SOLAR POWERED AIR COMPRESSOR.
RUN ANY AC MOTOR WITH THE PICO CELL CONTROLLER

PicoCell, a unique off-grid controller based on advanced patented maximum power point tracking (MPPT) technology, which can run any grid-tied water pump or other AC motor loads directly off of solar PV panels.

PicoCell decreases overall system's cost, by having up to 50% fewer solar PV panels. Now customers can accurately match the power of Solar PV with the power requirement of the pump. Hence, unlike other solar controllers, no more high PV voltage threshold required for having a VFD run the AC pump. The overall project savings are in the 20-40% range depending on the pump size.
The AC air compressor was tested for 6 different pressures (heads) versus flow versus solar PV power as shown in the graphs (left). It takes around 200W to start a compressor, and its performance in air flow based on the input power, for a given pressure, is shown in the graphs (left).

For example, for 300W of input solar power, if the compressor's backpressure is 30psi, then it provides an air flow of just above 2scfm, while if backpressure is 20psi, then it provides 3scfm of air flow; but if the backpressure is only 5psi, then the air flow is 4.5scfm. This solar power is measured as an input to the PicoCell, driving the compressor.

Depending on the location where this solar air compressor system is installed, it will require more or less total PV capacity to achieve these results. There are 6 solar zones that are shown on the map above. Zone 6 has the most solar insolation (6-7 kWh/m2/day), while zone 1 has the least amount of sun (1-2 kWh/m2/day).
AIR PRESSURE FLOW

The AC air compressor was tested for 6 different pressures (heads) versus flow as shown in graphic (right). At no back pressure of the compressor (0 psi) the air flow is almost 5.5 scfm. Once the pressure starts rising, the flow drops, so for 5psi the flow is 3.85 scfm, 10psi it’s 3.5 scfm, etc until the 30psi at which the flow is 2.7scfm.

SOLAR COMPRESSOR SYSTEM

The PicoCell controller can be used for running any AC motor load from solar independent of phase, voltage and frequency. For a given compressor specification, PicoCell is capable of generating a true sinewave with a variable frequency range of 30-60Hz. By varying the frequency, PicoCell controls the compressor’s speed in the range between 50 and 100% of rated speed, depending on the power availability from the solar panels (PV input). It also provides soft start functionality, which can dramatically extend the life of the motor itself.

In this particular setup, a 0.5HP, 120Vac, 60Hz, single-phase (2-wire) air compressor was tested with the PicoCell controller powered by 3-5 standard (60cells, 230-270W) PV panels wired in series.