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Design of standardized turnkey power cabinet for remote stations

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INTRODUCTION AND MAIN RESULTS

This presentation's main goal is to showcase the development of a modular power solution for remote stations : a turnkey power cabinet elaborated considering IMS's power requirements.
Design, specifications and tests results will be detailed to give a comprehensive view of this product.

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Introduction & Motivation

Remote monitoring stations require sturdy power systems that can operate for years without maintenance. Enviroearth has been working on a solution, considering the many challenges such as reliability and performance of the equipment.

This led to the development of a turnkey, modular power cabinet, with the following main objectives :

- **Standardized** design while being **modular**
- **Continuous power** & **equipment protection**
- Suitable for **any climate**
- **Low consumption**

Testing & Performance results

Comprehensive testing process :

- Electrical norms compliance
- Protection devices tests
- Under load testing with various solar, battery and load parameters
- Hotspots study with thermal camera

On-field testing :

- All equipment tried and tested over IMS stations
- Different cabinet models in use in several IMS stations

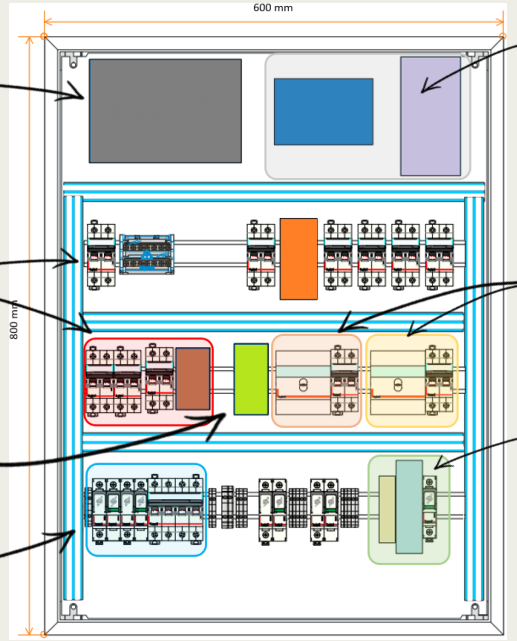
Main assets :

- Compact complete system
- Compliant with IMS Power Guidelines

Parameter	Rating
Equipment working temperature range	-30°C ; +60°C
Self-consumption	4W maximum
Internal hotspots	Max 60°C (localized)
Stable DC output	Max 0,3% difference

Picture – testing of the cabinet

System Overview



MPPT Solar Charge Controller :

- Different Main power source options
- Off-grid and grid connected compatibility
- Optimal solar power use

Protection devices :

- Equipment and operator safety
- In and Out circuit breakers &
- Lightning surge protection

Battery protection and BMS :

- Modular technology and capacity
- Optimal and safe charging

Main input :

- Surge Protection
- System shutdown

Power State of Health (SoH) monitoring :

- Screen for on-site checks (optional)
- Multiple parameters monitored

12 & 24 VDC (optional) outputs :

- DC/DC converters (optional)
- Configurable voltage

Communication hardware (optional) :

- Ethernet switch
- Optional PoE injector
- Flexible communication technology

Cabinet :

- IP66 rated stainless-steel (or other material)
- UV-rated and corrosion treatment options

Improvements & Future Works

- SoH monitoring data transfer and remote control
- Extensive environmental testing
- Integration of minimalist, low consumption cabinet

Conclusion

Enviroearth developed a power cabinet both modular and standardized, adapted to the IMS stations. Its testing highlighted its electrical compliance, low consumption and convenience of use.

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