

Field Ventilator Project

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Field Ventilator Project – Field Power

The Field Ventilator Project, ventilator design is optimised for 12V dc to enable it to be used in remote areas devoid of mains power and/or on a 12v backup battery in the event of power failure.

It is assumed that in a crisis, that each ventilator will be operated 24/7. At present we are assuming an average current of 2A @ 12V dc. This equates to 2A/hr. We do however intend to look at ways to reduce this current burden significantly.

Assuming a car battery of 100A hr, this could provide operation at 50% availability (battery condition and temperature) of approximately one day without charge. It is assumed that most locations will have solar and/or a wind turbine generator. However, as these sources of energy cannot be guaranteed a standby will be required.

Our leading suggestion is a bicycle driven generator. Reports indicate that a human can easily generate typically 100W for the average operator and up to 400W for somebody at peak fitness.

The lower power level is just over double the metabolic energy consumption of the average adult and therefore should be sustainable for long periods, and considerably more sustainable than hand manipulating an Ambu bag ventilator. Assuming at best 70% efficiency of generation and re-charge this should be adequate to operate one or two ventilators in conjunction with a single or shared battery.

Psychologically the ability to generate electricity via the cycle generator could also have beneficial effects to families that may feel frustrated and rejected by being asked to isolate, rather than help their family members. In many countries it is almost a tradition to take it in turn to ventilate a sick relative, however with Covid-19 this simply will lead to the spread of the disease.

Field Power Remit:

The remit is to design and manufacture a lightweight dynamo / alternator-based cycle roller generator system to recharge 12V batteries. The interface is suggested to be the rear bicycle tire simply sitting on/in two rollers of which one is driving the generator.

- a) Portable
- b) Carry Handle (desirable)
- c) Dry shipping weight of < 10Kg (desirable)
- d) Rollers with ball races (**essential**)
- e) Mechanical stable base (**essential**)
- f) Optimised to charge a 12V battery (**essential**)
- g) Charge indicator (optional)
- h) Overcharge protection (desirable)
- i) Able to deliver up to 200W peak power sprint cyclist (desirable)
- j) Safety fuse in output / output (**mandatory**)
- k) Reverse charge protected (diode) 25A (**mandatory**)
- l) EMC Complaint to relevant EN and FCC Norms to protect critical hospital apparatus and communication services from interference. (**mandatory**)
- m) Target cost < \$30.00 US