

PROJECT DESCRIPTION

Off-grid pioneer in Australia desires the AC•THOR community to keep growing!

Owner: Michael Meyer
System: Off-grid PV + hot-water with AC•THOR
Hot water demand: 2-3 people all year around
Control: SMA Sunny Island
Location: Tasmania, Australia



Figure 1: Michaels house with solar PV

Object data

- 3.51 kWp photovoltaics, North and East facing
- Inverters/charger: SMA Sunny Island 6.0H and SMA Sunny Boy 4000TL
- Battery capacity 12 kWh
- Single phase system
- 315 litres low pressure hot water tank
- Boost-backup: electric AC from the mains power via a 2-way switch



Figure 2: AC•THOR in Michaels office

Functionality

Among many other outstanding features, AC•THOR operates with frequency-shift battery inverters. These inverters raise the AC frequency when the battery is fully charged. This signals the PV inverter to limit power to prevent battery overcharge. AC•THOR detects excessive power by measuring this frequency rise. It increases heating power until the system is balanced, before the PV inverter derates. Thereby it automatically uses the excess energy for thermal storage by controlling its power linearly to use exactly the amount of the remaining PV power and to avoid discharging the battery.

Customers opinion

Michael is a very happy customer as he avoids energy and fixed charges from his energy provider. He only activates the Mains power through the 2-way switch when the batteries are running low.

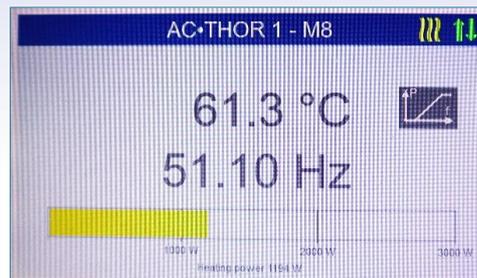


Figure 3: AC•THOR working on mode M8 off-grid

System Performance & Advantages

Thanks to the in-built data logger, Michael can monitor power, boost, temperatures and so on. He can monitor this on the cloud or in the in-built touch screen.



Figure 4: Monthly heating power on AC•THOR's web interface. Jan – July 2020

Since the installation in January Michael has saved approx. 70 kWh/month that otherwise would remain unused and had to be purchased from his electricity provider. Even with a small PV system, Michael is saving approx. 600 AUD/year (363 Euro) based on a rate of 0.30 €/kWh and 95.2 ¢/day.

Michael has achieved the following advantages from the AC•THOR:

- Avoids energy wasted and PV inverter shutdown when the battery is full
- Converts the hot water tank into a "liquid battery"
- Stable frequency
- Non dependant on energy retailers
- Avoids energy charges and fixed daily charges
- No CO2 emissions
- Wood fired or gas not required
- Hot water monitoring and remote control

Why hybrid storage?

Photovoltaic off grid systems need to be oversized in order to provide enough energy during all periods. This leads to unutilized PV power and a significant energy loss during sunny seasons. The AC•THOR detects the grid frequency of the inverters and in case of excess energy, power is diverted to boost the electric heating elements all over the station. The desired target-temperature can also be easily adjusted with AC•THOR. Storage capacity in the off-grid system can be inexpensively scaled up. Energy is now used that was wasted before.

System schematic

AC•THOR is plugged into an AC socket like any other load. No additional communication wiring is required.



Figure 5: AC•THOR in an AC off-grid

This is real „plug-and-play“: Just plug into the power line, done! There is no need of any additional communication wiring.

The chronological order of the hybrid storage concept is to supply the present loads first, afterwards surpluses are used to charge the battery and only the remaining excess energy is used for water heating.

Compatible batter inverters

The list of manufacturers that supply compatible products to control AC•THOR continues to grow. Please check our website for latest info. www.my-pv.com

Product details AC•THOR

- Supply voltage 230-240 V
- Linear power control 0 – 3,000 W
- Mains connection single-phase, Mains plug
- Load connection Mains socket for resistive loads
- Color Touch Screen 2.83“
- Power cord 2.8 m
- Dimensions 135 x 210 x 65 mm



Contact for Australia
 Energy Smart Water
info@esw.net.au
www.esw.net.au