ECOBOX-MR
REFORMER INTEGRATED FUEL CELL UPS SOLUTIONS

APPLICATIONS
• Telecom UPS
• Remote Monitoring
• Rail & Signals
• Marine
• Government
• Security & Surveillance
• Remote Area Power

- Cost savings over diesel power, even while reducing carbon output
- Remotely accessible for real-time control & monitoring
- Anti-theft solution (fuel source does not have a resale value)
- Optional extended-run / auxiliary fuel tank cabinets

- Quiet Operation, Clean Power
- Lower Energy Cost, Lower Maintenance

- Safe, non-volatile fuel: methanol diluted with water
- Achieves a fuel efficiency 1kWh/L
- No carbon monoxide, NOx or SOx emissions
- Can be hybridized with solar or wind power

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<table>
<thead>
<tr>
<th>MODEL</th>
<th>MR-1</th>
<th>MR-2.5</th>
<th>MR-5</th>
<th>MR-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Continuous Power Output</td>
<td>1kW</td>
<td>2.5kW</td>
<td>5kW</td>
<td>10kW</td>
</tr>
<tr>
<td>Nominal Current</td>
<td>21A</td>
<td>53A</td>
<td>105A</td>
<td>210A</td>
</tr>
<tr>
<td>Nominal Voltage (Typical DC)</td>
<td>-</td>
<td>48V DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Est. Fuel Consumption (L/hr)</td>
<td>1.6</td>
<td>3.9</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

**FOOTPRINT**

| Cabinet Dimensions (W x D x H) mm | 60*90*200 | 120*90*150 | 120*90*150 | 240*90*150 |
| Base Footprint (W x D) mm        | 60*90     | 120*90     | 120*90     | 240*90     |
| Total Weight kg                  | 200       | 250        | 280        | 500        |
| Enclosure Material               | Powder Coated Steel |

**OPERATION**

- **Power Conditioning**
  - DC/DC converter, load following, remote real-time controllable output
  - Optional DC/AC inverter, load following, 50 or 60 Hz, 120 / 240 VAC selectable

- **Warm up to Standby state**
  - Approximately 3-4 hours from 20 °C ambient temperatures

- **Black start power requirements**
  - 45-60 VDC, 600W for electric-only powered warm-up

- **Standby Power Consumption**
  - 48V DC, 150W for 1kW, 300W for 2.5kW and 5kW, 600W for 10kW

- **Standby to Run**
  - 2-4 minutes to 50%, 10 minutes to 100% output from electric standby

- **Rapid start**
  - TBD, rapid start uses alternate fuel mix for warm up cycle

**EMISSIONS**

- **Reformer exhaust**
  - CO2 by-product, must be properly vented to the outside atmosphere

- **Noise**
  - <65 dBA @ 1m

- **Water**
  - Approx 0.38L/kWh dependent on local conditions, condenser kit available

- **CO, Nox, Sox**
  - None

**FUEL CELL SYSTEM**

- **Type**
  - PEM

- **Coolant**
  - Air

- **Efficiency**
  - 55% peak operating for fuel cell power module

- **Fuel Type & Specification**
  - Methanol-Water mix. Mix ratio: 2 liters methanol, 1 liter de-ionized water

- **Methanol quality requirements**
  - 99.85% purity, recommend Methanol compliant with IMPCA Specifications

- **Water quality requirements**
  - De-ionized water

- **Hydrogen purity delivered**
  - 99.99% pure hydrogen

- **Fuel storage tank**
  - Outside

**OPERATING ENVIRONMENT**

- **Ambient temperature range**
  - Start temperature range, rated power maintained -20 to 45°C

- **Relative Humidity**
  - 0 to 95 % non-condensing

- **Standard altitude capability**
  - <3,050 meters, 10,000 ft

- **Shipping freeze exposure**
  - Fuel cell stack non-operating / shipping exposure limit: -20°C

**CONTROLS & COMMUNICATION**

- **Software**
  - Full remote command & monitoring via internet

- **GUI (Graphical User Interface)**
  - Standard 76mm LCD & Keypad

- **Remote Communications Options**
  - Serial port RS232
  - Full remote command & monitoring via internet
  - TCP/IP - Fiber, LAN, or Wireless network

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