The **Dachs W** with Sunny Island 5048
The **off grid solution** with micro CHP

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Off grid with Dachs W

The off-grid solution is a system with 3 Sunny Island 5048 inverters, a 48V battery pack and the **Dachs W micro CHP**, and it provides a permanent 3-phase electrical **AC grid** (3/N/PE, 400/230 V, 50 Hz), like the public grid.
The **modulating Dachs W** is based on Europe´s best selling micro CHP. It is connected directly on the **AC side** and provides the consumer with electricty at **maximum efficiency** without any transmission losses.
If the building needs more output than the Dachs CHP can provide, the inverters can take additonal energy from the batteries. Thus the consumer can use the **Dachs plus the inverter output**. If the object needs less electricity than the Dachs CHP provides, the excessive energy is used to load the batteries.
For an optimised loading process, controlled by the Sunny Island inverter, the Dachs only needs to reduce its output in the final stage of the process. The Dachs W can therefore operate for long periods with its nominal output and thus with a **high efficiency**.
The primary task of the Dachs W as an off-grid solution is the generation of electricity. But the Dachs W also produces 12,5 kW thermal output at the same time, and a condensing unit can produce an additonal 2,3 kW. The heat can be used for DHW or the heating system.

Applications

The Dachs W is designed to supply electricity to an off-grid building or application, ie. with **no connection to the public grid**. Examples:

- Chalets
- Isolated houses
- Summer residences
- Forester´s houses
- Small farms
- Small commercial applications

Components of the off grid system

The full automatic off-grid system is designed to be **modular** and can be **scaled** and **extended**:

- No. of inverters (Multicluster system according to SMA)
- No. of Dachs W units (1 to 3)
- Size of battery pack (48 V, 420 Ah to 10 000 Ah)
- Connecton of other generators (e.g. PV system, emergency power unit)
- Connection of other heat applicances (e.g. gas boiler)

What is necessary?

- A **battery pack** (system voltage 48 V, type: VRLA, FLA, NiCd) for storage of electrical energy.
- 3 Sunny Island 5048 **inverters** to provide a 3 phase electrical grid.
- **Dachs W** CHP for electricity and heat generation.
- **LPG supply** (Propane type 3P. Min. methane no. 35) to supply the Dachs W.
- **Cooling system** to dump heat and secure the electricity generation from the Dachs W.

Recommendations:

- SE750 **buffer** vessel to store the thermal energy.
- A GSM modem or Ethernet module for **remote control** of the Dachs W.
- **Other generators** (up to 2 additonal Dachs W CHP, an emergency power generator or a PV system) to have a fail-safe system.

Overview output data:

Electricity output* data *3 Sunny Island 5048 inverters with 1 to 3 Dachs W CHP*			
	3 × Sunny Island + 1 Dachs W	2 Dachs W	3 Dachs W
AC off grid	3/N/PE, 400/230 V, 50 Hz		
continous AC output @ 25 °C ** @ 45 °C	20,5 kW 17,5 kW	26,0 kW 23,0 kW	31,5 kW 28,5 kW
AC output for 30 min @ 25 °C ** for 1 min @ 25 °C for 3 s @ 25 °C	25,0 kW 30,7 kW 41,5 kW	30,5 kW 36,2 kW 47,0 kW	36,0 kW 41,7 kW 52,5 kW

* Complete data is available in the technical data sheet of the Dachs (4798.465.xxx), in the Dachs W planning, assembly and start-up document (4798.329.xxx), and in the Sunny Island 5048 data sheet. Electricity output data refers to maximum values with running Dachs and loaded battery, thermal output data refers to maximum values at rated output.
** Ambient temperatur of inverter

What is the output of the off grid system?

The available **electrical output** in the off-grid system depends on the continous output of the inverters and the output of the Dachs W. In total **20,5 kW** can be provided **with a single Dachs W unit** and 31,5 kW with 3 Dachs W.

Thermal output* data *Dachs W*			
	1 unit	2 units	3 units
Thermal output with condensing unit	12,5 kW 14,8 kW	25,0 kW 29,6 kW	37,5 kW 44,4 kW
Thermal efficiency with condensing unit	61 % 72 %		
Total efficiency with condensing unit	88 % 99 %		

Design of system according to the demand

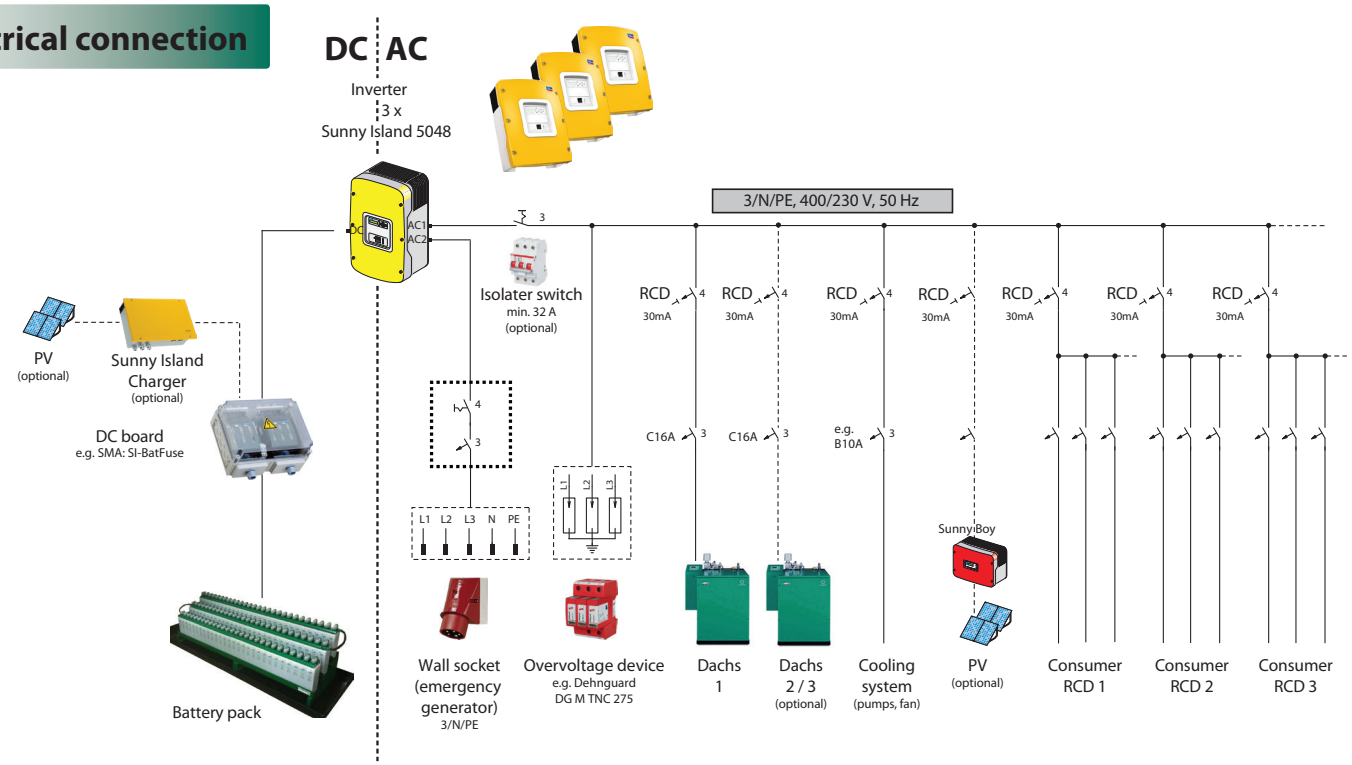
1 Dachs W unit can supply applications with an electrical demand of **up to 90 kWh/day**. Because of the lower atmospheric pressure at higher locations, the nominal electrical output of Dachs is reduced.

Nominal output	**5,5 kW**	**5,0 kW**	**4,5 kW**	**4,0 kW**
Height above sea level	≤ 700 m	≤ 1300 m	≤ 1900 m	≤ 2500 m
Max. electrical demand	90 kWh/day	82 kWh/day	73 kWh/day	64 kWh/day

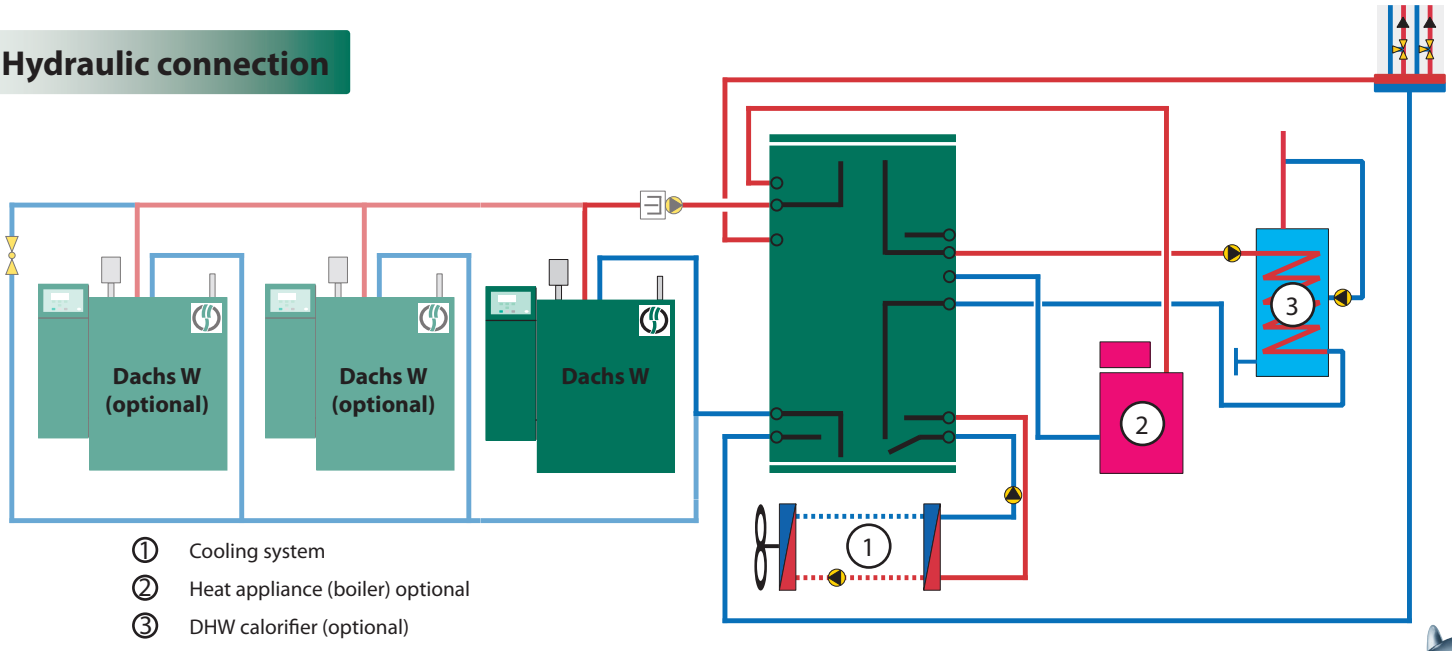
If the **max. electrical demand** is higher than the available output, an **additional generator** is required (e.g. second Dachs W unit or a PV system).
The required **minimum capacity of the battery pack** can be estimated on the daily electrical demand.

Average daily electrical demand	≤ 15 kWh/day	≤ 20 kWh/day	≤ 30 kWh/day	≤ 50 kWh/day	≤ 70 kWh/day	≤ 90 kWh/day	> 90 kWh/day
Minimum capacity of the battery (@ 48V)	420 Ah	490 Ah	600 Ah	800 Ah	1000 Ah	1200 Ah	> 1500 Ah

Electrical connection



Hydraulic connection



① Cooling system
② Heat appliance (boiler) optional
③ DHW calorifier (optional)

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