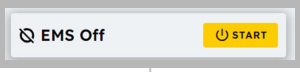
Troubleshooting Guide for Common PV Curtailment Issues

Where is the PV curtailment coming from?

Access eConf
UC Model -LAN 2 | MC Model - LAN4
IP : 192.168.4.127

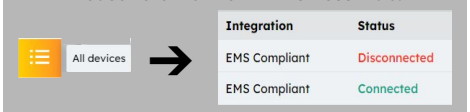
Is the controller OFF and EMS is inactive?



YES → Turn **ON** Controller & **activate** EMS.

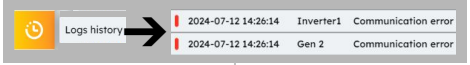
NO

Does your device appear as "Disconnected"?
Please refer to the "**All Devices**" tab.



Or

Are you experiencing unstable communications or CRC errors?
Please refer to the "**Logs**" tab.



YES → It might be due to incorrect parameters or a configuration mismatch between Elum's ePowerControl and the "**Disconnected**" device.
→ check section 1

YES → It might be due to noise in the network communication line, impacting both TCP or RTU protocols.
→ check section 1

NO

Is the PV inverters nominal power configuration correct in eConf?

YES → It might be due to a discrepancy between the inverter's factory-rated apparent power and the value entered during its configuration in eConf.
→ check section 2

NO

Is the issue identified on eConf?

NO

Is reactive power management or power factor correction activated?

YES → It might disrupt the balance between real and reactive power, causing voltage instability or exceeding operational limits, which can lead to PV curtailment to maintain system stability and comply with grid requirements.
→ check section 3

NO

Are you using an SD series or HFS series ePowerControl solution?

YES → Check if the fixed genset minimum loading value has been reached. If it hasn't, the PV system should avoid ramping up.
→ check section 4

NO

NO

Have you noticed any meter reading discrepancies?

YES → If the values displayed on eConf differ from those on the meters of any value appears unusual, investigate for discrepancies and check for any current imbalances.
→ check section 5

Could the issue be related to the PV Inverter(s)?

YES → check section 6

ISSUE RESOLVED

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Section 1 : Is your device "Disconnected"? Experiencing unstable communication, or CRC errors?

> Go to the "**All Devices**" tab on eConf to verify the communication status for PV inverters, meters, genset controllers, and BESS.

If a certain component appears as "Disconnected", it may be due to incorrect **RTU/TCP** parameters or a configuration mismatch between the Device x Elum's product (check : table 1).

To address this, you should check :

- **RTU parameters :** Cross-check if those following settings on your "Disconnected" device match those set on eConf : Slave ID, Baud rate, and Parity.

Or

- **TCP parameters :** - Ensure the "Disconnected" device is on the same subnet as the Elum Explorer. The IP address must not be within the 192.168.4.XX range.
  - Verify that the subnet mask matches the one used by the Elum Explorer.

> Go to the "**Logs**" tab on eConf to check for any unwanted disconnections affecting the setpoints sent by Elum.

If a "communication error" appears on the logs page :

- Ensure you selected the correct driver (right reference) for the device encountering communication errors when adding it to eConf.
- The issue might be due to noise on the network communication line, impacting both TCP and RTU protocols.
  → Verify cable integrity and check for magnetic interference from power cables, transformers, or antennas (refer to Table 1).

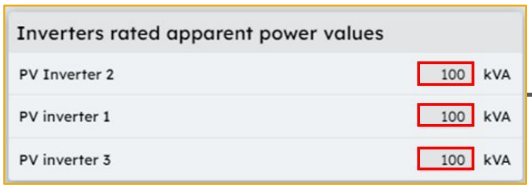
Section 2 : Is the nominal power configuration for PV inverters correct in eConf?

Verify and compare each inverter's nominal power with the value configured on eConf. To do so :
First, > Go to the "**Settings**" tab on eConf > Navigate to "**Update**" or "**Firmware**", and check the firmware version on your controller.
Then,

- **For ScV1 :** Ensure that the correct reference for the nominal power was selected when adding your PV inverter in the Network tab. > Go to the "**Settings**" tab> Navigate to "**Network**" and verify that the selected reference matches the device's specifications.

Let's take the Huawei SUN2000-100KTL-H1 inverter as an example, where the '**100K**' reference denotes the **rated active power of 100,000 W.**

- **For ScV2 :** Confirm that the correct value for the inverter's rated apparent power is entered in the PV control tab. > Go to the "**Control**" tab > Navigate to "**PV Control**" > Verify that the "**Inverter's rated apparent power values**" match the device's specifications.



Here, the correct **rated apparent power** value of the inverter, as specified in its factory specifications, should be entered.

P.S.: Ensure that the connected power on site matches the rated power configured on eConf and aligns with the power connected to the inverters. Mismatches between the configured power and the connected load may cause the EMS to limit production for optimal system performance.

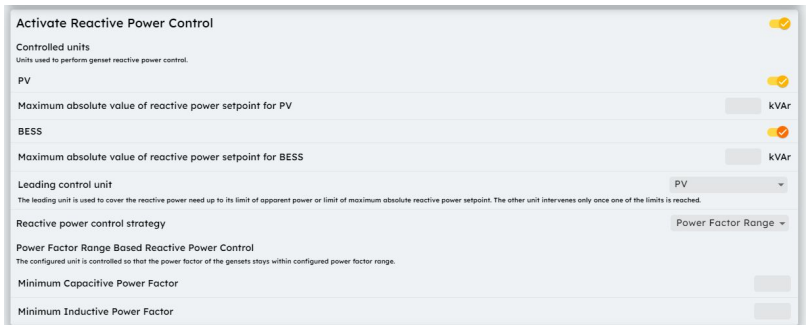
Section 3 : Is reactive power management or power factor correction enabled?

If reactive power is prioritized, it can affect site operations. This configuration can be found for both PV control, grid control, and genset control.

> Go to the "**Control**" tab on eConf and check if any of those options are enabled. If so, disable them and observe the system's behavior.

- **PV Control :**

- **Grid & Genset Control :**



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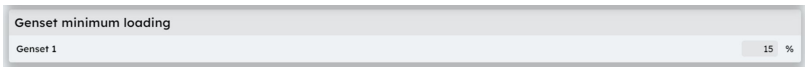
Section 4 : Are you using an SD series or HFS series ePowerControl solution?

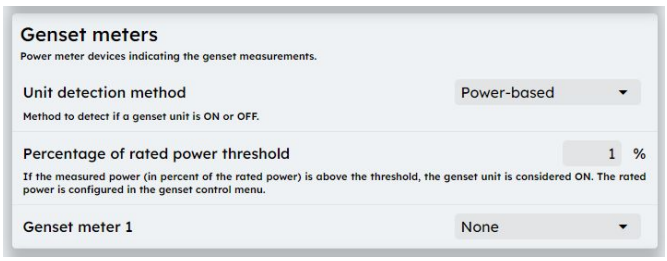
For Elum solutions that integrate gensets,

> Go to the "**Control** " tab > Navigate to "**Genset Control** " and check the fixed value of the genset's minimum loading. Check if this value is being met.

If the client's consumption is below the fixed minimum loading of the genset, the PV system should not ramp up to ensure safe operation of the genset.
E.g., for a genset with a nominal power of 500kVA and a fixed minimum load of 20%, the consumption should exceed 80kW to allow the PV system to ramp up.



> Go to the "**Control**" tab > Navigate to "**Genset meters**" section and adjust the "**unit detection method (either frequency or the percentage of rated power threshold)**" based on the site specifications



Sometimes generators readings may show a frequency or a very small amount of power even when not running. Adjusting the **unit detection method** will prevent the generator from being incorrectly included in the EMS calculations, which could otherwise lead to unnecessary PV curtailment if the minimum loading requirement is not met.

Section 5 : Have you noticed any discrepancies in the meter readings?

> Go to the "**Control** " section > Navigate to "**Grid control**" :

- ➔ If the "**3x Lowest Phase**" method is used and one phase consistently reads low, the system sets a low peak shaving reference. This can cause unnecessary PV curtailment even if the total grid power is high, as the system restricts output based on the low phase reading to maintain balance.
- ➔ If the grid meter continuously reads 0, this may indicate a problem with the current transformers (CTs). Inspect the CTs for any issues.

Section 6 : If the issue is not identified on eConf, check the PV inverters.

If none of the aforementioned troubleshooting sections work, please check your inverters :

➔ **Check for any alarms related to :**
- Voltage out of range.
- Frequency out of range.
- Temperature or DC alarms activated.

➔ **Verify the modbus external control configuration :**
- Enable external control (ensure only one master device is configured on the network communication line).
- Ensure persistent configuration so that inverters always adhere to the Modbus setpoint.
- Set the active command timeout to "0" if applicable.

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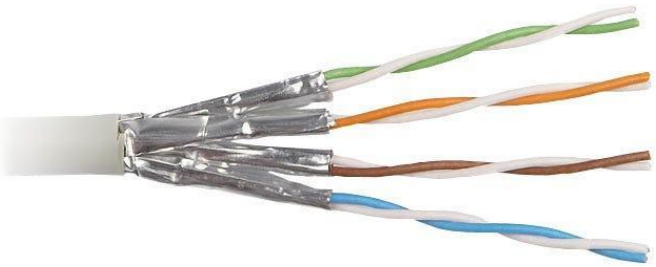
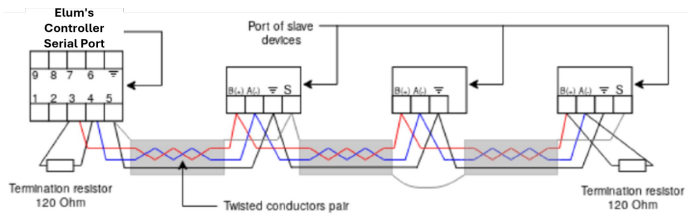
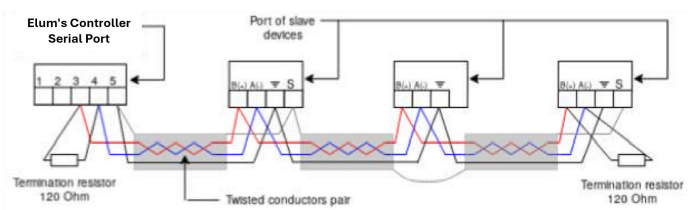
Table 1 : Modbus RTU/TCP IP communication inspection.

n°	Issue	Description	Addressing
1	**Noise interference**	External electrical noise distorts signals, leading to errors.	• Use twisted pair cables to reduce electromagnetic interference (EMI). • Employ shielded cables and ensure proper grounding. • Implement differential signaling to improve noise immunity. 
2	**Reflections**	Signal reflections occur due to impedance mismatches, causing degradation.	• Terminate the communication line with the correct impedance. • Use termination resistors at both ends of the cable.  

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n°	Issue	Description	Addressing
3	**Signal attenuation**	Signal strength diminishes over long cable lengths, resulting in errors	• Use repeaters or signal boosters to amplify the signal. • Reduce cable length or increase the baud rate to minimize attenuation effects.
4	**Ground Loops**	Voltage differences between grounds cause communication errors.	• Ensure a single ground reference for all devices. • Use isolated RS485 transceivers..
5	**Cross-talk**	Signals from adjacent wires interfere, leading to errors.	• Maintain proper spacing between RS485 cables and other high-frequency signal cables. • Use twisted pair cables and proper shielding.
6	**Incorrect Termination**	Improper termination leads to signal reflections and errors.	• Use termination resistors of the correct value (usually 120 ohms). • Avoid leaving unterminated stubs.
7	**Voltage Transients**	Voltage spikes or transients can damage transceivers or disrupt communication.	• Use transient voltage suppressors (TVS diodes) for protection. • Implement surge protection devices and proper grounding.
8	**Hardware Failures**	Malfunctioning hardware disrupts communication.	• Regularly inspect and maintain RS485 hardware components. • Promptly replace faulty transceivers or damaged cables.
9	**Protocol Errors**	Incorrect or incompatible communication protocols cause data corruption.	• Ensure all devices use the same communication protocol and settings. • Verify protocol implementation.
10	**Software Issues**	Errors in software implementation cause communication failures.	• Verify software configuration and error-checking mechanisms. • Thoroughly test software for bugs.

If you need additional help contact:
support@elum-energy.com

Find answers to frequently asked questions on Elum's customer portal.