

Wind turbine extension kit

for the batcorder 2.0



Introduction

version 1.0 February 2011

General description

This extension kit for the batcorder allows the user to install the batcorder 2.0 in the nacelle of a **wind-turbine-generator (WTG)** to monitor acoustic bat activity. Recorded files with calls are stored automatically on flash-memory for later analysis. Because acoustic bat activity at the height of the gondola is correlated with the bat fatality, monitoring can be used to do a risk assessment.

Features

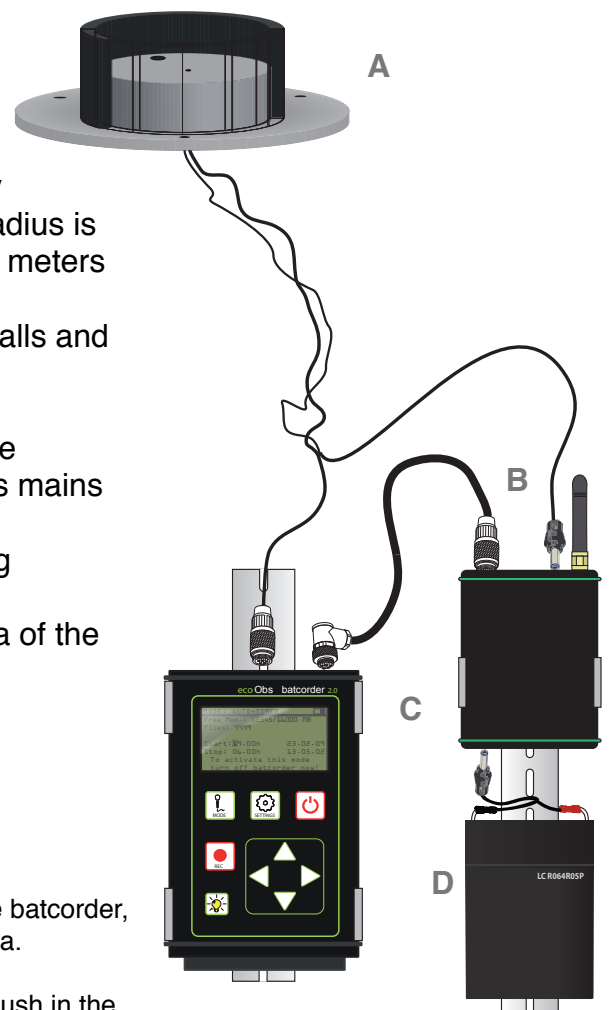
- comparable data acquisition due to calibrated sensitivity of the batcorder. Every calling bat within the detection radius is automatically recorded. Operation distance about 40-50 meters for bigger and 20-25 meters for smaller species*.
- a realtime algorithm analyses the signals to detect bat calls and neglect most of the noise
- a timer starts and stops the monitoring each day
- The electric power is supplied via a mains adapter by the network of the WTG. A rechargeable lead battery buffers mains failure.
- a microphone check is done each day after the scanning process
- the extension kit offers the possibility to send status data of the device via SMS

* depends on batcorder settings, humidity, temperature and bat species

Parts supplied

The WTG extension kit contains a special borderline microphone for the batcorder, a control module and all mounting parts for the installation in the gondola.

- borderline microphone: the microphone is designed to be mounted flush in the hull of the nacelle. A ring of rubber foam protects the microphone from wind and splash water as well as from laterally incoming echos from structures of the gondola. A build-in piezo transducer sends test signals every morning.
- control module: this module is connected to the grid and the battery backup and supplies the batcorder and the the microphone with current. It filters the power supply to enhance recording quality. It also contains a GSM module for sending status messages via SMS.
- DIN rails: two DIN rails with vibration dampers for the ease of installation of the device in the nacelle. The rails carry the batcorder, the module and the battery backup. The module and the batcorder can be snapped in special clamps on the rails.
- rechargeable lead battery: backup battery (6 V, 4.5 Ah)
- cables: cables for connecting module and batcorder as well as the battery backup
- mains adapter: the control module is connected to the grid with this mains adapter with cable

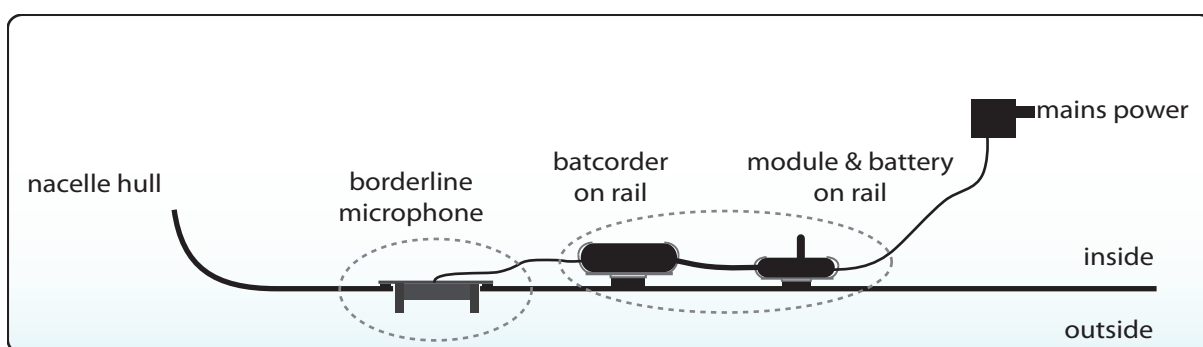


Installation

We recommend to embed the microphone in the lower surface of the nacelle hull. This way the microphone is protected from direct rain. The batcorder and other parts have to be installed nearby within the nacelle using the supplied DIN rails.

To insert the microphone, a hole (10 cm diameter) has to be cut in the hull. The microphone is screwed on, using a rubber ring as spacer. The dampers of the DIN rails are screwed on the hull or other suitable structures. The extension kit is offered with dampers with a thread rod (thread M6) for mounting on aluminum hulls as well as dampers for carbon fibre (fixation with SPAX screws).

After the fixation of the rails and the microphone, the batcorder and the module can be snapped in the clamps on the rails. The lead battery is fixed on the rail with binders. Further fixation of the cables to the rails or the ground with cable binders and duct tape may be necessary.



Usage

This installation provides an optimal passive monitoring system. The batcorder runs on the main power and the backup battery is able to buffer power failures for a few days. Because the device is designed for temperatures of 0° - 40° C, it should be removed from late autumn to spring. By use of SDHC cards with a capacity of 32 GB the device is able to store data for months (depending on bat activity). However, to prevent data loss, we recommend to switch memory cards every 30 to 60 days.

If a SIM card is installed, the module will send status information, that help to plan the on-site inspections and prevent data loss by malfunction of the microphone or the batcorder. The status messages contain information on the number of obtained recordings, the free space on the memory card and the microphone sensitivity. Please see the user manual for details.

Because the microphone is exposed to harsh environmental conditions, its sensitivity may drop. Therefore a microphone test is done each morning. The results are sent with the SMS message. If a lasting loss in sensitivity happened, the microphone should be re-calibrated by the NHBS or be replaced.

The recordings are stored with time-stamp in raw audio format (500 kHz, 16 bit). They can be analyzed on the computer with various sound analysis software. NHBS offers a special software bundle (bcAdmin, batIdent and bcAnalyze) to easily import, manage and analyze the recordings. A statistical method allows to automatically identify middle-european bat species by the calls measurements.