

swiss made power



solutions for rural electrification



EN

Solar Home System (SHS)



► Efficient and simple

A Solar Home System is an independent electrification system for individual use. It generally includes a battery bank charged and maintained with renewable energy sources - usually solar panels - via charge controllers.

Such a system supply different daily electrical devices (light, appliances, etc...) with power through a local distribution network. This network can be either low-voltage DC (for smaller systems) or alternating current (AC), similar to the public grid (230 or 120 VAC), using an inverter. In networks with alternating current it is essential to use a conversion system that meets all requirements for proper energy management: embedded protections, proper battery management, low-voltage disconnection, ...

The **AJ** inverter range has been specially developed for Solar Home Systems with alternating current, ensuring optimal use of energy and effective protection of the battery.

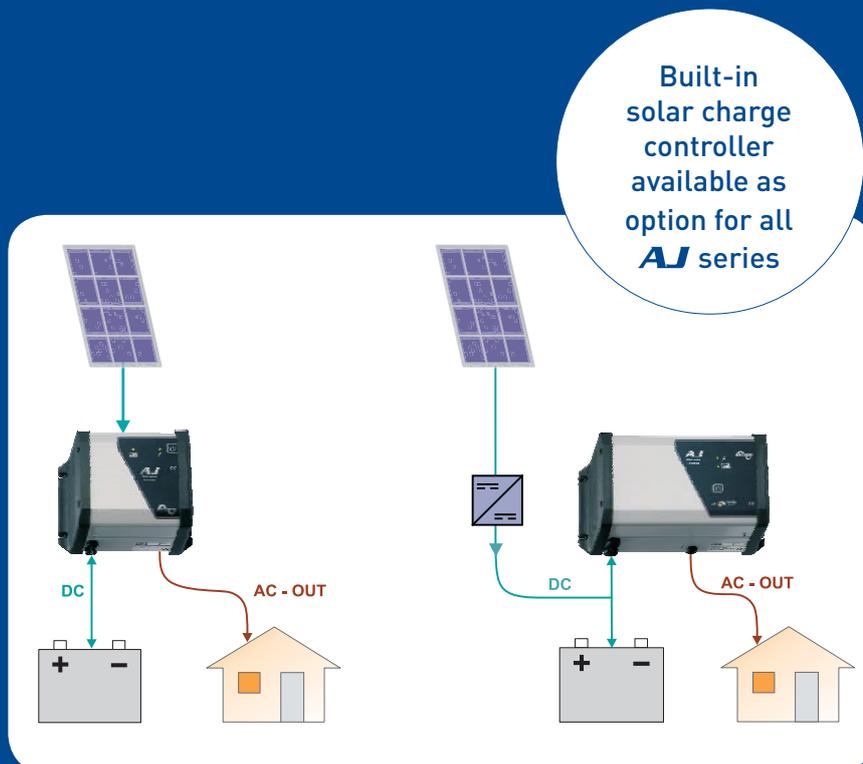


Figure 1: Solar Home System

Hybrid system: renewable / diesel + AC-coupling



► At the heart of a hybrid system

A « hybrid system » is a combination of different energy sources, one or more producing renewable energy (solar, wind, hydro) and a diesel/gas generator. This generator is generally used to fill the energy deficits of other producers that are depending on environmental conditions, bringing flexibility to the system.

As seen in figure 2, the core of such a system consists of an **Xtender** inverter-charger. It is connected to a battery bank and to a generator, supplying energy to all kinds of electrical appliances. The battery bank can be recharged by the different renewable energy sources using the dedicated efficient MPPT charger, **VarioTrack**, and/or by the generator, which is entirely automatically managed by the **Xtender**.

A special power assistance function for the generator integrated in the **Xtender** provides stable operation of the generator. It can be sized to a lower power than the peak consumer load power, giving lower fuel consumption and a lower investment cost.

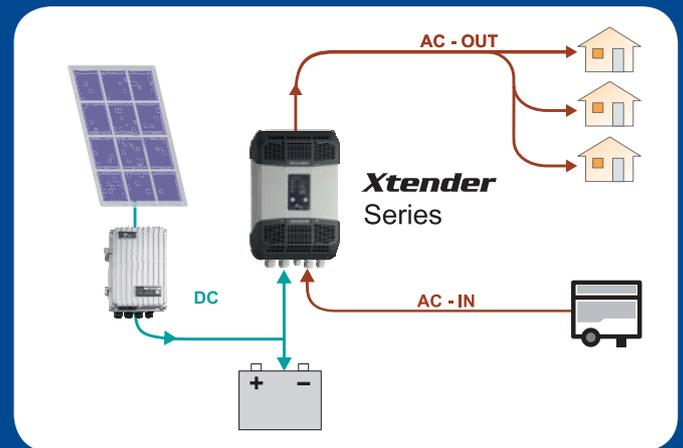
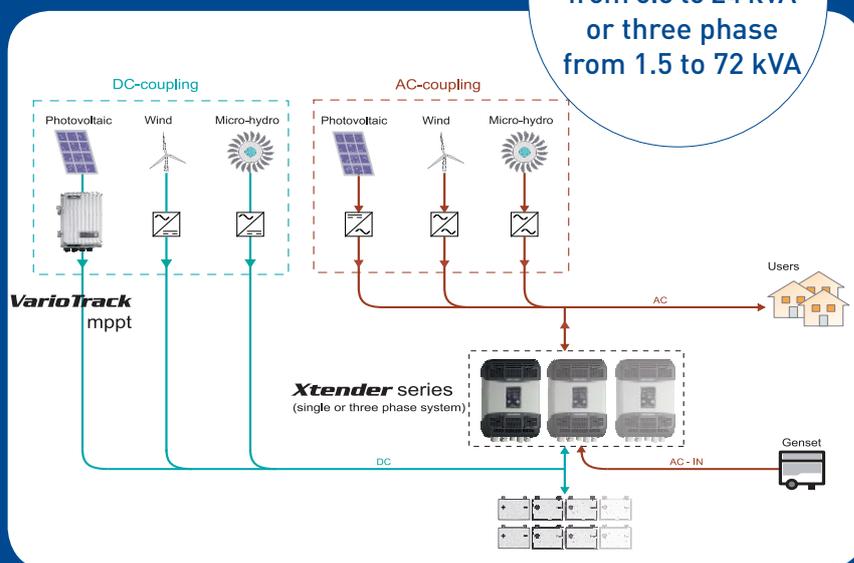


Figure 2: Hybrid system

In comparison with a 100% green energy system, association with a generator is currently proven to be the **most economical and robust solution**.

Inverter-chargers
single phase
from 0.5 to 24 kVA
or three phase
from 1.5 to 72 kVA



► A true energy regulator

As seen in figure 3, the **Xtender** can also be used in systems where energy producers are connected directly to the AC-bus via standard grid-inverters.

In such an installation, the **Xtender** (or the multi-Xtender system) plays the role of «energy regulator» for the system's energy production, consumption and storage. With a frequency control for the AC-line and an automatic start/stop for the generator, the **Xtender** manages the different actors for an optimal operation of the system.

Figure 3: Hybrid system with multiple energy sources connected to DC-bus and AC-bus

Electrical microgrid (minigrid)



► An electrical grid at your fingertips

To meet the growing demand for larger and more complex rural electrification systems, Studer Innotec offers a new concept for microgrids (figure 4). With quite similar behavior to the preceding system (figure 3), this concept brings a **very robust solution**, which is **simple to implement** while providing **flexibility in both its design and management**. A standard hybrid unit is at the core of the system and decentralized units can provide redundancy, storage service, power assistance, and interface with other renewable sources to the microgrid.

This concept offers the following advantages :

- **Independence**
Each decentralized unit is independent from the rest of the system and can supply its own load in case of non-availability of the central unit. Each decentralized unit is also protected against the mal-functioning of other participants of the system if they have excessive energy consumption. Energy and power allocations can be managed for each distributed group.
- **Flexibility**
Each decentralized unit can add its own power to what is allocated from the central unit.
- **Sharing**
Each distributed system with its own energy source can share the excess with other participants of the minigrid on a “share the excess, keep the essential” principle. It also has a given quota of energy available from the minigrid.

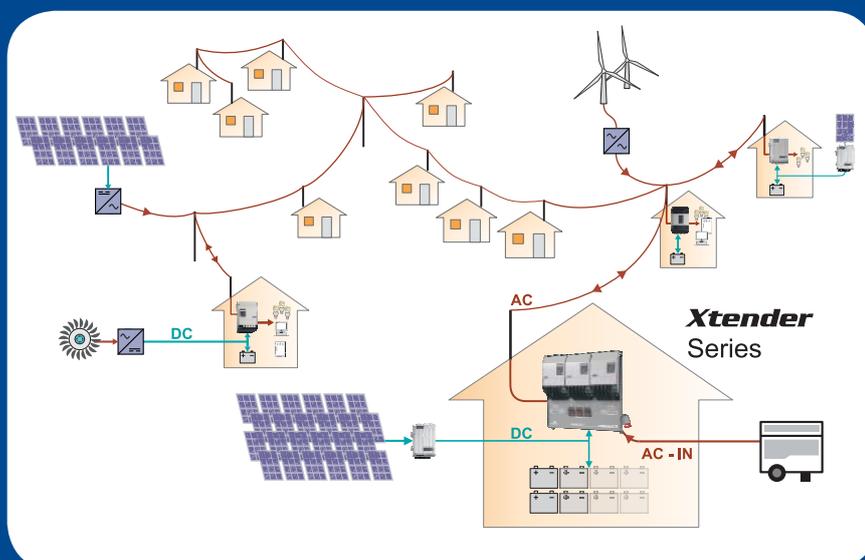


Figure 4: Minigrid example

► System Extension...

The minigrid is an **open and modular network** that can easily be extended, in case of village growth for example, to accommodate new consumers and energy producers.

In addition, the minigrid can integrate and feed its excess energy into the public grid, if it would become available, making it a sustainable investment. In this case it would participate as an energy producer and stabilizer of the grid and have a backup function in case of mains failure.

A **Studer** solution for each situation!

Solar Home System ► **AJ series**

Power any AC appliance from 200 to 2400 VA (230 V/50 Hz and 120 V/60 Hz) with AJ sine wave inverters.

- Low self-consumption due to «low frequency» technology
- Optimal sizing of the inverter thanks to its high overload capacity
- Reduced energy consumption with standby and current detection from 2 W
- Plug & Play, with DC and AC cables already mounted
- Special algorithm «B.L.O.» that optimizes the battery lifetime

MPPT solar charger ► **VarioTrack**

Maximize the energy generated from solar panels by adding a VarioTrack solar charge controller with maximum power point tracker (MPPT) to any solar installation. 65-80A/12-24-48V, 16-150V input voltage range.

- Easy and safe commissioning with full protection against incorrect wiring
- Rugged and durable, this device is designed to perform in harsh environmental conditions (IP54)
- High conversion efficiency, 98%
- Up to 15 units in parallel

Hybrid system ► **Xtender series**

Create flexible hybrid energy systems with 1-phase or 3-phase power output from 0.5 to 72 kVA (230 V/50 Hz and 120 V/60 Hz) with Xtender sine wave inverter-chargers.

- Optimal sizing of the inverter-charger thanks to its high overload capacity
- Matches all applications (acceptance of all kind of loads; asymmetrical, inductive and reactive)
- Very open programming with two independent auxiliary relays and a logic «and/or» function
- Reduced investment and operating costs due to the optimal sizing of the genset enabled by the Smart-boost power assistance
- Influence on the inverter operation with a command entry and programming at the Xtender entry
- Three phase power output possible from a 1 phase genset



AJ series

AJ 275-12(-S)
AJ 350-24(-S)
AJ 400-48(-S)

AJ 500-12(-S)
AJ 600-24(-S)
AJ 700-48(-S)

AJ 1000-12(-S)
AJ 1300-24(-S)

AJ 2100-12(-S)
AJ 2400-24(-S)

(-S) = Optional Built-In Solar Charge Controller



VarioTrack series

VT 65
VT 80



Xtender series

XTS 900-12
XTS 1200-24
XTS 1400-48

XTM 1500-12
XTM 2000-12
XTM 2400-24
XTM 2600-48
XTM 3500-24
XTM 4000-48

XTH 3000-12
XTH 5000-24
XTH 6000-48
XTH 8000-48

