# 120/240V 10kW Hand Truck Build Sheet

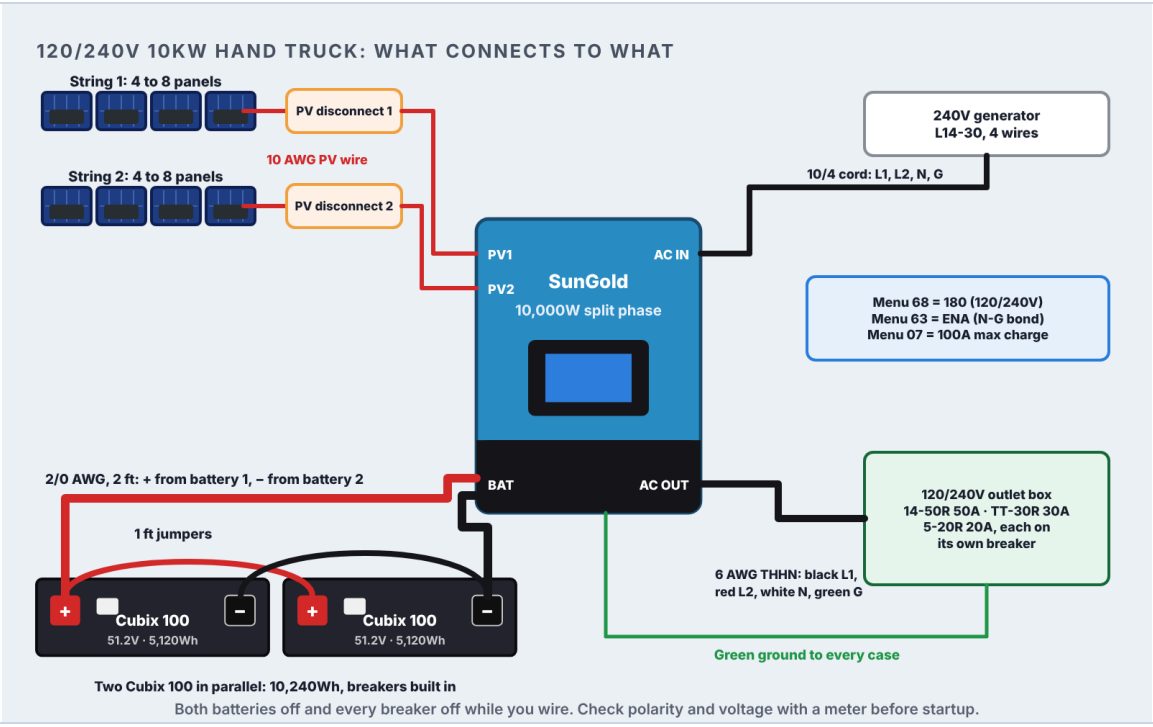


WILL PROWSE BUILD SHEET

Built by: Date built: Inverter serial: Battery serials:

| 10,240Wh | 10,000W | 10,000W | 200A | ~$3,586 |
|---|---|---|---|---|
| two ECO-WORTHY Cubix 100, 51.2V 100Ah each | continuous, 120/240V split phase, 20,000W peak | max solar, two MPPTs, 125–425V, 500V max | max battery charging, 120A from a generator | parts, Nov 15, 2026, before tools and panels |

## Wiring diagram




Both batteries off and every breaker off while you wire. Check polarity and voltage with a meter before startup.

## Wire, lugs and protection

| Run | Wire | Protection / ends |
|---|---|---|
| Battery to battery | 2/0 AWG: red 1 ft (+ to +), black 1 ft (– to –) | 5/16 in (M8) lugs both ends |
| Batteries to inverter | 2/0 AWG: red 2 ft from battery 1 +, black 2 ft from battery 2 – | Breakers built into both Cubix 100s. 5/16 in (M8) lugs on both ends |
| Solar to PV1 and PV2 | 10 AWG PV wire, MC4 | One DC1000V 30A disconnect per string. Ferrules |
| Generator to AC IN | 10/4 cord, L14-30P | Ferrules. Black L1, red L2, white N, green G |
| AC OUT to outlet box | 6 AWG THHN, 4 wires | Outlet box breakers. Ferrules |

The SunGold manual lists 4/0 AWG and a 250A breaker for this inverter. This build uses 2/0: each Cubix 100 stops at 100A, so the cables carry 200A at most.

## What it can run

| Load | Runtime |
|---|---|
| 500W | 17.4 h |
| 1,000W | 8.7 h |
| 2,000W | 4.4 h |
| 4,000W | 2.2 h |
| 6,000W | 1.5 h |
| 10,000W | 0.9 h |

Runtime = 10,240Wh × 0.85 ÷ load W. The 0.85 allows for inverter losses.

**Load and battery life.** The system runs up to 10,000W, the inverter's rating. Each Cubix 100 recommends 50A, so two recommend 100A, about 4,400W. Keep steady loads under that for long battery life and start big motors one at a time.

# Parts and Tools



WILL PROWSE BUILD SHEET

## Order list (prices checked November 15, 2026)

| | Part | Where | ASIN / item | Qty | Price |
|---|---|---|---|---|---|
| ☐ | SunGold Power 10,000W 48V split-phase all-in-one, SPH10048P | Amazon | B0FWCMD631 | 1 | $1,422.00 |
| ☐ | ECO-WORTHY Cubix 100, 48V 100Ah server rack battery | Amazon | B0DP4LTRMG | 2 | $1,779.98 |
| ☐ | Gorilla 1,000 lb steel hand truck, GHH-10 | Home Depot | 326355671 | 1 | $149.00 |
| ☐ | Custom 2/0 AWG battery cables: red 2 ft, black 2 ft, red 1 ft, black 1 ft | Current Connected | Custom builder | 4 | about $92 |
| ☐ | 120/240V outlet box: 14-50R, TT-30R, 5-20R, each with a breaker | Amazon | B0DJX1Q4N2 | 1 | $81.69 |
| ☐ | 6 AWG THHN, black, white, red + 10 AWG green, 5 ft each | Amazon | B0D79YZ8D6 | 1 | $32.99 |
| ☐ | PV disconnect, DC1000V 30A (add one for a second string) | Amazon | B0CFCZX9N4 | 1 | $27.88 |
| | **Total for parts** | | | | **about $3,586** |

Prices change; the buttons on the page show current prices. Solar panels, the PV wire from the panels to the disconnect, and a generator cord (L14-30P, ASIN B0GV262SV4, $36.99) are extra.

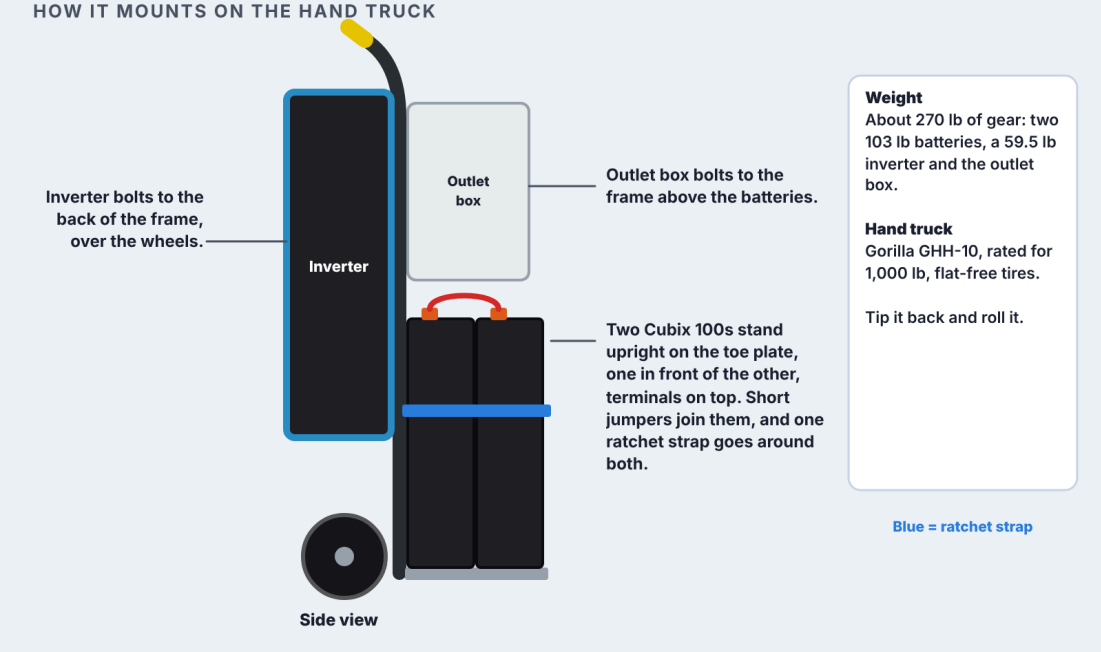
## Tools

| | Tool | ASIN | Price |
|---|---|---|---|
| ☐ | Cable cutter | B09BTWLXLG | $9.89 |
| ☐ | Wire stripper, 10–24 AWG | B000OQ21CA | $21.99 |
| ☐ | Ferrule kit, hex ratchet, 28–5 AWG | B0CRR7LWG5 | $41.99 |
| ☐ | Multimeter or clamp meter | any | |
| ☐ | Outlet tester (3-light) | hardware store | |

## Hardware store

| | Item |
|---|---|
| ☐ | Bolts, washers and nuts for the inverter bracket |
| ☐ | Bolts or U-bolts for the outlet box |
| ☐ | One or two ratchet straps around both batteries |
| ☐ | Screws for the PV disconnect |
| ☐ | Zip ties and cable clamps |

## Mounting layout



# Build, Start and Set Up



**WILL PROWSE BUILD SHEET**

## Build steps

1. Bolt the inverter to the back of the frame, above the wheels, using its wall bracket. Keep the vents open.
2. Stand both Cubix 100s upright on the toe plate, one in front of the other, broad face out and terminals on top. Strap both to the frame. Both batteries off.
3. Bolt the outlet box to the frame above the batteries.
4. Meter both batteries. They should read within 0.1V of each other before you join them. If not, charge the low one first.
5. Jumpers between the front and back battery: red 1 ft + to +, black 1 ft − to −.
6. Red 2 ft: battery 1 + to BAT+. Black 2 ft: battery 2 − to BAT−. Washer, nut, tighten, tug test.
7. Crimp ferrules on every stranded wire that goes into a screw terminal.
8. Generator cord to AC IN: black L1, red L2, white N, green ground.
9. 6 AWG THHN from AC OUT to the outlet box: black L1, red L2, white N, green ground.
10. PV disconnects off. String 1 to PV1 and string 2 to PV2, each through its own disconnect.
11. Run the green ground to every metal case.
12. Check battery voltage (about 51–54V) and PV polarity before anything turns on.

## Startup

1. Both battery breakers on, then turn both Cubix 100s on.
2. Inverter power switch on.
3. Set the menu items in the table.
4. PV disconnects on.
5. Plug in the generator if you are using one.
6. Loads on one at a time, smallest first.

Shutdown: loads off, generator unplugged, PV off, inverter off, batteries off, battery breakers off.

## Inverter settings

| # | Setting | Default | Set to | ☐ |
|---|---|---|---|---|
| 68 | Output phase | 180 | **180** (120/240V split phase) | ☐ |
| 38 | Output voltage | 120V | **120V** | ☐ |
| 08 | Battery type | GEL | **USER** | ☐ |
| 09 | Boost (bulk) charge | 57.6V | **56.0V** | ☐ |
| 11 | Float charge | 55.2V | **54.0V** | ☐ |
| 16 | Equalization | ENA | **DIS** | ☐ |
| 12 | Low-voltage cutoff (output off) | 42V | **48.0V** | ☐ |
| 14 | Low battery alarm | 44V | **50.0V** | ☐ |
| 15 | Discharge limit | 40V | **46.0V** | ☐ |
| 35 | Output back on after cutoff | 52V | **52.0V** | ☐ |
| 07 | Max charge current, all sources | 60A | **100A** | ☐ |
| 28 | Max charge current from AC | 60A | **80A** on a 30A generator | ☐ |
| 63 | Neutral-ground bond | DIS | **ENA** | ☐ |

With communication cables: 08 = L16, 32 = 485, 33 = PYL. Never equalize lithium.

## Neutral-ground bond check

Running on battery, plug a 3-light outlet tester into a 5-20R on the outlet box. It must read **correct**, not open ground. If it reads open ground, set menu 63 to ENA.

## Charging times

| Source | Rate | Empty to full |
|---|---|---|
| Solar, menu 07 = 100A | about 5,400W | about 1.9 h of full sun |
| 30A 240V generator, menu 28 = 80A | about 4,300W | about 2.4 h |

10,240Wh ÷ charge watts. Solar needs at least 5,400W of panels producing to hit 100A.

# Solar, Troubleshooting and Log



## Panels per string

| SunGold 590W | String | Vmp | Voc 77°F | Voc −22°F | <500V |
|---|---|---|---|---|---|
| 4 | 2,360W | 178V | 209V | 242V | OK |
| 5 | 2,950W | 222V | 262V | 302V | OK |
| 6 | 3,540W | 266V | 314V | 362V | OK |
| 7 | 4,130W | 311V | 366V | 423V | OK |
| 8 | 4,720W | 355V | 419V | 483V | OK |

Two strings, one per MPPT (PV1, PV2). Each string: 125–425V to charge, under 500V on the coldest morning, up to 22A. 10,000W total across both strings. Two strings of 8 = 9,440W. 590W panel: Voc 52.35V, Vmp 44.4V, −0.28%/°C.

## Check your own panels

| | |
|---|---|
| **Panel Voc × panels** | |
| **× 1.15 for a −22°F morning** | must be under 500V |
| **Panel Vmp × panels** | must be 125–425V |
| **Panel W × panels** | up to 10,000W total |

Free exact check: diysolarforum.com, Equipment tab, System check (search SPH10048P).

## Troubleshooting

| Code | Meaning | Fix |
|---|---|---|
| Blank | No power | Battery breakers on, batteries on, inverter switch on |
| 03 | Battery not connected | Cables, jumpers and both battery breakers |
| 14 | Inverter overload | Loads under 10,000W, restart |
| 17 | Output short circuit | Unplug loads, find the short |
| 09 | PV over-voltage | Open that PV disconnect, remove a panel |
| 28 | Line phase error | AC input must be 240V split phase (L14-30), not 120V |
| 45 | Split-phase setting error | Check menu 68 = 180 |
| 58 | BMS communication | Cables, menus 32/33, or set 08 = USER |
| 01 / 04 | Battery low | Charge from solar or the generator |
| 19 / 20 | Over-temperature | Let it cool, give it more room |

## Before every move

| | |
|---|---|
| ☐ | Strap tight, batteries cannot slide |
| ☐ | Jumpers and battery lugs still tight (no turning on a tug) |
| ☐ | PV disconnects off before plugging in panels |
| ☐ | Outlet tester reads correct on battery power |
| ☐ | Inverter vents clear |

## Maintenance log

| Date | Battery V | SOC % | Notes |
|---|---|---|---|
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**Indoor-rated gear. Keep it dry. Do not tie the AC output into house wiring without a transfer switch installed by an electrician.**

Sources: SunGold Power SPH8048P/SPH10048P manual; ECO-WORTHY Cubix 100 spec page at Current Connected. Help: diysolarforum.com