POLAR POWER INC

Case Study on a Polar DC Generator running more than 30,000 hours continuously

Site name: Comic Con North

Site type: Off-grid with one Polar generator running in manual mode 24 x 7

Address: San Diego, California, USA

Install date: June 2015

Product description: -48 V, 10 kW Diesel DC Generator

Engine Model: Isuzu 3CA1 engine manufactured by Yanmar. The identical Yanmar model is 3TNV74

Product details: 8220 model permanent magnet alternator, electric radiator, supercap starter, electric fuel pump, GPRS modem, 14-liter extended oil sump, oil refining pack, 8-alarm relay board, captive vibration mounts in an all-weather aluminum enclosure. Supplied with a 133-gallon double walled UL142 rated fuel tank.

Load: 4.4 kW per hour

Diesel consumption per day: 11.43 gallons (or, 43.27 liters per day)

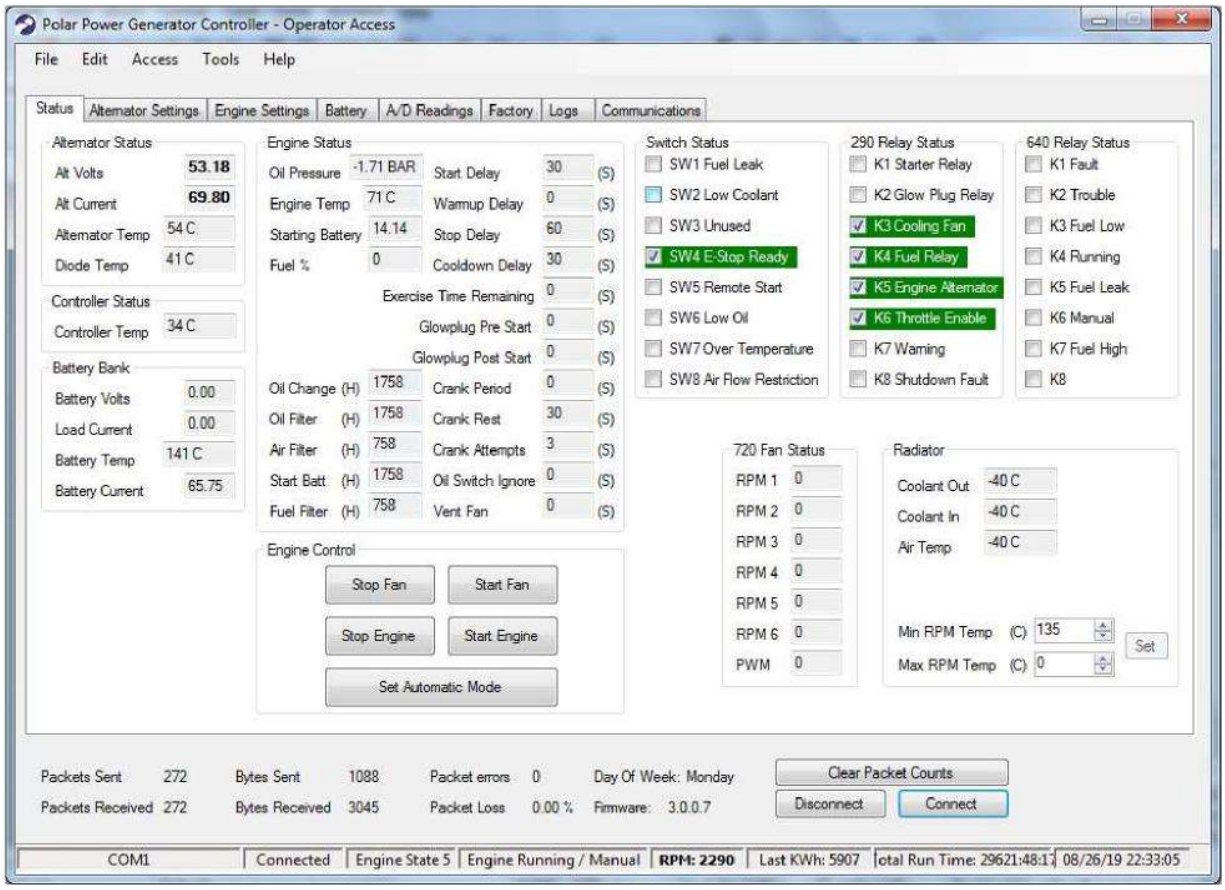
Generator continuous run hours: 30,546 and continuing

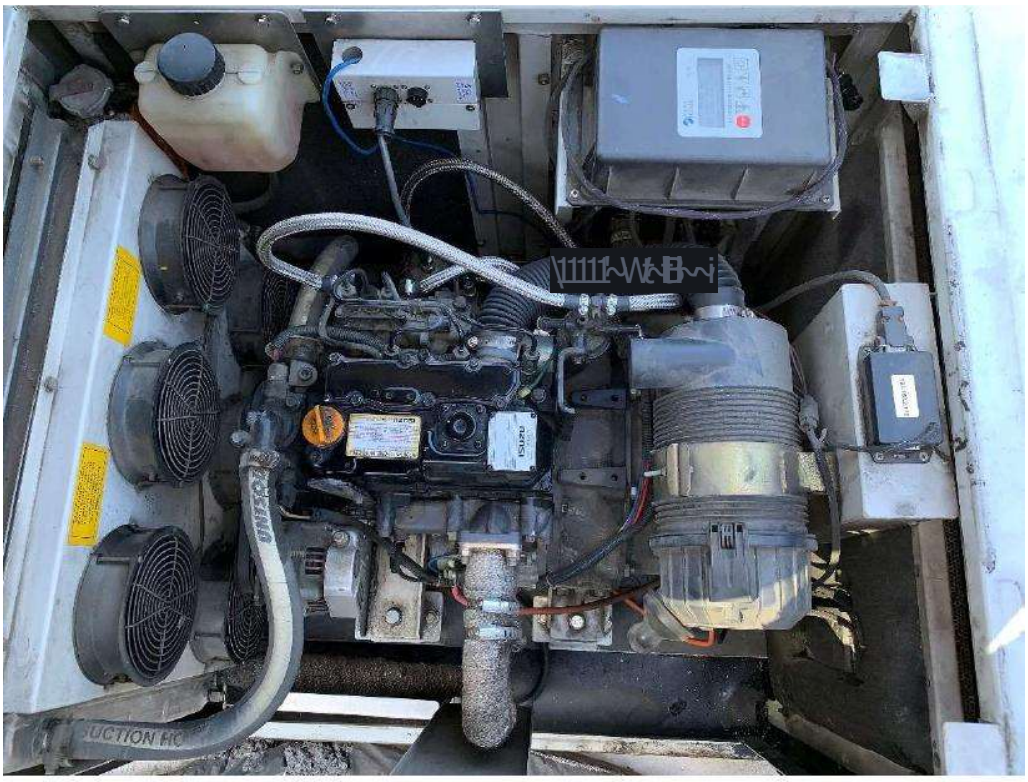
Results from past 4 years were taken as part of this study at this site with a continuous generator run time of over 30,546 hours and continuing. There were no failures from any critical components in the generator like the alternator, controller, engine, radiator, or the modems. There are no apparent issues that might indicate that an engine overhaul or replacement may be necessary.

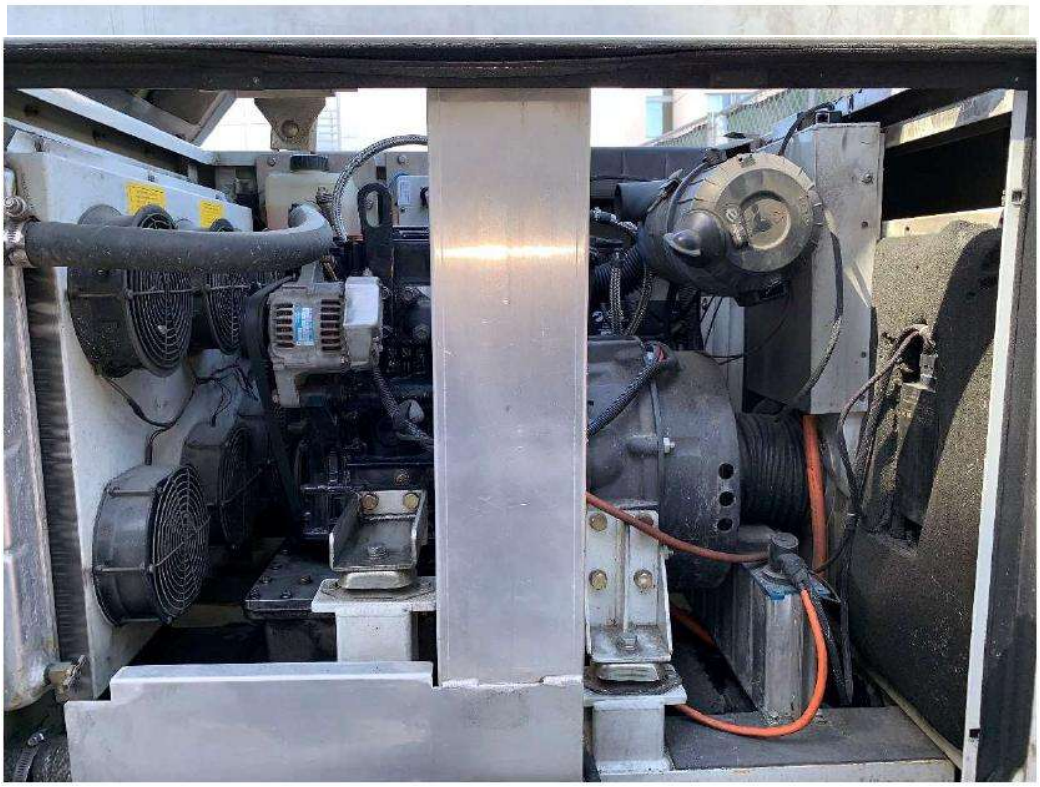
To date there were a total of 3 unscheduled service calls.

1) After 2,800 hours of running, the fan belt on the engine failed and caused the generator to shut down. Service records from other sites shown that the factory installed belts on Isuzu 3CA1 engine were prone to early failure, Polar took the problem to Gates Rubber to supply an upgraded / premium quality belt which is now used on all the Isuzu engines. Maintenance has the Gates Belts being replacing once every 1,000 hours; this interval maybe extended longer say to between 2000 to 4,000 hours. For the most part we have no access to customers replacement of belts, and customers are purchasing belts from the local automotive parts stores. The single larger factor on belt replacement is having the proper tension set by the servicing technician
2) During Year 3 (at 16,500 hours running), two of the six 48 V cooling fans attached to the radiator failed. These fans were replaced and no additional failures experienced.
3) During Year 4 (23,000 hours running), fuel line hoses that connect from the diesel tank to the fuel pump and to the engine failed. In 2016 Polar started to stainless steel wire braid over the fuel hosed to protect against abrasion, rodents, sunlight / UV, and other elements.

As can be evidenced below from the controller settings in the Generator User Interface (GUI), this generator has been running for 29,621 hours in manual model. Last service record was on August 26th, 2019.







Comments:

1. Oil consumption was not measured, no additional was required between the 2,000 hour intervals. No oil testing to determine if the oil change interval could be extended beyond the 2,000 hours.
2. Fuel efficiency was lost in the sizing of a 10 kW generator on a 4.4 kW load. Fuel could have been saved with a 6 kW alternator configuration with the same engine and running at a lower speed.