

Grok Mini Sub: Step-by-step build

Concept assembly guide derived from the staged build plan. Not a certified engineering drawing. Prices are estimates (Oct 2026); nothing here is a purchase.

Stage 1

1	Cut and glue the PVC frame. Part M8: PVC pipe, fittings, pool noodle, dive weights x1 (~\$25) Buy: Amazon search
2	Strap pool-noodle floats on top and dive weights below. Part M8: PVC pipe, fittings, pool noodle, dive weights x1 (~\$25) Buy: Amazon search
3	Mount two horizontal thrusters on the rear. Part M1: cheeyoo 12 V brushed underwater thruster x3 (\$92.34) Buy: Amazon B0D5JN1Z5R
4	Mount one vertical thruster in the center. Part M1: cheeyoo 12 V brushed underwater thruster x3 (\$92.34) Buy: Amazon B0D5JN1Z5R
5	Solder thruster leads to three pairs of the 8-conductor cable. Part M4: 50 ft 18 AWG 8-conductor cable x1 (~\$35) Buy: Amazon search
6	Seal every splice with marine heat shrink and liquid tape. Part M9: Marine heat shrink, liquid tape, silicone x1 (~\$12) Buy: Amazon search
7	Tie the braided pull line to the frame (carries the load, not the wires). Part M5: Braided pull line 1/8 in x1 (~\$8) Buy: Amazon search
8	Zip-tie the endoscope camera to the frame front. Part M2: USB endoscope camera, 15 m waterproof cable, LEDs x1 (~\$30) Buy: Amazon search
9	Build the fused 12 V battery box topside. Part M6: 12 V 6 Ah LiFePO4 battery + 10 A fuse x1 (~\$36) Buy: Amazon search
10	Mount three BTS7960 drivers inside the battery box. Part M3: BTS7960 H-bridge motor driver x3 (~\$27) Buy: Amazon search
11	Feed the Pi 4 from the 12V-to-5V buck. Part M7: 12 V to 5 V 5 A buck for Pi x1 (~\$10) Buy: Amazon search
12	Plug the camera into the Pi 4; confirm /dev/video0. Part M2: USB endoscope camera, 15 m waterproof cable, LEDs x1 (~\$30) Buy: Amazon search
13	Test each thruster in a bucket before going in the pool. Part M1: cheeyoo 12 V brushed underwater thruster x3 (\$92.34) Buy: Amazon B0D5JN1Z5R

Stage 2

14	Assemble the Blue Robotics enclosure. Part M10: Blue Robotics 3-inch watertight enclosure, aluminum cap x1 (~\$110) Buy: Blue Robotics search
15	Install the five WetLink penetrators in the end cap. Part M11: WetLink penetrators x5 (~\$75) Buy: Blue Robotics search
16	Mount the Bar02 depth sensor in one penetrator. Part M12: Bar02 depth sensor x1 (\$80) Buy: Blue Robotics search

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Mount the ESP32-S3 inside the enclosure.

Part M13: ESP32-S3 board x1 (~\$15) Buy: [Amazon search](#)

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Wire the BNO085 to the ESP32 I2C.

Part M14: BNO085 IMU x1 (~\$25) Buy: [Amazon search](#)

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Link ESP32 to topside over RS-485 on the spare tether pair.

Part M15: RS-485 transceivers x2 (~\$8) Buy: [Amazon search](#)

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Add the 4th thruster as a second vertical.

Part M16: 4th thruster (second vertical) x1 (\$30.78) Buy: [Amazon B0D5JN1Z5R](#)

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Mount the two dive lights.

Part M17: Self-contained dive lights x2 (~\$40) Buy: [Amazon search](#)

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Place the leak probe at the enclosure bottom.

Part M19: DIY leak probe x1 (~\$5) Buy: [Amazon search](#)

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Vacuum-test the sealed enclosure with the plug and pump.

Part M18: Vacuum plug + hand pump x1 (~\$45) Buy: [Blue Robotics search](#)