

Operating instructions for the Black Monolith

Controls

There are two controls:

1. the Generator Inlet immediately to the left of the monolith, and
2. the big red Shutdown button immediately to the right of the monolith.

Displays

There are three displays:

1. the State of Charge meter on the side of the box containing the shutdown button,
2. the Upper Lights, most notably a large blue light in the upper half of the monolith (the inverter/charger display), and
3. the Lower Lights, flashing blue in the lower half of the monolith, which may also show yellow and red on occasion (the battery display).

Generator inlet

The generator inlet can only take a 15 amp lead (with the large earth pin) and should only be connected to a 240 Vac generator with a rating of 3.5 kVA or greater. When the monolith is not shut down, the generator will both run the house and charge the battery. When the monolith is shut down, the generator will only run the house. If the monolith has been shut down due to a low state of charge, you should attempt to restart the monolith so it can charge the battery, but only after starting and connecting the generator.

Shutdown button

The normal position for the Shutdown button is out. If it has been pushed in, it can be released to pop out again by rotating it clockwise as indicated by the arrows printed on it. If you rotate it anti-clockwise by mistake you will simply unscrew the button. This is harmless. Just screw it back on clockwise until it releases.

Note that it takes about 15 seconds after releasing the button, before the monolith will start up again. Even if the generator is running, the power will be cut off during these 15 seconds.

Note that while this Shutdown button isolates the solar array and the battery, it does not disconnect the generator (except for those 15 seconds on restart). This is so that you can still power the house from the generator if the monolith is shut down. For complete shutdown in an emergency, or for an electrician to work on the monolith or the house wiring, the generator must also be disconnected by unplugging it from the inlet.

The monolith may shut itself down if it detects a fault, including if the battery state of charge

falls below about 10%. This will be indicated by the upper lights being off. To restart the monolith in this condition, you must first push the shutdown button in, so that you can then release it (by rotating it clockwise) to restart as usual.

State of Charge meter

This meter is graduated from 0 to 1.0 which you can read as 0 to 100%. When you restart the monolith after having been shut down, this meter will read zero, and this should be ignored (unless you also have continuous lower red lights and beeping). The monolith does not know the state of charge of its battery when it has been shut down and restarted. It needs to achieve full charge, either from the generator or the solar array, before it will reset the meter to 100% and give meaningful readings from then on.

You should consider running the generator to recharge the battery if the state of charge gets below about 30%, at which time you may have an occasional lower red light and beep. As the state of charge falls further below 30% you should have more lower red lights and beeps, and if it gets down to about 20% the monolith will disconnect itself from the household loads (i.e. the lights and power will go off) to save its battery from going even lower. If this happens, you should definitely start the generator and connect it to the generator inlet. It will take about 4 hours for the generator to return the battery from 20% to 100% state of charge. If you have the prospect of a sunny day the next day you may choose to only run the generator until the state of charge gets to about 50%.

Unlike the older lead-acid batteries, lithium batteries last longer if they stay away from 100% charge, as well as staying away from 0% charge. They are happiest in the range of 30% to 80% charge.

Upper lights

If the large central upper blue light is off, then the monolith is shut down, whether or not the shutdown button is pushed in. If you don't know why the monolith is shut down, attempt to restart it by first pushing (if necessary) then releasing the shutdown button. There are also smaller red and green lights on the upper left of the monolith, but these are not important.

Lower lights

The flashing blue lights indicate that the individual battery cells are being monitored. They will continue to flash even when the monolith is shut down, as they are powered directly by the cells they are attached to (so long as the cell has any charge at all).

You may occasionally see yellow lights in the same location. These come on at the very peak of charge and indicate that the cells are being "balanced" in the sense of ensuring that they all continue to reach full charge at the same time.

If you see red lights in the same location, these will be accompanied by beeping sounds and are a warning that the cell on which the red light appears is being stressed by one of four possible conditions: Voltage too high or too low, Temperature too high or too low. An occasional red light or beep is nothing to be concerned about. The monolith itself should eventually take action to eliminate the stress, by disconnecting the household loads in the case of low cell voltage or high cell temperature, and disconnecting the charging sources (solar array and generator) in the case of high cell voltage or high or low cell temperature.

If red lights and beeping persist for more than about 10 minutes, you should first attempt to determine the likely cause by looking at the state-of-charge meter. If it is below 30% then the cause is most likely low cell voltage and you should use the generator to recharge the battery.

If the state-of-charge meter shows 100% while red lights and beeping continue for more than 10 minutes, then you should start and connect the generator to the inlet beside the monolith to provide power to the house. Then you should push the shutdown button beside the monolith. You should then contact the designer (details below).

If the red lights and beeping are due to high or low temperature, they will not stop until the cells have returned to a more comfortable temperature, even though the monolith is shut down. But when they do, you may try restarting the monolith.

Emergency Shutdown

Of course in the unlikely event that you hear any strange noises, see fire or smoke, or smell any strange smells coming from the monolith, you should push the shutdown button immediately, and disconnect the generator.

Vents

Do not place anything so as to block the louvered vents in the sides or top of the monolith, and do not allow any water to enter these vents when hosing or cleaning. The vents should be brushed occasionally to keep them free of dust, spider webs and mud-wasp nests that would block the flow of cooling air.

Cleaning

The outside of the monolith is made of polycarbonate and aluminium. It should only be cleaned with a soft damp cloth, with a little hand-dish-washing detergent if necessary. Do not use any solvents or caustic or abrasive cleaners. Take care to avoid personal injury on the sharp top corners when cleaning.

Contact

If there are any problems with the solar power system, or if you have any questions, please

contact the designer, <details removed>