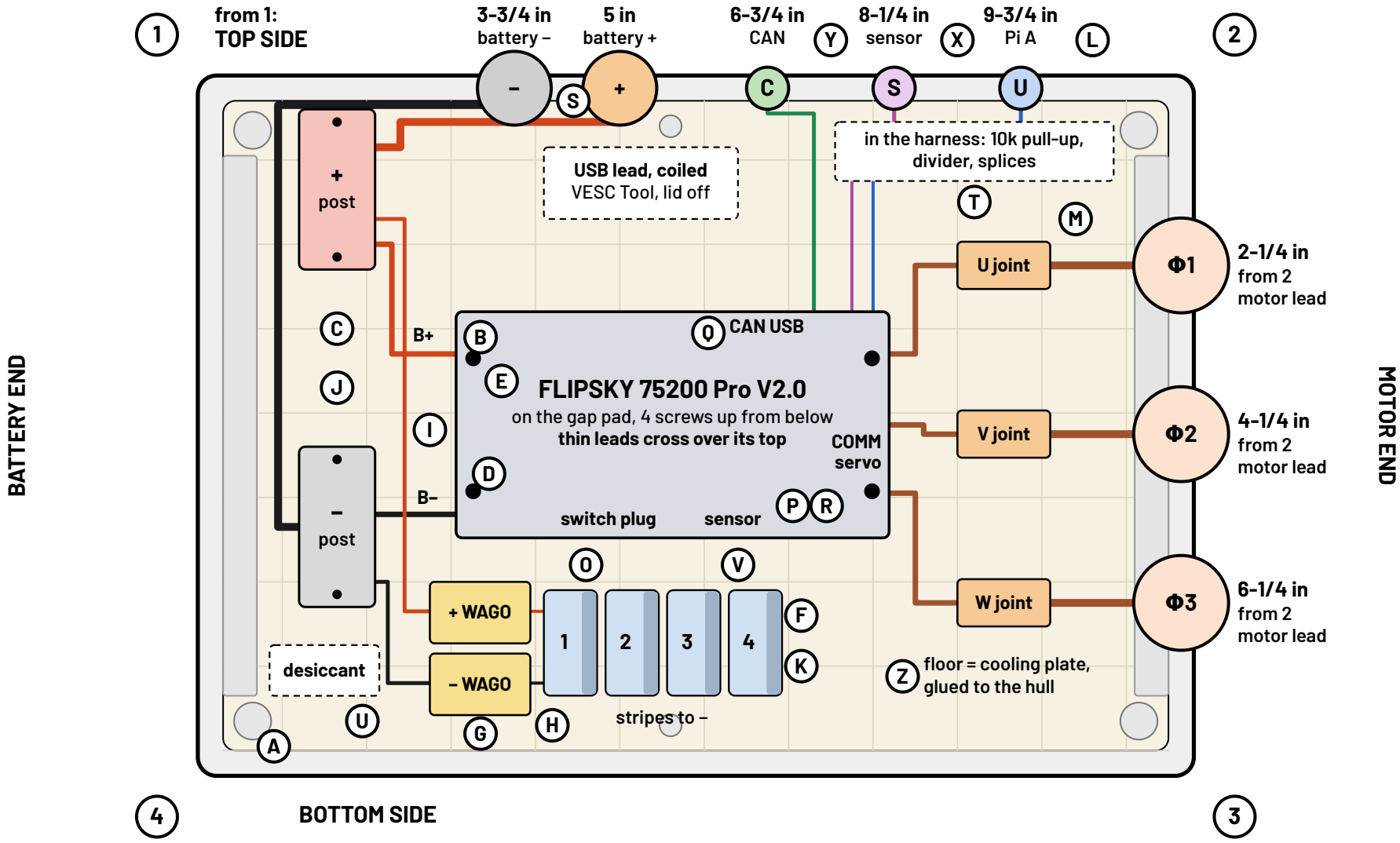
Z

epoxy and gray grit

Heat bed: West, #120 grit
Glues the floor to the hull
1 batch · have

VESC A BOX · LAYOUT

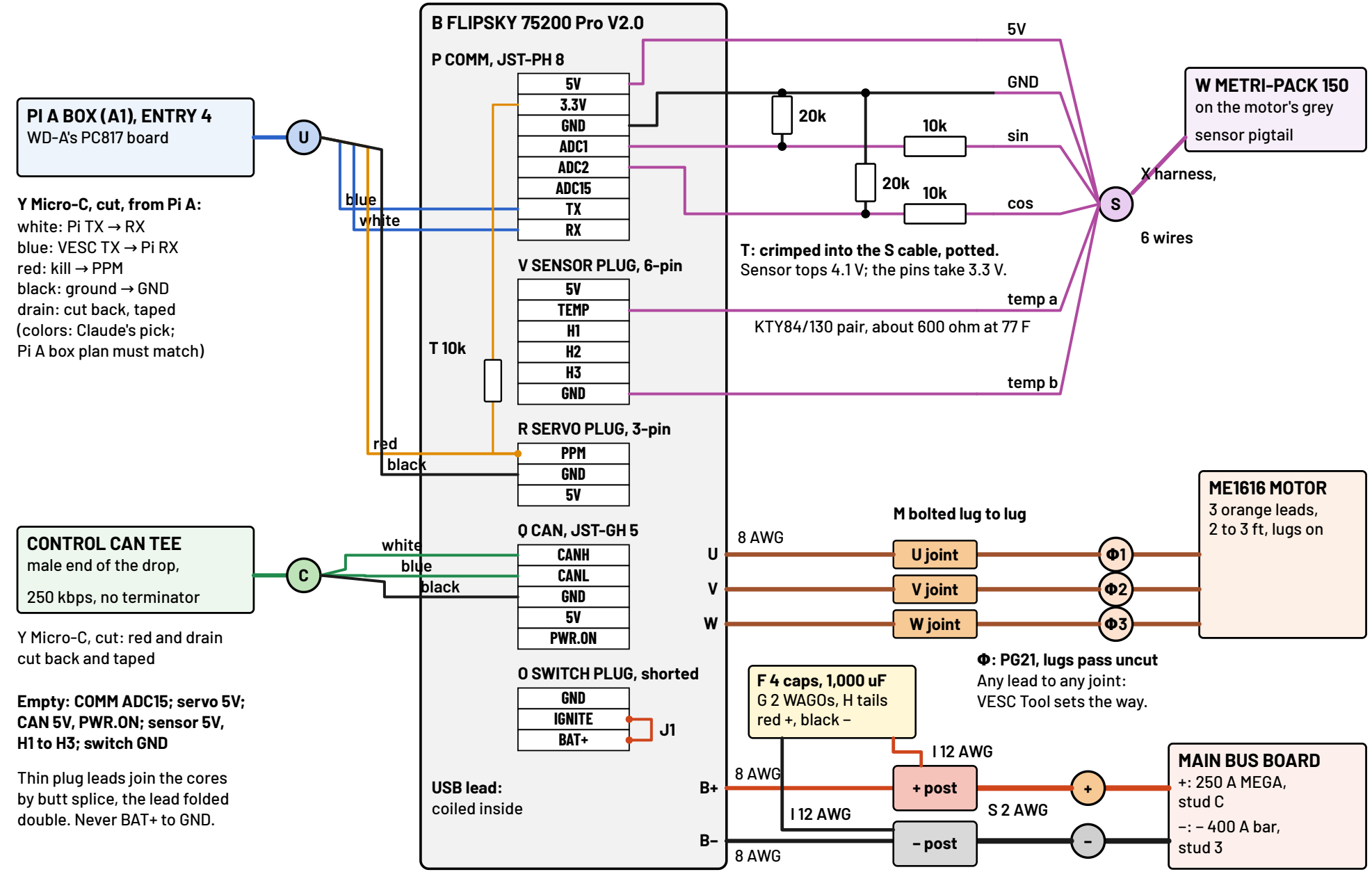
lid off, looking down · about to scale, 1 grid square = 1 in · as built, Nov 6 photo



Holes, as drilled (spots read off Mike's photo, about): + and – PG16 (7/8 in), C, S, U PG7 (1/2 in), all on the top side, measured from corner 1; Φ1 to Φ3 PG21 (1-1/8 in) on the motor end, from corner 2. The 2 AWG – runs along the battery end behind the posts. Motor leads come in through Φ1 to Φ3, their own lugs uncut, and bolt to the Flipsky's U, V, W inside. Thin leads (C, S, U) cross over the Flipsky's top, never alongside the motor leads. Posts held by screws from inside: their tips flush with the outside of the floor. Each post, bottom up: 2 AWG, 8 AWG, 12 AWG, then the nut. Caps and WAGOs glued with K along the bottom side, away from the glands, stripes all to the – side, levers up; both 12 AWG leads under 6 in (the + one about 5-1/4 in). Flipsky button out; the shorted plug O in its socket. Big circles on the walls = holes; small circles = page 1 letters.

VESC A BOX · WIRING

how it connects · pin rows = the Flipsky's plugs, circles = holes · not to scale



battery + · battery –, ground · motor phase · CAN · UART · kill line · sensor harness · dashed = open · lines crossing with no dot do not join

VESC A BOX · EVERY WIRE

plugs and holes named as on pages 2 and 3

POSTS, WAGOS, PHASE JOINTS

Nothing bare but the post lugs. Crimps only, no solder.

Part	Job	Wires
+ post	battery +	bottom: 2 AWG red from hole + (F1). middle: Flipsky B+, its own 8 AWG red cut under 6 in (F3). top: 12 AWG red from the + WAGO (F5). Then the nut
– post	battery –	bottom: 2 AWG black from hole – (F2). middle: Flipsky B– (F4). top: 12 AWG from the – WAGO, black or red marked black (F6). Then the nut
+ WAGO	red only	port 1: 12 AWG red lead to the + post (F5). ports 2 to 5: the + tails of caps 1 to 4 (T1 to T4)
– WAGO	black only	ports 1 to 4: the – tails, stripe side, of caps 1 to 4 (T5 to T8). port 5: 12 AWG black lead to the – post (F6)
U joint	phase	hole Φ1 motor lead (M1) and the Flipsky U lead (M4), lug to lug
V joint	phase	Φ2 motor lead (M2) and Flipsky V (M5)
W joint	phase	Φ3 motor lead (M3) and Flipsky W (M6). Each: 3/8-16 x 1 in 316 bolt, washers, nyloc, glue-lined heat-shrink over

VESC TOOL, AT FIRST POWER-UP

Setting	Value
Battery max, min	28.0 V, 22.0 V
Battery current	about 85 A; CUT-BURST about 180 A, 10 s
Motor current	about 180 A; CUT-BURST about 300 A
Regen ends	27.8 V
Motor thermistor	KTY84/130 (never NTC, never KTY83/122)
Motor temp	derate 212 F, off 248 F; alert 194 F
Controller temp	derate 167 F, off 194 F
Accel temp decrease	0 percent (factory 15)
Field weakening	off
Position sensor	sin ADC1, cos ADC2, each about 2.0 V plus or minus 0.7 V; sensorless fallback
Kill switch	PPM, active low (set once the kill line is wired)
CAN	control bus, 250 kbps

THE FLIPSKY'S PLUGS, PIN BY PIN

Plug	Pins and wires
P COMM, JST-PH 8	5V ← S 5V core (H1). 3.3V → 10k pull-up to PPM (R1). GND ← harness GND joint (H13). ADC1 ← sin joint (H11). ADC2 ← cos joint (H12). ADC15: empty. TX → U blue (U2). RX ← U white (U1). Pin order as printed; find pin 1 with a meter
R servo, 3-pin	PPM ← U red, the kill line (U4), and the 10k from 3.3V (R1). GND ← U black (U3). 5V: empty
Q CAN, JST-GH 5	CANH ← C white (C1). CANL ← C blue (C2). GND ← C black (C3). 5V, PWR.ON: empty
V sensor, 6-pin	TEMP ← S temp a (H14). GND ← S temp b (H15). 5V, H1, H2, H3: empty
O switch, 3-pin	IGNITE joined to BAT+ by a short jumper crimped in the plug (J1). GND: empty. Never BAT+ to GND
USB	its own lead, coiled inside, for VESC Tool with the lid off

HARNESS JOINTS (T), IN THE S CABLE

Crimped, potted, ratios on the label. Always fitted: the RMB29 swings 3.0 V plus or minus 1.1 V (RLS data sheet RMB29D01), tops near 4.1 V; after the divider about 1.3 to 2.7 V.

Joint	What joins there
ADC1 joint	10k from sin (H3, H4); 20k leg 1 (H7); lead to COMM ADC1 (H11)
ADC2 joint	10k from cos (H5, H6); 20k leg 1 (H9); lead to COMM ADC2 (H12)
GND joint	S GND core (H2); both 20k leg 2s (H8, H10); lead to COMM GND (H13)

WIRE AND ENDS

Caps: a butt splice on each full-length leg, an 18 AWG tail 3 to 4 in, all eight the same; red on +, black on the striped –. Strip 7/16 in for the WAGO. 12 AWG leads under 6 in. Motor leads bundled tight, nothing beside them, no ferrite; thin leads cross over the Flipsky's top, away from them. Thin plug leads join the cable cores by heat-shrink butt splice, the lead folded double (Claude's pick: not written). Label both ends.

CABLES IN, BY HOLE

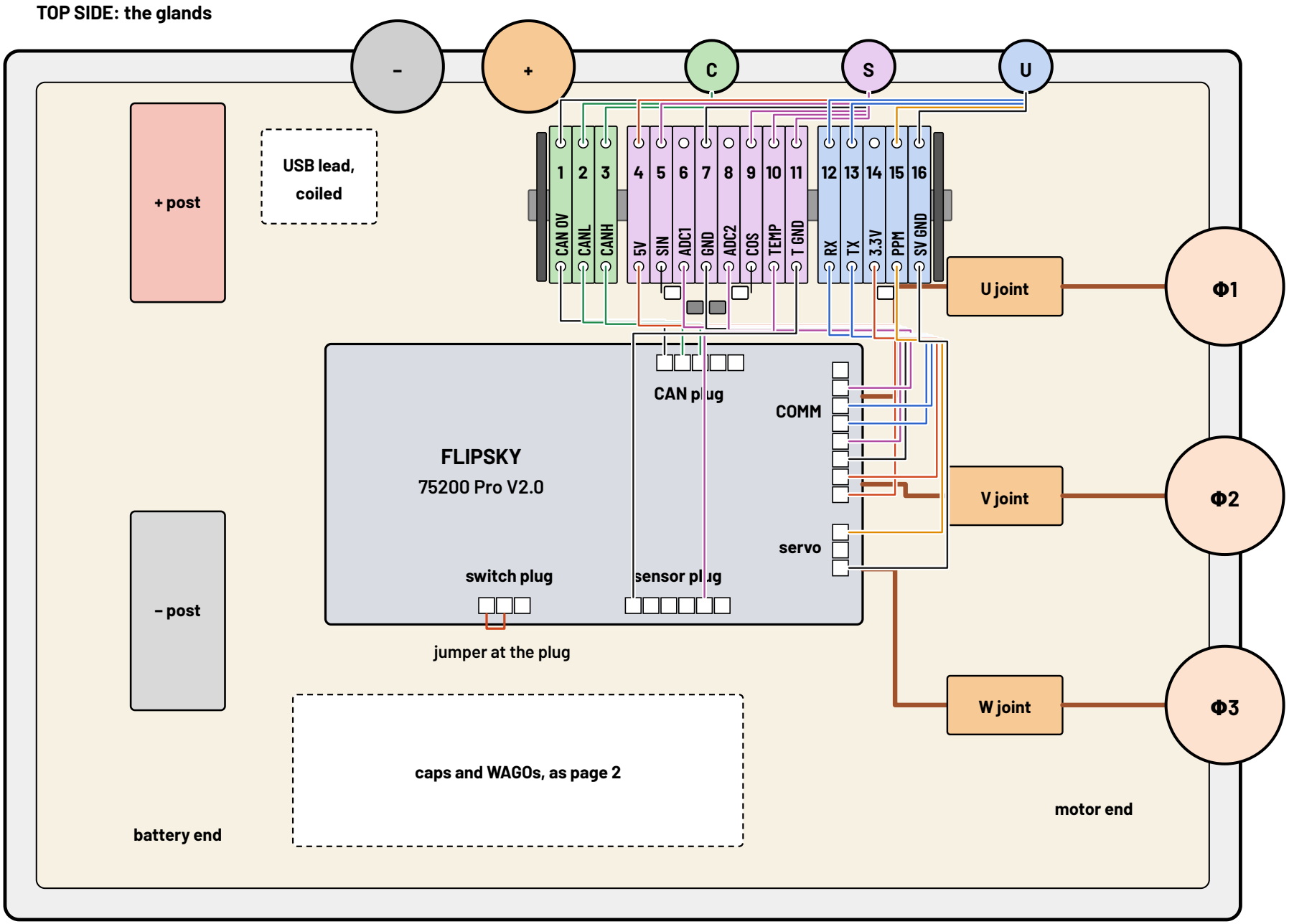
Hole	Cable	Cores
+	2 AWG red, PG16	→ + post bottom (F1). From the 250 A MEGA, stud C. Twisted with – outside
–	2 AWG black, PG16	→ – post bottom (F2). From the – 400 A bar, stud 3
Φ1-3	ME1616 orange leads, PG21	→ U, V, W joints inside (M1 to M3); their own lugs pass the gland uncut
C	Micro-C drop, PG7	white → CANH, blue → CANL, black → CAN GND (C1 to C3). Red, drain: cut back, taped (C4, C5)
S	harness, 6 wires, PG7	5V → COMM 5V; GND → GND joint; sin, cos → 10k → ADC joints; temp pair → sensor TEMP, GND (H1 to H15)
U	Micro-C from Pi A entry 4	white → RX, blue → TX, red → PPM, black → servo GND (U1 to U4). Drain: cut back, taped (U5)

BEFORE WIRING

Shorted plug on, power the Flipsky from the battery side: it must come up. Find pin 1 on COMM and CAN with a meter. KTY84 about 600 ohm at 77 F. Read the motor lead size and the Flipsky's hole thread. First power-up: the settings at left (System Settings Sheet 2), motor setup with the prop clear.

STILL OPEN

Flipsky thread M3 or M4. The 2 AWG feed length. The harness cable, its colors and lengths; the Metri-Pack pin map. Whether the Flipsky has the 10k on its temp pin.



+, 3.3 V, 5 V · ground · CAN · UART · kill line · sensor · motor phase

White bar = 10k, grey bar = 20k. Lines with a white edge cross on top; crossing lines never join.

VESC A BOX · BOAT 2: EVERY SCREW

blocks numbered left to right as on page 5

EVERY SCREW

Block	Gland side (top screw)	Flipsky side (bottom screw)
1	C black	CAN plug GND
2	C blue	CAN plug CANL
3	C white	CAN plug CANH
4	S 5V	COMM 5V
5	S sin	10k to 6
6		COMM ADC1; 10k from 5; 20k to 7
7	S GND, S shield	COMM GND; 20k from 6 and 8
8		COMM ADC2; 10k from 9; 20k to 7
9	S cos	10k to 8
10	S temp a	sensor plug TEMP
11	S temp b	sensor plug GND
12	U white (Pi TX)	COMM RX
13	U blue (Pi RX)	COMM TX
14		COMM 3.3V; 10k to 15
15	U red (kill)	servo PPM; 10k from 14
16	U black	servo GND

PARTS

35 mm DIN rail about 5 in, 16 screw blocks and 2 end stops (the wet lab box's kind). A ferrule on every thin plug lead, the lead folded double. Resistors: 10k x3, 20k x2, legs straight into the screws.

RULES

Each plug lead tied down within 2 in of its plug; a dab of silicone holds each plug in. No splices, no lever nuts. C and U drains cut back and taped; the S shield to block 7 only. The switch plug keeps its own short jumper, off the rail.

Same wires and pins as pages 3 and 4; only the joints move onto the rail.