

Item	Quantity per sampler	Notes
Adjustable buck converter	1	12 V, DC-DC required. Serves as a modulator for power from the battery to the motor, can be adjusted to alter speed. Increasing voltage to the motor will increase rotational speed.
Battery	1	Charged for testing during building
Charge controller	1	5 A current rating. Some solar panels are sold with control elements preinstalled. Preinstalled controllers are preferable to external ones.
Hook and loop fastener	2	25.4 mm (1 in) width; used to mount the buck converter and charge controller to the box.
Insulated wire terminals	2	Should match gauge of wire and shape of battery terminals
Motor		Direct current (DC) 12 V motor recommended.
Schedule 40 PVC	1 at 15 cm (6 in)	For motor encasing, wire, and switch mounting. Alternatively, switch may be mounted within controls box. Size varies.
Schedule 40, 38 mm (1.5 in) PVC end cap (test cap)	2	Must be flat-top, not convex. One for the top and bottom of the sampler, or the top and bottom of the PVC pipe (above)
Screws to mount motor	2	Size will depend on the motor and PVC thickness. If screws are too long, the motor may fail or break. Testing different screw lengths is recommended (author experience suggests 3mm (M3) based on materials in this guide)
Silica gel pack	2	One into controls box and one into PVC pipe to maintain dryness
Switch (2 pin toggle)	1	Rated for at least 5 A and 6 V or 12 V.

Item	Quantity per sampler	Notes
Waterproof enclosure	1	Ideally it will be 2 mm (0.1 in) in wall thickness. If plastic is too thin there will not be enough threads in tapped holes for proper waterproofing.
Wire	3 m (9.8 ft) broken into increments	Dependent on sampler height and modifications. 18 gauge (AWG) recommended. Should have UV-stable casing if being used for multiple seasons. Always err on the side of caution and purchase extra wire.
Wire glands	3	Must match tap size and fit chosen wire gauge (11.5 mm (29/64 in) recommended for most applications).
Wire nuts	10	Base size off chosen wire gauge; number dependent on sampler design
3D printed arm	1	Parameters and materials subjective; can be designed using online tools and then printed at a university, public library, or private company. Today's material is PTG (Polyethylene Terephthalate Glycol) printing filament (thermal resistance and high strength)

Tools for building (at the workshop)

Flat head screwdriver (small; 2.5mm)	1	For securing screws to motor and altering control of buck converter
Multimeter	1	Auto-ranging is recommended; used to troubleshoot and read voltage
Permanent marker	1	For marking various pieces
Tachometer	1	Digital laser; for measuring rotating-arm speed; speed is calculated by dividing final read number in half.
Wire crimper/stripper	1	Recommended using with a spring (and 18 gauge wire capability)