

FAQ – Can I use lithium batteries with AC-coupling system?

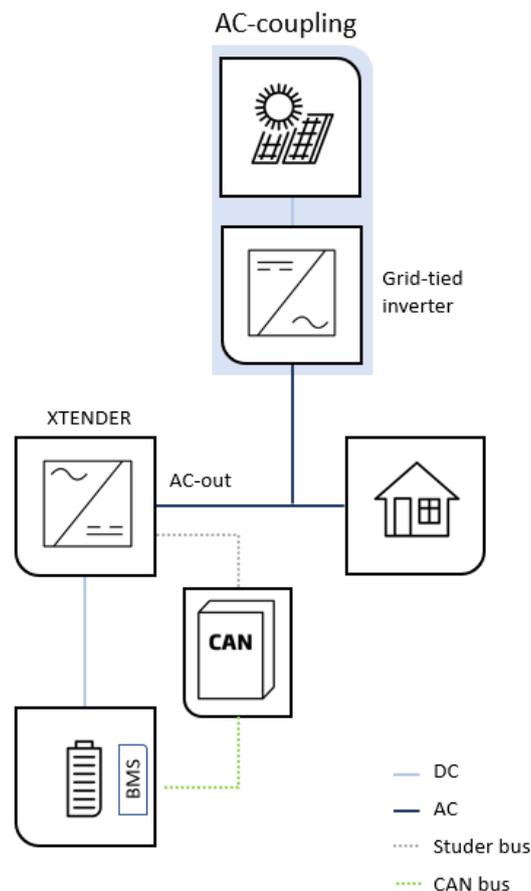
Lithium batteries have many benefits, but as all new technologies, challenges appear to adapt to current solutions. **With SW version R672 and later**, we have gone a step further to integrate lithium batteries with AC-coupling solutions, having always in mind that reliability and performance must come first.

If you use lithium batteries for the first time, go to this [lithium batteries FAQ](#) for general information.

Be aware that this solution is **for lithium batteries with communication (Active BMS)**. Find the list of compatible battery models in the [Compatible lithium battery list](#).

Studer Xcom-CAN accessory must be included to communicate Xtender system and battery BMS. Read [Xcom-CAN Manual](#) for more details.

See basic off-grid diagram below as example:

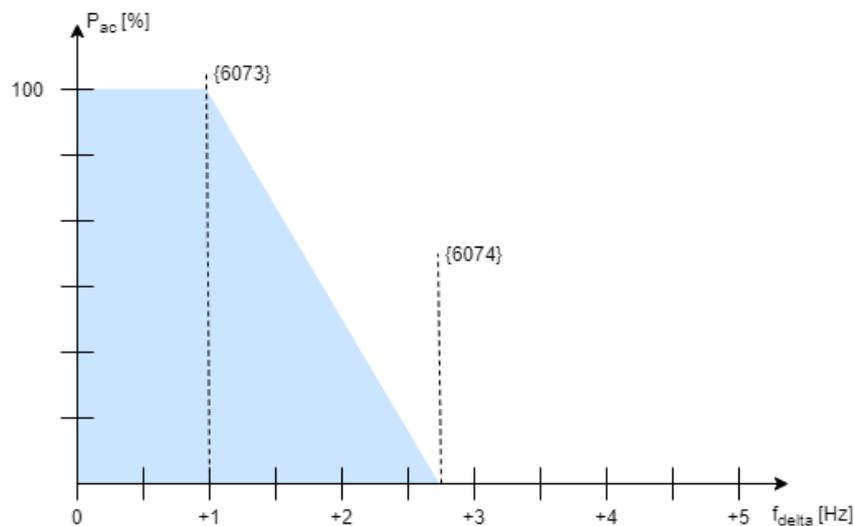


In systems with communicating lithium batteries, the configuration remains straightforward and centralized by the Xcom-CAN settings. There are 3 parameters in the Xcom-CAN advanced settings menu that will help easily configuring ac coupling with lithium batteries. The rest of the devices in the

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system, including Xtender inverters, will follow up these settings without any further configuration required (I.e.: Battery voltage charge values or maximum charge current).

The frequency control of the AC output is again the responsible of controlling the AC coupled source as represented in the following graph:



Xtender Inverter/Charger modify AC-output frequency to control the performance of the grid inverter. This frequency shift depends on the "Maximum Battery Current" set dynamically by battery BMS (or BMU depending on the manufacturer).

Level	Parameter	Xcom-CAN Parameter description	Value
Expert	6072	Solar Inverter connected on AC-Out	YES
Expert	6073	Delta from user frequency to start derating of solar inverter	1 Hz (Default)
Expert	6074	Delta from user frequency to reach 100% derating of solar inverter	2.7 Hz (Default)

- {6072} must be set to "Yes" to enable this functionality.

- {6073} defines the frequency delta from the user frequency (e.g. 50Hz) at which the power derating of the solar inverter begins.

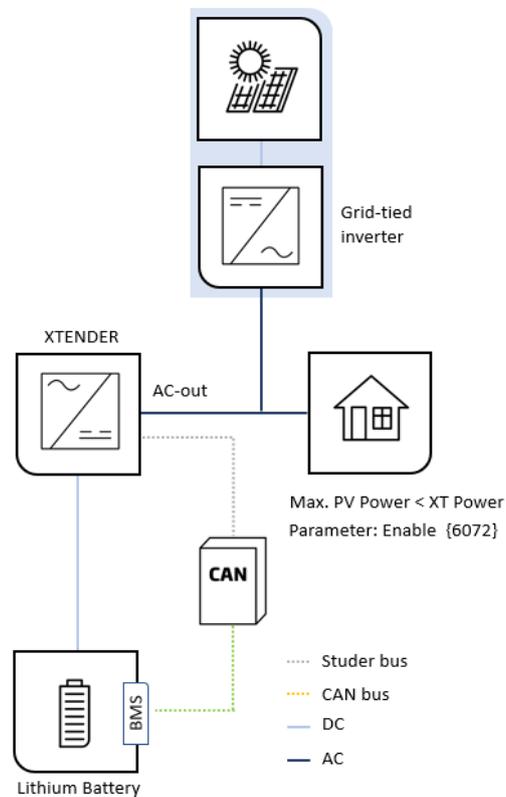
- {6074} defines the frequency delta from the user frequency at which the power derating of the solar inverter reaches 100%.

You could find further info about [AC coupling](#) section in our FAQ.

Although AC-Coupling is the mix of Off-Grid inverter and On-grid inverter, there are different types of installation depending on whether it has support from an AC Source and if this source is a generator or the grid:

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Basic AC-Coupling



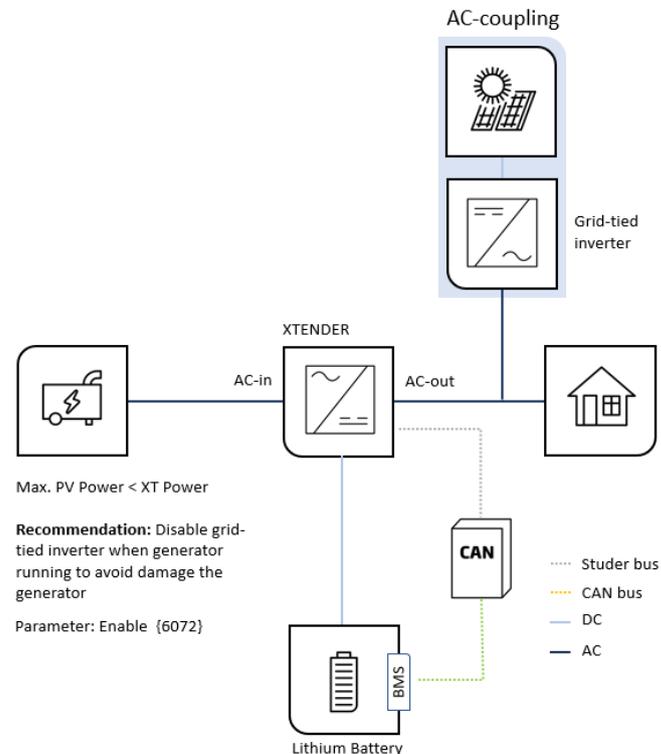
This is an off-grid installation (No AC source connected to AC-In).

Important:

- The maximum PV power that can be installed is limited by the power of the Xtender, which in case all the energy generated by PV passes through the Xtender, it can be handled without damaging or stressing the device. In case of doubt, ask our technical team.
Example, If installed 1x XTM4000-48. Maximum On-grid inverter power will be 4kW.
- If the battery runs out of power, the Xtender will shut down. An external power source (generator) and battery charger will be required to recover the system. We recommend in these cases to add a solar charger (VT or VS) to avoid having this problem.

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AC-Coupling connected to a generator.



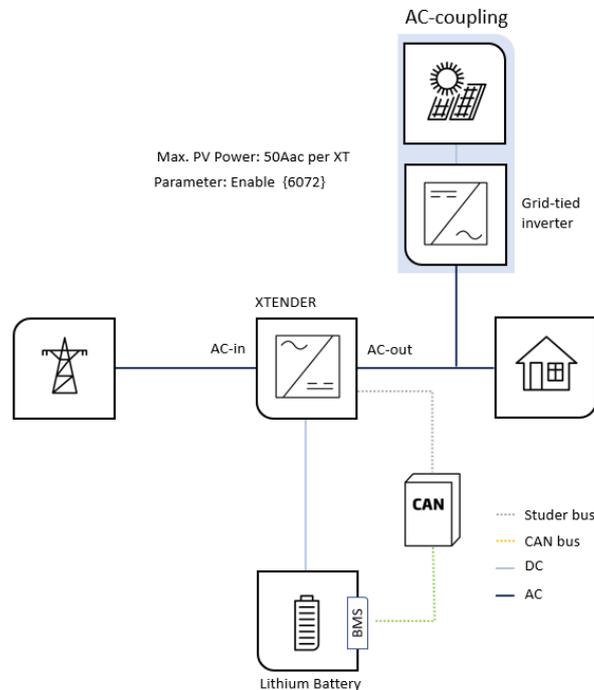
This is an off-grid installation with a generator as support. In case a generator is connected on AC-in (Transfer relay closed), the Xtender can not shift the output frequency. The output frequency is managed by generator. Our recommendation is that if the generator is running, disable On-grid inverter to prevent reverse current from entering the generator. This could affect the functionality of the generator and reduce life expectancy.

Important:

- The maximum PV power that can be installed is limited by the power of the Xtender, which in case all the energy generated by PV passes through the Xtender, it can be handled without damaging or stressing the device. In case of doubt, ask our technical team.
Example, If installed 1x XTM4000-48. Maximum On-grid inverter power will be 4kW.
- If the battery runs out of power (due to a generator problem), the Xtender will shut down. An external battery charger will be required to recover the system. We recommend in these cases to add a solar charger (VT or VS) to avoid having this problem.

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AC-Coupling connected to Grid



In case the grid is connected on AC-in (Transfer relay closed), the Xtender cannot change the output frequency. The output frequency is managed by the grid. In this situation, the On-grid inverter will produce the maximum possible power. If there is excess power, Xtender will let it pass through transfer relay to the grid (Check local regulations).

The only time that the Xtender will manage frequency shift is in the event that the grid is disconnected or there is a blackout, at that time the Xtender will work in inverter mode to produce sinusoidal signal and will modify the output frequency according to the battery information.

Important: The maximum PV power that can be installed is limited by transfer relay. XTH and XTM is 50Aac per unit and XTS is 16Aac per unit.

Example, If installed 1x XTH6000-48. Maximum PV Power will be $50Aac \times 230Vac = 11,5kVA$ or $11,5kWp$. Be careful do not go over 50A, as it could damage the transfer relay.

Inrush Current

Inrush current is a very important characteristic of lithium batteries that must be taken into account to avoid problem with charge/discharge currents and spikes.

Please refer to the battery manufacturer datasheet or manual for this value. In case of exceeding it, BMS will protect the battery by causing the system stop.

Note: 60Hz configuration. These 2 parameters apply in the same way when the frequency of the system is set to 60 Hz, which will modify frequency between 61 and 62.7Hz.

Note: Grid inverter must be configured to modify its production according to frequency.

Note: If enable {6072}, do not enable {1549} or {1536} as you will have the two corrections stacked over one another.