

### Hydrogen Miner® Machines for Gas production by Electrolysis

Hydrogen Miner uses a minimalist, aesthetically pleasing machine design for generation of gas by electrolysis. Each unit is light weight, promotes rapid deployment and facilitates point of service generation of gasses using available power sources.

Hydrogen Miner is designed for the electrolysis enthusiast interested in converting electricity into gas by way of electrolysis. Parties of interest may include industrial artists, science art collectors, scuba instructors, drone operators, hobby rocket developers, farmers, veterinarians, or educators. A multi-tool such as this Vertical Cell Electrolysis Machine (VC or VCE) is capable of producing Oxygen, Hydrogen, Carbon compounds and other molecular gasses by changing the desired chemistry. On or off grid production of the “minor” electrolytic component, Oxygen is suggested. Oxygen is great for Scuba diving by rebreather, beer fermentation, medical supplement or use within hobby or industry. Point of service electrolysis is necessary for hard to reach places that require modest volumes of gas.

Hydrogen Miner was conceived as an off-grid product capable of being powered by solar, wind, hydro or renewable source. Hydrogen Miner is portable with an aesthetically pleasing sturdy frame. Each unit may fit into a tight space of 65 inches by 12.5 inches by 6 inches. Three sides of the frame allow for attachment to a predetermined pattern for stand alone or framed arrays. Structural stability to dry weight is optimized under 60 pound dry weight. The frame and dry electrolytic cell weigh in around 31 pounds. Electrodes may weight upwards of 24 pounds and a power supply of no more than 5 pounds is provided.

Hydrogen Miner is optimized for Interconnectivity and power by renewable energy. Electronics and electrical connections are robust utilizing DC variable voltage and current to drive reactions. Standard Anderson SB-50 Plugs are prepared and coated to match. Steel split rings are used to mate 6AWG Vu-Tron to the desired point of DC input on a 1 inch stainless electrode. Functionality has been tested between 2.5 volts and 30 Volts, up to 20 Amps, while the system has been optimized for 60 Amps per cell\*. Hydrogen Miner might be used to

facilitate dump loading from a wind turbine, solar, grid or in management of grid power stabilization.

Emarena’s electrolysis machine is a two-part standardized system consisting of a frame and a reaction cell. A standard frame allow mounting of a sight-glass, replaceable fused fluid cell. Each cell can retain a sealed electrode dimensionally. Height adjustment of the electrodes may be made until satisfied split ring clamps. When satisfied with performance seals may be set further with RTV silicon. A second set of electrode clamps provide a point of energization. The Hydrogen Miner™ electrolysis machine has a failsafe, design with low pressure output of 0.75 Liters per minute. The modified U-tube to Y design features dual bar stock electrodes that when properly arranged prohibits over-pressurization. In fact blockage or gradual over-voltage cut-off of gas production through displacement of conductive fluid as per factory suggested parameterization in the owners manual.

Hydrogen Miner is designed to accept standard one inch bar stock electrodes of stainless steel, carbon, copper or other metal, alloy reactive or non reactive compound. Such promotes various chemistry configurations not possible through parallel plate electrolysis. Consumable electrodes open the door to accelerated gas production regardless of over-voltage and over-current.

The default reaction for Hydrogen Miner is electrolysis of water in a Sodium Hydroxide solution. Performance is as good using food grade 5% solutions of Sodium Hydroxide. [see Owners Manual provided with your purchase] Use of petroleum products or volatiles is prohibited.

“Cake Eater” series Hydrogen Miners have a clear finish to retain transparent glass-like coating features. Laminate coatings of two part marine epoxy are performed to encapsulate the frame. Most components are made by hand or hand tool. This labor intense system allows for visibility of both the weather resistant Marine mahogany plywood and electrodes. The newly introduced frame design allows each element of the machine and functional gas formation on the electrode to be viewed.



Photo: Hydrogen Miner Vertical Cell Electrolysis Machine. Model VC 2.0-W60, Series Cake Eater. DC Power supply included and integrable on the rear. extension not included .

No Warranty, \* see Owners Manual