

AC•THOR - AVOCADO FARM PROJECT

Off-grid system with hybrid storage in Western-Australia

System: Off-grid PV power + hot water system
6 x AC•THOR

Control: SMA Sunny Island

Planner: ESW Energy Smart Water



Description

An avocado farm in Australia produces 90 tons of avocados annually. The energy concept for the farm includes a 53 kW photovoltaic system that simultaneously feeds a 160 kWh saltwater battery as well as a 48 kWh lithium energy storage. The farm is completely off-grid, operating on 100% renewable energy.

Why hybrid storage?

Photovoltaic off grid systems need to be oversized in order to provide enough energy during winter 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 hot-water 9kW elements in each of the ROTEX tanks. The desired water-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.

Object data

- 53 kWp off-grid system, frequency-shift inverters
- 160 kWh saltwater battery and 48 kWh lithium-cells
- Two tanks ROTEX Sanicube, each with a 9 kW immersion heater powered by three AC•THORs

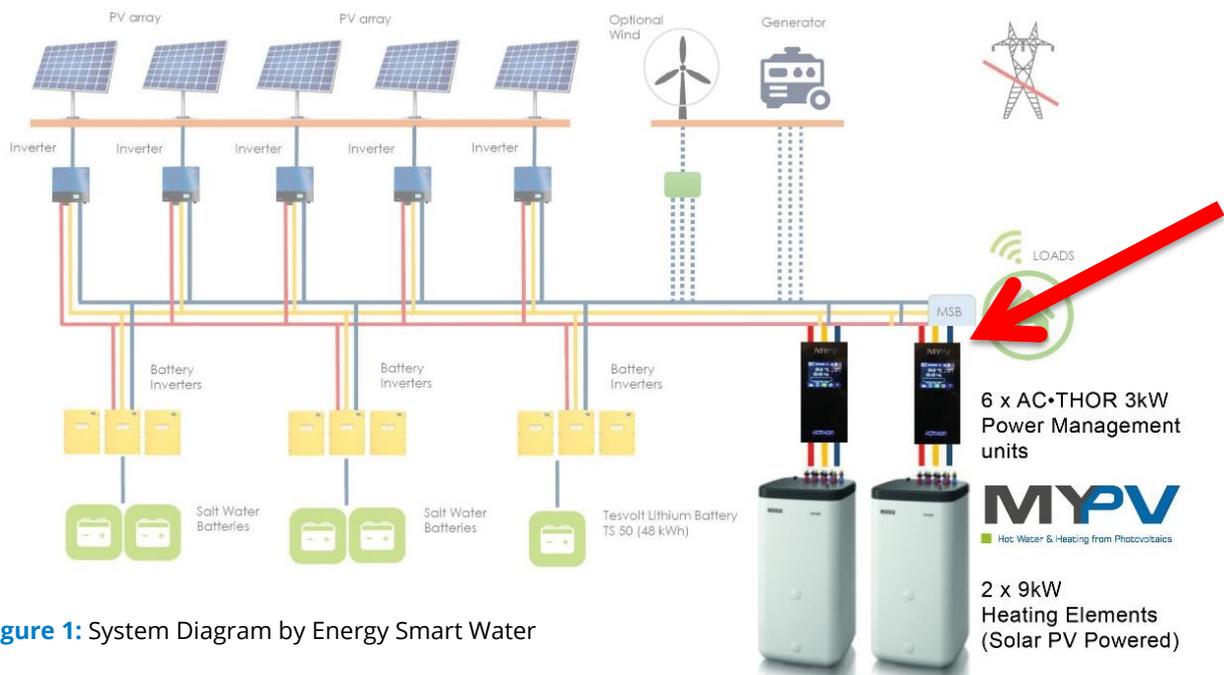


Figure 1: System Diagram by Energy Smart Water

The price for this additional capacity bears no relation to the actual costs of the batteries. The addition of the AC•THOR therefore requires minimal additional effort!

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 hot water storage by controlling its power linearly to use exactly the amount of the remaining PV power and to avoid discharging the battery.

System schematic

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



Figure 2: 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
- 0 – 3,000 W linear power control
- 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

