

123-SG-4S82-40

Solar Generator, modular pairing
solar.123e.com/123-SG-4S82-40



12 kW as two units: ten panels backed by a standalone 40 kW diesel.



Two units, one system: ten panels open beside the standalone 40 kW diesel.



OVERVIEW

A new cell site is often ready to go on air before utility power reaches it, and until it does, a temporary diesel generator runs it around the clock. 123-SG-4S82-40 does that job as a modular system of two units: the ten-panel 123-SG-4S82 solar trailer carries the site, and a standalone 40 kW diesel generator on its own trailer runs only when the sun and the battery cannot, then stops.

The solar trailer is rated for 12 kW continuous, set by its inverter, with surges to 24 kW for 10 seconds and 13 kW for 30 minutes. Its 4.6 kW array harvests 19.8 kWh on an average day into a 30.4 kWh lithium iron phosphate bank, and below 0.82 kW the generator never starts.

Above the break-even, the generator carries the load and recharges the bank together, then shuts down. At a steady 6 kW that is 6.83 engine hours a day, and the 140-gallon tank lasts 14.39 days between refuels, against 7.92 days for the same generator carrying the load alone. The lighter the site, the wider the gap: 23.32 days at 4 kW and 62.52 at 2 kW, while the generator alone still refuels every 7.92 days. Both engines are read by the same fuel rule: their own published figures, held at the lowest one below it. At a remote site every refuel is a truck, a driver and a day on the road, so the days between refuels are what make this the cost-effective way to keep the site on air.

Because the generator is a separate unit, it can be serviced or exchanged without moving the solar trailer, and the solar trailer can work alone where an engine is not permitted. Output is 120/240 V or 120/208 V at 50/60 Hz with a 5 ms transfer.

FEATURES AND BENEFITS

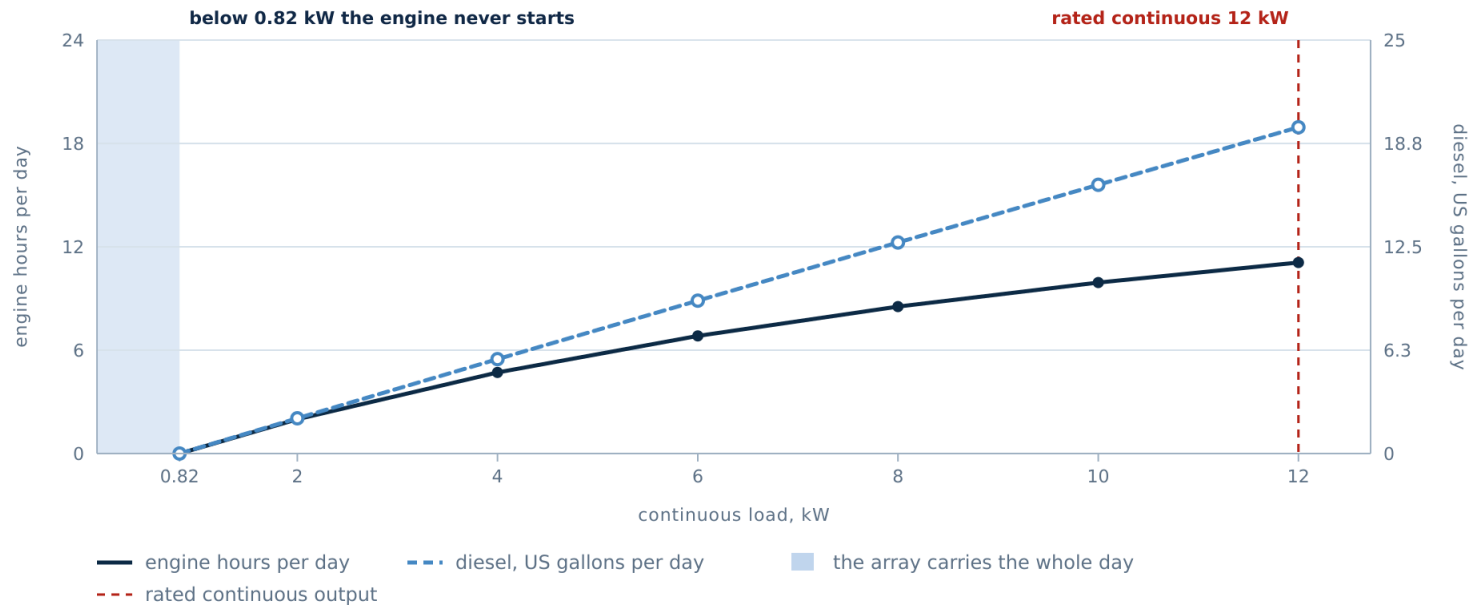
- **Standalone 40 kW diesel, 140-gallon tank** — Refuel visits about two weeks apart at 6 kW: 14.4 days between them.
- **Ten 460 W panels over a 30.4 kWh lithium bank** — Light overnight loads run silent, with no engine hours.
- **Two units, two trailers** — Maintenance is a one-unit job, and the solar side can work alone where engines are not permitted.
- **12 kW inverter, 24 kW surge for 10 seconds** — The generator is never asked to cover a start-up spike.

KEY SPECIFICATIONS

POWER	
Rated continuous output	12 kW
Peak output	12 kW
Surge	24 kW
Surge, 30 minutes	13 kW
Output voltage and phase	120/240 V or 120/208 V
Output frequency	50 / 60 Hz
Transfer time	5 ms
ENERGY STORAGE	
Battery technology	Lithium iron phosphate (LFP)
Arrays installed	8
Total stored energy	30.4 kWh
Usable stored energy at 50%	15.2 kWh
Silent runtime at 6 kW	2.4 hours
SOLAR	
Array rated power	4.6 kW
Solar panels	10 x 460 W
Daily solar production	19.8 kWh/day
Load covered by solar alone	0.82 kW
DIESEL BACKUP	
Generator output	40 kW
Fuel capacity	140 US gallons
Days between refuels at 6 kW	14.4 days
Engine starts and stops at	30% and 80% state of charge
Engine runs at 6 kW	5.5 a day, 1.2 h each
MECHANICAL AND SITE	
Ambient operating range	-4 to 140 °F (-20 to 60 °C)

PERFORMANCE ACROSS THE LOAD RANGE

What the engine does at each load. Below 0.82 kW the array carries the whole day and the engine never starts. Above it, the engine runs only to put back what the sun did not: at 12 kW, 11.09 hours a day on 19.7 US gallons.



LOAD, CONTINUOUS	BATTERY ONLY	DAILY DRAW	AFTER SOLAR	GENERATOR	ENGINE RUNS	DIESEL	DAYS ON A TANK
0.82 kW · solar break-even	17.8 h	19.8 kWh	covered	0 h/day	none	0 gal/day	—
2 kW	7.33 h	48 kWh	28.2 kWh	1.99 h/day	1.6 × 1.2 h	2.1 gal/day	62.5 days
4 kW	3.67 h	96 kWh	76.2 kWh	4.71 h/day	3.8 × 1.2 h	5.7 gal/day	23.3 days
6 kW	2.44 h	144 kWh	124.2 kWh	6.83 h/day	5.5 × 1.2 h	9.2 gal/day	14.4 days
8 kW	1.83 h	192 kWh	172.2 kWh	8.53 h/day	6.8 × 1.2 h	12.8 gal/day	10.4 days
10 kW	1.47 h	240 kWh	220.2 kWh	9.93 h/day	8 × 1.2 h	16.3 gal/day	8.2 days
12 kW	1.22 h	288 kWh	268.2 kWh	11.09 h/day	8.9 × 1.2 h	19.7 gal/day	6.7 days

Every load runs continuously and the day is 24 hours: daily draw is the load × 24 h. Solar is a daily energy offset, not an instantaneous power match. The engine starts at 30% state of charge (a 70% depth of discharge) and stops at 80%, putting 15.2 kWh back into the bank on each run while it carries the load.

CASE STUDY: AGAINST THE 40 KW GENERATOR RUNNING ALONE

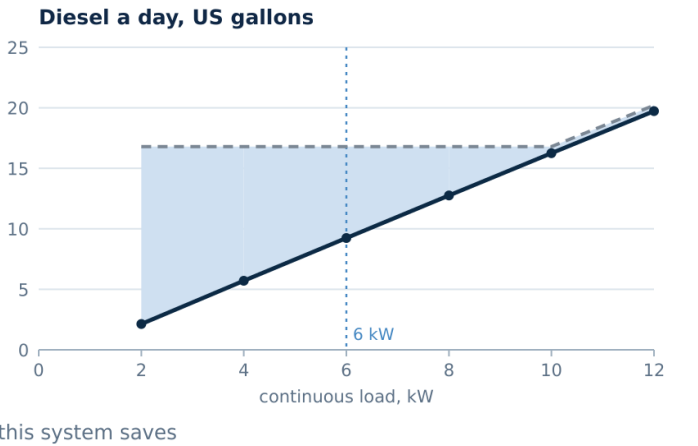
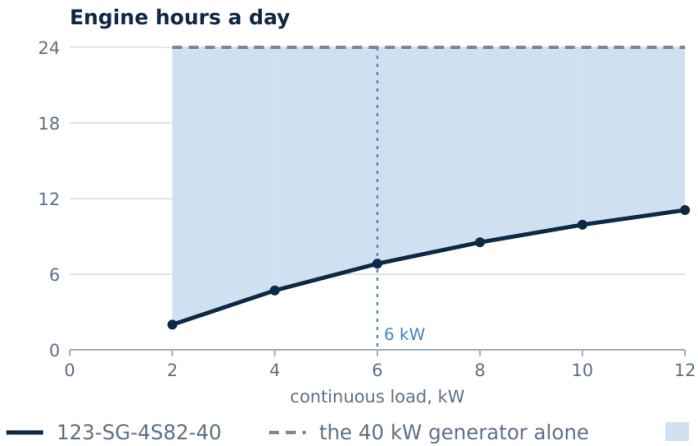
At 6 kW around the clock, its own 40 kW generator — the one telecom sites use for temporary power — would carry the site alone at 15% of its rating, 24 hours a day. 123-SG-4S82-40 runs its engine **6.8 hours a day** — **72% fewer engine hours** — and burns **45% less diesel**: 9.2 US gallons a day against 16.8 US gallons, and 14.4 days between refuels against 7.9 days.



The 40 kW generator alone
Engine 24 h a day at 15% of its rating · 16.8 gal a day



123-SG-4S82-40
Engine 6.8 h a day, the sun and the battery the rest · 9.2 gal a day



LOAD, CONTINUOUS	40 KW ALONE	DAYS ON A TANK	THIS SYSTEM, ENGINE	THIS SYSTEM, DIESEL	DAYS ON A TANK	ENGINE HOURS SAVED	DIESEL SAVED
2 kW	16.8 gal/day	7.9 days	2 h/day	2.1 gal/day	62.5 days	92%	87%
4 kW	16.8 gal/day	7.9 days	4.7 h/day	5.7 gal/day	23.3 days	80%	66%
6 kW	16.8 gal/day	7.9 days	6.8 h/day	9.2 gal/day	14.4 days	72%	45%
8 kW	16.8 gal/day	7.9 days	8.5 h/day	12.8 gal/day	10.4 days	64%	24%
10 kW	16.8 gal/day	7.9 days	9.9 h/day	16.3 gal/day	8.2 days	59%	3%
12 kW	20.2 gal/day	6.6 days	11.1 h/day	19.7 gal/day	6.7 days	54%	2%

The 40 kW generator telecom sites use for temporary power carries the load alone, 24 h a day with no sun and no battery, on its own 140-gallon tank (133 usable). Both engines are read by the same rule: their own published fuel figures, a straight line between them, and below the lowest published point that point's burn.