METEL.EU
SECURITY & AUTOMATION

OFF-GRID Systems

IPLOG

DEMO System in Ceska Skalice

System at a construction site in Portugal

Systems are designed to help people function without the support of an electrical grid. Solar and wind power can be easily used to power, monitor and control systems in remote areas such as building sites, agricultural buildings, state borders and dangerous sections of roads, etc.

- OpenVPN - Encrypted Data Transfer
- LINUX - Long-Term Stable and Open System
- LAN - IP Solutions with PoE+ Support
- COM - Modbus Serial Interface
- GSM - Remote Access over 2G / 3G / 4G-LTE
- FBD & LD - Graphic Programming Languages
- I & O - A Wide Range of Inputs and Outputs

For New Solutions

OFF-GRID Systems

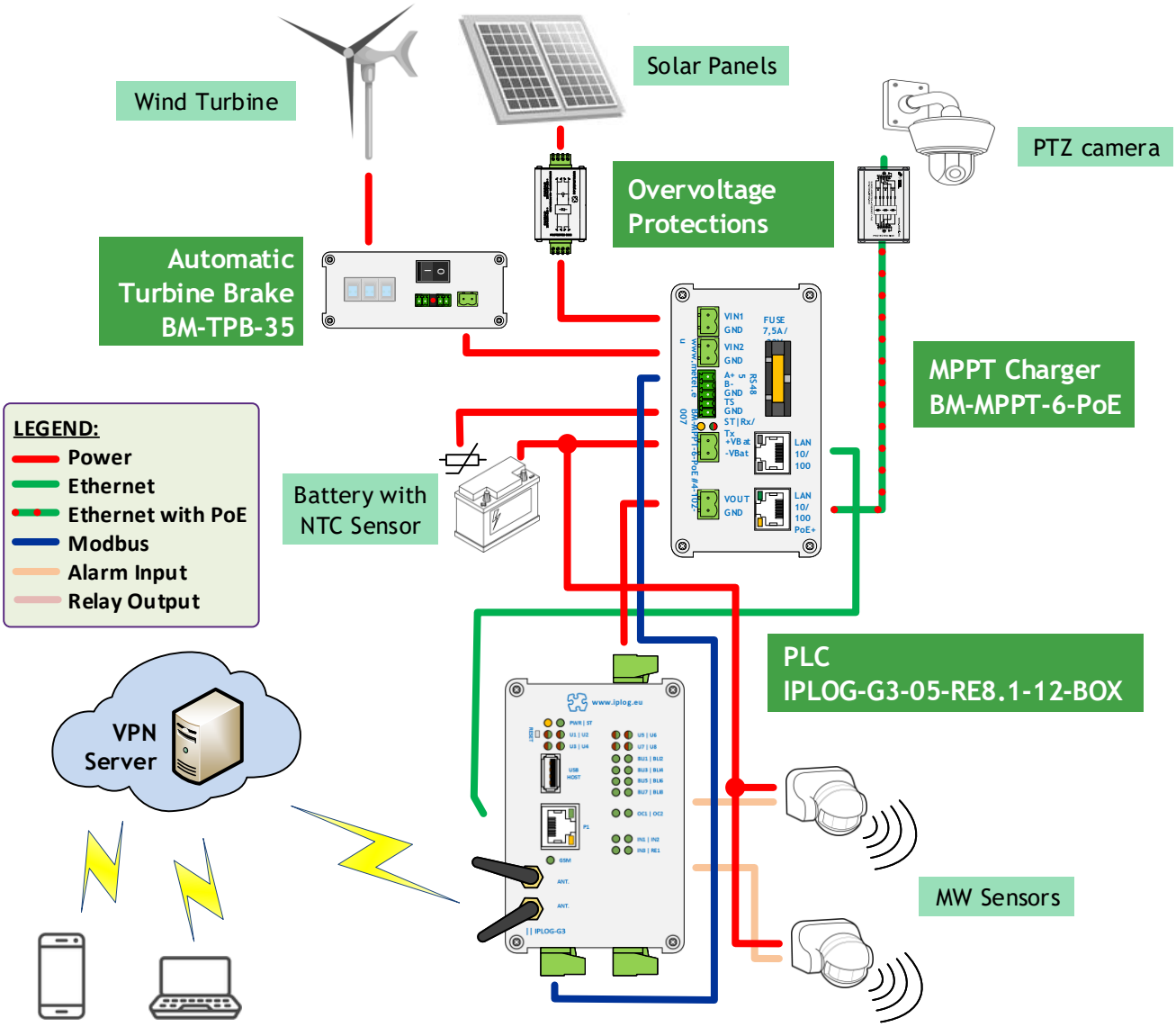
Description of a Typical Application

2G/3G/4G | MODBUS | IEC 61131-3

How did it begin

The idea that brought me to develop the OFF-GRID system was to establish a vineyard in a remote area without the availabilty of electricity. The biggest challenge was in the development of the charger because we decided to connect the charger with the PoE+ injector and Modbus communication for charger control and monitoring. We did not want to increase the charger size with a big passive cooler. That's why we first focused on maximizing design efficiency and then we added a small fan controlled by a processor. The processor measures the charger temperature and activates the fan if it is too high. At the same time, the processor measures other operating variables such as the charging current, battery voltage and current from PV panels etc. The control PLC stores measured values in the database and can be displayed online on the webpage if required. At the beginning of the 24/7 tests, we used PLC 2G / 3G connections, which we later replaced with the final version supporting the 4G-LTE network. A huge advantage of the PLC used, is the large variability of inputs and outputs. In this system we used, for example, alarm inputs to which we connected the MW sensors for guarding the vineyard and tamper for detection of the cabinet opening. In the event of an alarm, the PLC sends an SMS to the preset numbers and automatically turns on the PoE power to the camera. Through the VMS client on my mobile or PC, I can then remotely check the vineyard. Another task that the PLC performs is the automatic control of the duck door, and in the Spring of 2019 the controlling of water pumping from the well will be added.

Written by Tomas Metelka



OFF-GRID Systems

The Main Advantages

2G/3G/4G | MODBUS | IEC 61131-3

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OpenVPN - Encrypted Data Transfer

OpenVPN tool provides flexible VPN solutions to secure your data communications. VPN server software is deployed on the virtual server with one public IP address can provide secure private connection to many remote off grid sites.

LINUX - Long-Term Stable and Open System

Free and open-source software operating systems with an extremelly good stability. The user has free access to scripting languages, databases, and other freely available tools. This gives him great freedom when designing his own applications and programs

LAN - IP Solutions with PoE+ Support

The LAN port allows the user to connect any Ethernet IoT device or for example IP camera. The PoE+ injector, which is part of the MPPT charger, can also supply connected ethernet device directly through data cable.

COM - Modbus Serial Interface

The universal MODBUS interface can be used to monitor the charging status of the battery, remote turn on/off the connected PoE camera or for the connection of IO modules and sensors. Modbus is a standardized protocol, so devices from different manufacturers can be connected.

GSM - Remote Access over 2G / 3G / 4G-LTE

Wherever remote access is needed to remote locations, a wireless connection via cellular networks is the ideal solution. Or it may used as redundant path for alarm transmission in accordance to security standards for high risk objects.

FBD & LD - Graphic Programming Languages

In addition, the OFF-GRID system can run a program. Typical examples are: alarm systems for area monitoring, data collection from the weather stations, control of pumping water from the wells. Everything can be programmed in intuitive graphical languages with hundreds of supported features.

I & O - A Wide Range of Inputs and Outputs

The IPLOG-GAMA control system also includes IO modules with different types of digital and analog inputs and outputs. IO modules can be part of the control unit or are supplied as separate IO modules with Modbus interface.

Completed OFF-GRID system has met and exceeded the goals we set out before development began. The system is able to protect the remote object, while running the control program and securely providing the data to the remote users. The extreme summer heat and a series of storms also showed its high resistance to extreme weather.

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Ordering Information

2G/3G/4G | MODBUS | IEC 61131-3

METEL DEVICES	NAME AND CODE	NOTE
Outdoor Cabinets for Off-Grid Applications 	OH6425 - OG1-POE 4-000-003	Cabinets are designed for outdoor installation of IPLOG-G2 series PLCs in OFF-GRID systems. They are equipped with a battery rack and an overpressure fuse. Furthermore, DIN35 rails, terminals, fuses, outdoor 2G / 3G antenna and easy-to-connect wiring, BM-MPPT series chargers and surge protectors.
	OH6425 - OG1-LTE-POE 4-000-004	Cabinets are designed for outdoor installation of IPLOG-G3 series PLCs in OFF-GRID systems. They are equipped with a battery rack and an overpressure fuse. Furthermore, DIN35 bars, terminals, fuses, outdoor 2G / 3G / 4G-LTE antenna and easy-to-connect wiring, BM-MPPT series chargers and surge protectors.
	OH6425 - OG2-LTE-POE 4-000-005	Cabinets are designed for outdoor installation of IPLOG-G3 series PLCs in OFF-GRID systems. They are equipped with a battery rack, automatic turbine brakes and an overpressure fuse. Furthermore, DIN35 bars, terminals, fuses, outdoor 2G / 3G / 4G-LTE antenna and easy-to-connect wiring, BM-MPPT series chargers and surge protectors.
Industrial PLCs with: 2G/3G modem (G2) 2G/3G/4G modem (G3) 	IPLOG-G2-05[(1)] 5607-0000	[(1)]Basic model. In the online configurator http://www.metel.eu/en/iplog-configurator, you can build PLCs with other required inputs, outputs, and serial interfaces.
	IPLOG-G3-05[(1)] 5707-0000	[(1)]Basic model. In the online configurator http://www.metel.eu/en/iplog-configurator, you can build PLCs with other required inputs, outputs, and serial interfaces.
6A MPPT Chargers Suitable for OFF-THE-GRID Applications 	BM-MPPT-6 4-102-006	Two independent inputs for power sources, detection of overheating and disconnection of the battery, output 10 to 30 VDC for the powering of the PLC and accessories, output for charging a 12 V GEL battery, MODBUS interface for communication with the PLC.
	BM-MPPT-6-POE 4-102-007	Two independent inputs for power sources, detection of overheating and disconnection of the battery, output 10 to 30 VDC for the powering of the PLC and accessories, output for 12 V GEL battery, PoE+ injector, MODBUS interface for communication with the PLC.

3RD PARTY DEVICES

Solar Panels	Wind Turbine	Battery	Lightning Protection
			

More information here: http://www.metel.eu/en/products/succes-stories?catId=84

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