WET LAB BOX (A18)

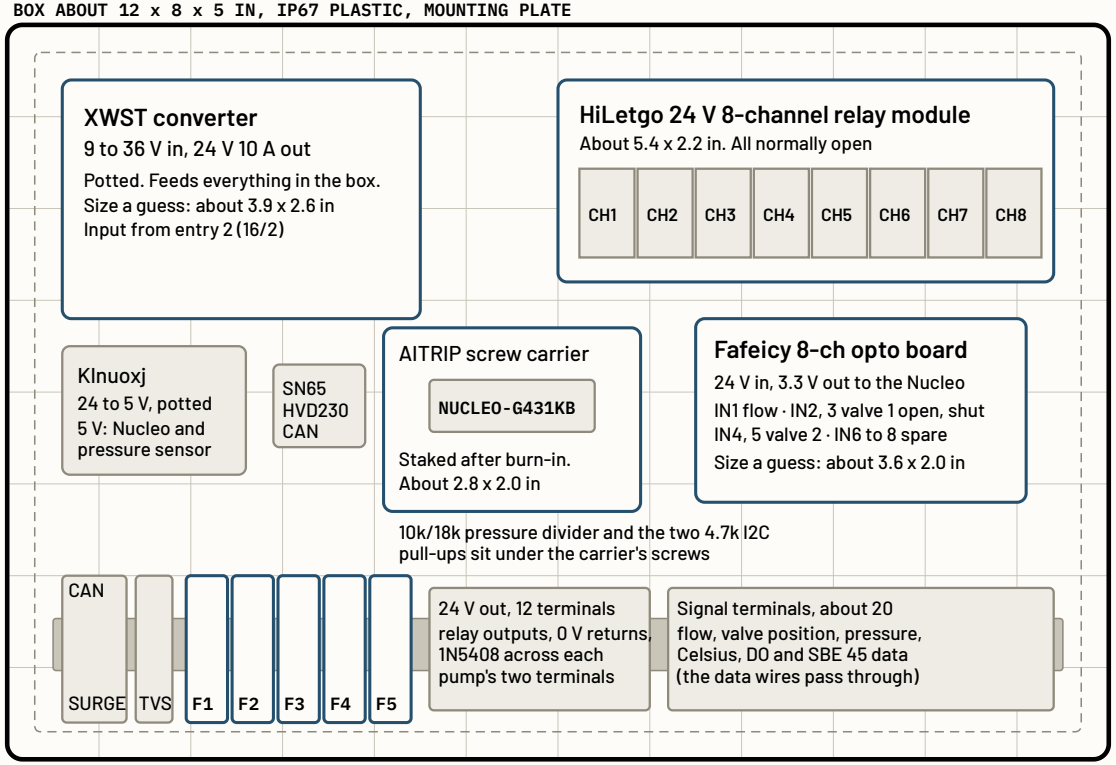
A small node on the house bus that switches each wet lab pump and valve one at a time and reads the wet lab's sensors. Pi A runs the hourly cycle; this box does what it is told and refuses anything unsafe. Claude's layout, standing unless Mike says otherwise (Pending Amendments, wet lab box item).

BOAT	Boat 1, Prime Ranger
DOC SET	v10.2, new box
DRAWN	Oct 15, 2026
TEXT VERSION	Reference\Wet_Lab_Box_2026-10-14

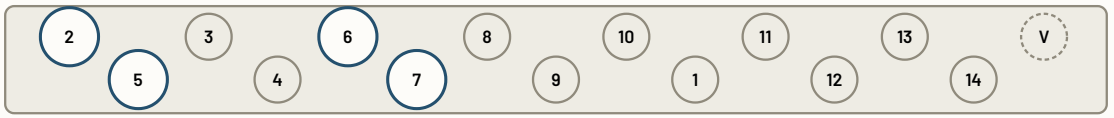
PLATE LAYOUT, LID OFF

ROUGH SCALE · GRID = 1 IN · PART SIZES ARE ESTIMATES

BOX ABOUT 12 x 8 x 5 IN, IP67 PLASTIC, MOUNTING PLATE



BOTTOM FACE, SEEN FROM BELOW · GLANDS FACE DOWN, DRIP LOOP ON EVERY CABLE



Big circles PG9 (5/8 in hole), small PG7 (1/2 in hole), V the vent (1/2 in). Power at left, sensors middle, science pass-throughs right.

Fuses (F1 to F5)

5 x 20 mm slow-blow, DIN holders, QBGTFAK kit on hand

F1 5 A Gulper (a guess: read its label)
F2 2 A Iwaki pump + dosing pump
F3 2 A both valves + position wires
F4 1 A DO sensor + SBE 45 power
F5 1 A node, relay coils, flow meter

Where the box goes

Beside the wet lab, outside its drip tray and above its rim. Within about 5 ft of the USB hub box if it can be (the FTDI cables are 6 ft). Nothing here goes to the lightning copper.

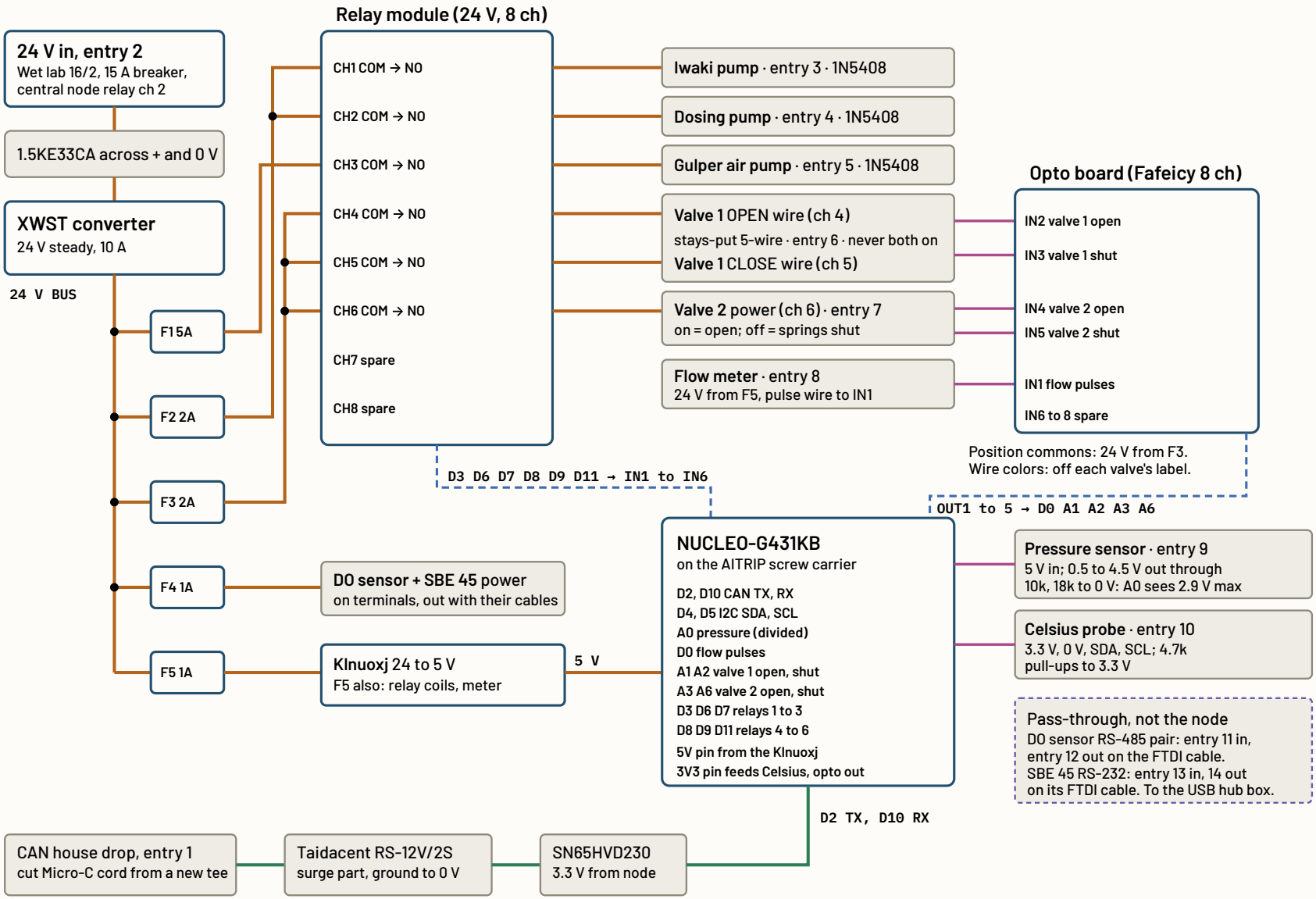
Gland entries

1 CAN drop · 2 24 V in
3 Iwaki · 4 dosing pump · 5 Gulper
6 valve 1 · 7 valve 2
8 flow meter · 9 pressure
10 Celsius probe
11 DO in · 12 DO data out
13 SBE 45 in · 14 SBE 45 data out
V vent

Check each cable's diameter against its gland before drilling: PG7 grips 1/8 to 1/4 in, PG9 5/32 to 5/16 in.

WIRING

DOT = JOINED · LINES CROSSING WITH NO DOT DO NOT TOUCH · EVERY LOAD'S MINUS GOES TO THE 0 V TERMINALS



24 V and 5 V power · Logic, 3.3 V · Sensor and position wires · CAN · Science data, passes through

PARTS, RULES AND WHAT TO BUY

STATUS FROM THE ORDER TRACKER, OCT 14

PARTS

PART	STATUS
NUCLEO-G431KB	**BUY one (both on hand are used)**
AITRIP Nano screw carrier	On hand (six bought, two used)
SN65HVD230 CAN board	On hand (four, two used)
Taidacent RS-12V/2S	Coming Oct 21+ (one of two with no other job)
KInuoxj 24 to 5 V	Shelf (8 shipped, 3 used)
HiLetgo 24 V 8-ch relay module	Shelf (4 on record, 2 used)
Fafeicy 8-ch opto board	On hand (five, one used)
XWST 24 V 10 A converter	On hand
1N5408 x3, 1.5KE33CA x1	On hand
10k, 18k, 4.7k x2 resistors	On hand (MelkTemn kit)
DIN fuse holders x5 + fuses	Count (holder count unknown); fuses on hand
DIN rail, about 30 terminals	Count
Glands PG7 x10, PG9 x4, vent x1	Count
Box about 12 x 8 x 5 in	The TICONN box of Oct 3 if that size, else buy
N2K single tee (house bus)	Count (seven 2-packs in the order log)

RELAY CHANNELS

CH	SWITCHES	RULE
1	Iwaki pump	Only with valve 2 reading open
2	Kamoer dosing pump	Run time set for 5 mL
3	Gulper air pump	Only with valve 2 reading shut
4	Valve 1 open	Never with ch 5
5	Valve 1 close	Never with ch 4
6	Valve 2 power	Off = springs shut
7, 8	Spare	Later sensors

FAIL-SAFE, IN THE NODE ITSELF

- No message from Pi A for 60 s: all relays off. The pump stops and valve 2 springs shut.
- Each valve stroke is timed from its position wires and reported: the wear gauge the Wet Lab Design asks for.
- Relay channel 2 at the central node on only around each burst (Claude's pick): the wet lab draws nothing between bursts.

BEFORE WIRING

- Take off the Nucleo's four solder links (A4 to D4, A5 to D5, A2 and A7 to the USB serial), as on the central node.
- Set the relay module's trigger jumper the same way as the central node's modules.
- Read valve 1's and valve 2's wire colors off their labels.

LEFT OUT, AND WHAT STANDS IN

Pump current and the dosing reservoir level (Wet Lab Design sec 11 lists both): no current sensor is fitted on the boat and no level sensor is named. Flow rate shows the pump's health; the reservoir level is counted from the doses given. Not yet written into the guides: Electronics plan A18 and the house bus layout, Wet Lab Design secs 10 to 12, a Box Wiring Sheet A18, BOM 15.11, System Settings Sheet.