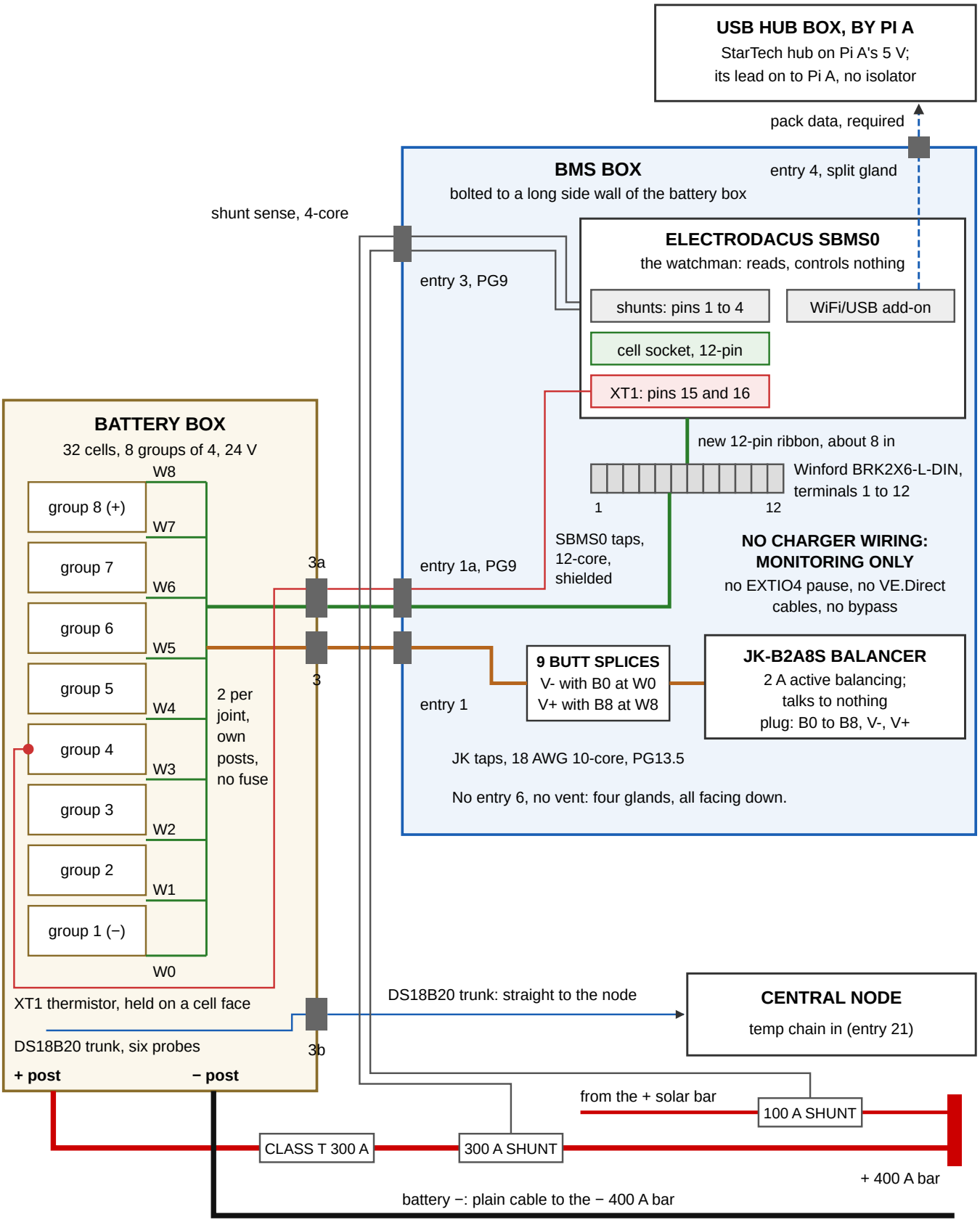
BMS box: what is wired to what, and why

From Electronics and Wiring Plan v10.5 (sec 6.7, Appendix A3, A4, A9) and Battery Box Building Guide v10.5 Part 8. Drawn 2026-09-07, rev 2026-11-09. The table and notes are on page 2.



Both shunts sit on the + side, on the main bus board; only their thin sense wires go up to entry 3, one 4-core 20 AWG cable for both, no fuse of any kind, a cover on each shunt.

What each link is, and why

Link	What it is	Why
Battery box to BMS box: two cables, one gland each at both ends	18 tap wires (W0 to W8 twice), each straight to its own insulated ring on its bus bar nut, with no fuse of any kind (Mike, 2026-11-08), the two wires of each joint on two posts; split loom where a tap wire crosses a bar or stud of another voltage, every wire tied so it cannot rub. The SBMS0's nine and the XT1 pair on 11 cores of the 22 AWG 12-core shielded cable (0.24 in across; shield grounded at this box only, at W0): battery box entry 3a to BMS box entry 1a, PG9 (5/8 in hole) at both ends. The JK's nine on its ENERJOUR 18 AWG 10-core (0.39 in across): battery box entry 3 to BMS box entry 1, PG13.5 (13/16 in hole) at both ends. Each cable with its own drip loop; dielectric grease on each insert. No gas sensor lead.	Two cables of different size do not seal in one gland, sleeved or not (Mike, 2026-10-13). The SBMS0's taps read the 8 group voltages. The JK pushes up to 2 A through its own taps; on shared wires that would put tens of mV of error into the SBMS0's readings.
SBMS0 to the breakout board, inside	A new 12-pin ribbon, about 8 in, to the Winford BRK2X6-L-DIN on the DIN rail; terminal n = ribbon wire n. It runs pin 1 to pin 1, its stripe on terminal 1 of the Winford board; with both plugs keyed the same way, its stripe sits on the opposite edge from the factory ribbon's red wire (which marks pin 12). A ribbon fits one way at each end and can still be crossed inside: before plugging in, meter pin 1 to pin 12 at the SBMS0 end, black lead on pin 1: plus about 26 V, never a minus sign. W0 on 1 (jumper 1 to 2, shield drain on 2), W1 to W7 on 3 to 9, W8 on 10 (jumpers 10 to 11, 11 to 12). At most two wires under one screw.	The SBMS0's own ribbon is never cut or lengthened (never longer than its 6 ft).
Shunts to BMS box (entry 3)	One 4-core 20 AWG cable (black, red, yellow, white) for both shunts, a ring under each small shunt screw: solar shunt black on the bus side, red on the solar-bar side; battery shunt yellow on the bus side, white on the battery-switch side. Tag the black core +26 V. In the box it lands on the top of terminals 1 to 4 of a six-block DIN strip, and Cat6 cores run from the bottom screws to the green plug, so terminals 1 to 4 are SBMS0 pins 1 to 4 (PVn, PVp, ADC1n, ADC1p); terminals 5 and 6 carry XT1 (the 12-core's white and tan) to pins 15 and 16. No fuse of any kind (Mike, 2026-11-08: “yes no fuses on shunt wires”): at the shunts the wires sit only beside each other and the + leads, all within millivolts, so a rub there shorts nothing; the cable stays clear of the bus board's minus bars and is tied away from the SBMS0's USB plug (its shell is Pi A's unfused minus). Both shunts on the + side of the main bus board; a cover on each shunt. Sense leads only. If battery current reads backward, swap white and yellow. As built: Box	The SBMS0 reads a shunt only with 4 to 76 V on it: on the − side it would read nothing.

	`Plans v10.5/SBMS0 Setup and Shunt Wires v10.5.pdf`.	
BMS box to the USB hub box beside Pi A (entry 4)	Micro USB lead from the WiFi/USB add-on, tied down outside the plug, into the StarTech hub. Its plug passes whole through an Altelix PG25 4-port split gland, three ports plugged, here, and in by a split gland on the hub box's side wall at the other end (Electronics and Wiring Plan A1a). SBMS0 Device Settings: UART on, 115,200. Required. No USB isolator: the hub runs on Pi A's own 5 V.	The battery percentage comes from this stream: the SBMS0 shunt is the only current sensor aboard. A quiet stream raises an alert.
Battery box to the central node (battery box entry 3b)	The DS18B20 trunk: Mike's 3-conductor 20 AWG cable (red power, black ground, the third data), out by its own PG9 (5/8 in hole) and straight to central node entry 21, alone in that gland; it never enters the BMS box, which has no entry 6. Six probes, three per 16-cell stack, each named by its serial number, spliced in along the trunk with red heat-shrink butt splices (no solder, no WAGO), their 3 ft leads left full length (Battery Box Building Guide Part 8).	The six pack probes carry the battery trip: 150 F, or a 10 F rise in five minutes, isolates the bank.
Balancer	Its 11-pin plug: B0 to B8 plus its own power pair, V- and V+ (10 to 40 V), joined to its 10-core cable by butt splices; V- shares the W0 splice, V+ the W8 splice. Set up by phone over Bluetooth: LiFePO4, 8 cells.	It only evens out the groups: no data, no control, no wire to the node or the Pi.

Where it goes. As built, bolted to a long side wall of the battery box (Mike, 2026-11-02): four 1/4 in stainless bolts, each bedded in sealant (Battery Box Building Guide Parts 4 and 8). **Open:** which side and how high; Mike's word or a photo settles it. Four glands and no vent, all facing down, each cable with its own drip loop.

Monitoring only. No wire leaves this box to a charger, relay or load. No CAN and no RS-485. The only data wire is the USB lead to the hub box beside Pi A, which is required. The charge limits live in the five MPPTs' own lithium profiles, the only charge ceiling: there is no charge stop. Below 33 F on any pack probe, and on the cell-temperature trip, the computer in command alerts shore and runs the motor at about the solar output, so the battery's net current stays near zero (not while the drogue is out or in STORM, when the motor is off).