

Field Day Generators

Generators on trailers have been used for Field Day by clubs for decades and perhaps have been the traditional workhorse for Field Day power. These have typically been in the 5 kW to 20 kW range. The Figure is a Magnum light tower generator with a 6 kW rating. But standalone units are common and are made by Generac, Multiquip, Allmand and others. Used units can be purchased through Ironplanet online. Light towers have the benefit of providing both a power source and a tower.



These generators run with constant motor speed usually with diesel motors. They generate power with clean sine waves and little RFI or ignition noise issues, so that is good for radio operations. They are large, burn fuel between less than a gallon per hour to over a gallon per hour, and can be a bit noisy acoustically. For mid-size to large club Field Day operations, however, they can be a good fit due to the power needed.

Portable generators were introduced as far back as the 1960's with Honda an early innovator. But the power to weight ratio was a challenge for decades with a 2 kW to 3 kW device weighing 75 to 100 lb with slow and limited improvement over time. With the move to generator/inverters enabled by the development of solid state power management devices and technology, the weight for portable/inverter generators became much more attractive, and by 2010, were becoming common.

In this paper from 1999 published in QST, the portable generators weigh 65 to 110 lbs and only produce 1400 to 3500 Watts continuous output. This was prior to the widespread usage of generator/inverters.

<http://www.arrl.org/files/file/protected/Group/Members/Technology/tis/info/pdf/9906059.pdf>

By 2012, the picture had change considerably with an article in QST, June, 2012 with 4 generator inverters weighing 44 to 50 lbs with 1600 to 2000 watts continuous output power.

<https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://www.youtube.com/watch%3Fv%3DrOH7Ze7wreQ&ved=2ahUKEwivoK3bnbiXAxWxKfKFHQENECEQtwJ6BAghEAI&usg=AOvVaw1p4DTgB6HChPulmobVNVHv>

Honda had introduced the EU1000i as far back as 1999 delivering 900 watts continuous power and weighing about 32 lbs. Over the last 10 to 15 years, smaller units have become available such as the Sportsman 1000 which delivers 800 Watts continuously. It weighs only 22 lbs, and it is available new retail for as little as \$240.

The picture shows:

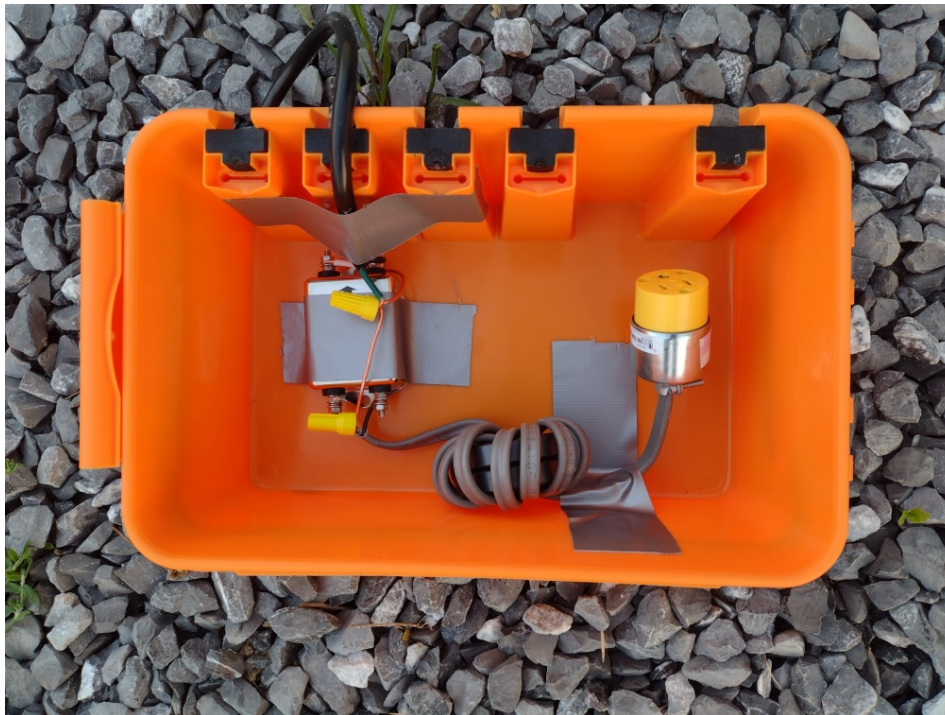
- A Generac GP2500i
- A Sportsman 1000
- A Honda EU2000i



The Honda EU2000i and smaller EU1000i have good reputations for reliability, performance and quiet operation including low RFI emissions. The Generac units are also considered good, but perhaps not quite at the Honda standards. But the Honda generators cost around \$1000 or more and the Generac units are lower cost, but the very low cost and low weight of the Sportsman is very attractive.

Testing for acoustical noise showed only small differences between these 3 units. The Honda unit appears to have an edge of a few dB, but the differences are fairly small overall.

RFI and conducted emissions testing showed that the Honda was the cleanest with the Generac a close second. But the Sportsman was very dirty with RFI noise. This is easily and simply solved at low cost with a high performance EMI/RFI filter rated for about 60 dB or more of suppression of common mode and differential mode noise. The achieved noise suppression is much less in practical setups, but still quite significant. To achieve best results, the ground of the EMI/RFI filter should be bonded to the generator/inverter ground with a wire or ground strap of only about 1 foot maximum, and a ground rod should be bonded to the generator/inverter also with a very short wire, if the system includes earth grounding. The EMI/RFI filter should be immediately followed by a strong RF choke such as 9 to 10 turns of power cable on 2 stacked FT240-43 or FT240-31 toroids to impede any residual RF currents including especially any RF currents on the ground wire. Notice that a ground wire connects power cable ground wires across the EMI/RFI filter and also connects to the ground lug of the EMI/RFI filter. These measures together strongly suppress any RF currents on the long power cable from the generator to the operating table and rig. The power cable can act as an antenna, so RFI noise should be suppressed prior to long power cables. A power plug is included inside the weather proof box to connect to a long power cable to go to the operating table. The short black power cable (less than 1 foot long) includes a power plug which is connected directly to a generator output.





In the last few years a large number of low-cost generator-inverters have become available such as Pulsar, Aivolt, Genmax and others in the \$200 to \$300 range. Information on RFI and conducted emissions are generally not available, but acoustical noise ratings, weight, fuel consumption and other specifications are available. Many of these are likely to have significant RFI noise problems for HF radio operations. But it should be possible to achieve good results using the filter explained here. For 160 meters operation, even the Honda generators tend to produce a lot of noise, so for 160 meters operation especially and possibly 80 meters, using an RFI noise filter is a good idea with any generator/inverter. Using a 100 foot outdoor extension cord to place the generator well away from the antennas and the operating position is recommended, and going as far as 200 feet so that generator acoustical noise pretty much disappears works well. A 100 watt rig with a 110VAC to 12 VDC power supply only draws about 2 to 3 Amp of 110 VAC power during full power CW TX, so voltage drop in the power cables are of little concern assuming other high power equipment is not added. The cables should not run near the antennas and preferably are in a cross-polarized arrangement. If possible placing the antennas and coaxes going in one direction from an operating table, and the generator and power cables going in the exact opposite direction at 180 degrees should provide the best RFI performance. Placement at 90 degrees can also work well.