

Using the Hobo Motor On/Off Logger to Monitor Motor Run-time

The Hobo Motor on/off logger is used to record the operation time of pumps, fans and other motorized equipment. When placed properly on the motor housing the logger detects the AC-field when the motor is on. The logger checks for a state change (on or off status) every half second and records the time at which a state change occurs.



Figure 1: Hobo Motor on/off logger

Logger Features

A blinking red LED confirms logger operation and a blinking green LED confirms that the logger is picking up the AC-field of a running motor. The logger senses fields greater than 2 Gauss at 60Hz and will typically work with AC motors drawing 1 amp or more. The logger has a programmable launch time, and uses a PC serial interface or a USB to serial adaptor for data transfer and real time readings. It has a memory capacity to record up to 2000 changes of state.

Launching the Logger

1. **Connect the Hobo Motor on/off Logger to the computer by plugging one end of the grey communication cable into the logger and the other end into the computer's serial port.** If using a USB to serial adapter, connect the adapter's male RS-232 to the Hobo PC serial cable and connect the Hobo cable to the motor logger.
2. **Open the Boxcar Pro 4.3 software.**
3. **Open the launch screen.** Click the launch button  or select *Launch* from the *Logger* menu as shown in *figure 2*.

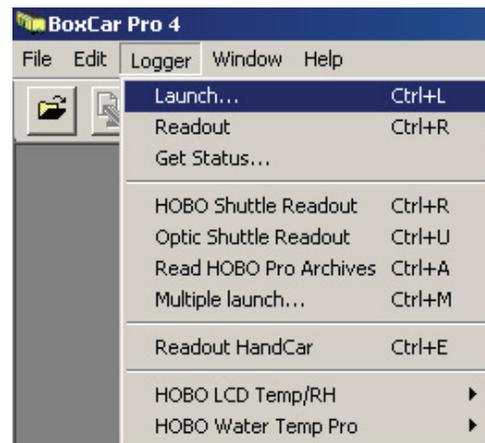


Figure 2: Launch menu

4. **If the computer fails to communicate with the logger, verify that the computer's COM Port matches the port selected in the Boxcar software.** Choose *Edit, Preferences* and select the correct COM Port for the computer.
5. **Enter a unique description in the *Description* field.** Up to 40 characters can be typed in this area. This description will be the title of the data set when it is downloaded. It is important to enter a unique and meaningful description for each logger in order to differentiate between individual data sets when multiple loggers are used for a study. It is also quite helpful to use a removable label or masking tape on the outer case of the logger to label each individual logger with its location.
6. **Choose either to stop logging or to overwrite the oldest data when the logger is full.** If the *Wrap around when full (overwrite oldest data)* box is checked, the logger will fill to its memory capacity and then continue to collect data while overwriting the oldest data until the logger is removed and downloaded. *Use caution when using this memory mode, it is very simple to inadvertently lose data this way.* If this box is not checked, the logger will stop logging when its memory is full.
7. **Leave the Stealth Mode box unchecked.** Checking this box disables both the red and the green LEDs making proper logger placement extremely difficult.
8. **Choose the logging start time.** If the *Delayed Start* box is checked, the logger will start collecting data at a specified date and time. The start date and time are adjusted by clicking on the date and time drop down arrows or by selecting the date and time values and typing in the correct values. If the *Delayed Start* box is not checked the logger will begin logging immediately after the logger has been launched.

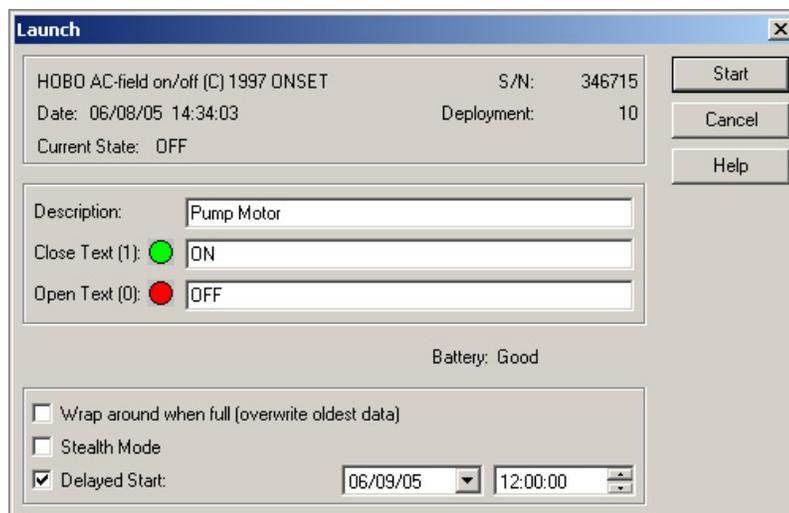


Figure 3: Launch screen

9. **Click *Start* to launch the logger.**
10. **Click *Yes* when the warning dialogue box appears.** The message on this screen warns that all of the previously collected data on the logger will be erased when the logger is launched.
11. **Unplug the logger from the communication cable and click *OK*.**
12. **The flashing red LED on the side of the logger confirms that the logger is programmed to begin logging and is ready to be deployed.**

Installing the Logger in the Field

1. **Place the Hobo Motor on/off logger on outside of the motor housing.** The motor should be running during installation. **Be very careful to avoid any moving parts!*
2. **Locate the AC field.** Move the logger around on the motor housing until you see the green LED flash continuously. This indicates that the logger is detecting the AC field of the running motor. The side of the motor is usually the best location.
3. **Secure the logger in place with tape.** The vibration of the motor can cause the logger to fall off of the motor during the study. It is recommended that the logger be secured to the motor housing with tape.



Figure 4: Motor logger installed on pump motor

Data Retrieval Procedure

1. **Remove the logger from the motor.** Be sure to make notes indicating where each logger was deployed.
2. **Connect the Hobo Motor on/off Logger to your computer**
3. **Open the Boxcar Pro 4.3 software.**
4. **Begin the data retrieval process.** Click the *Readout* button  or by selecting *Readout* from the *Logger* menu as shown as shown in figure 5.
5. **When prompted, unplug the logger and click “OK”.**
6. **Save the data file.** Enter a file name in the Save dialogue box. Be sure to note the location where the file is being saved on the computer. The file will have a .dtf file extension. This is a proprietary format readable only in the Boxcar software. Once the files have been downloaded into the Boxcar they can be exported into a format that can be opened in a spreadsheet program for further analysis. *(see instructions for exporting data in step 4 in the Analyzing Data section below)*

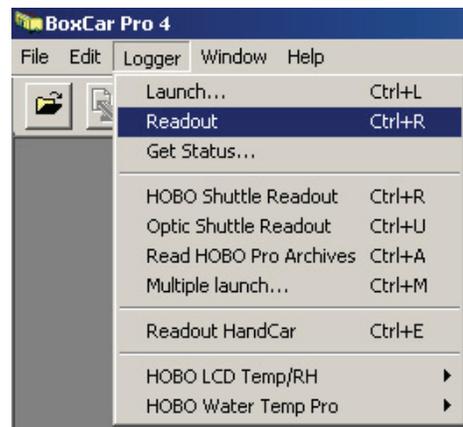


Figure 5: Readout menu

7. A graph of your data will automatically appear on the screen. *Figure 6*

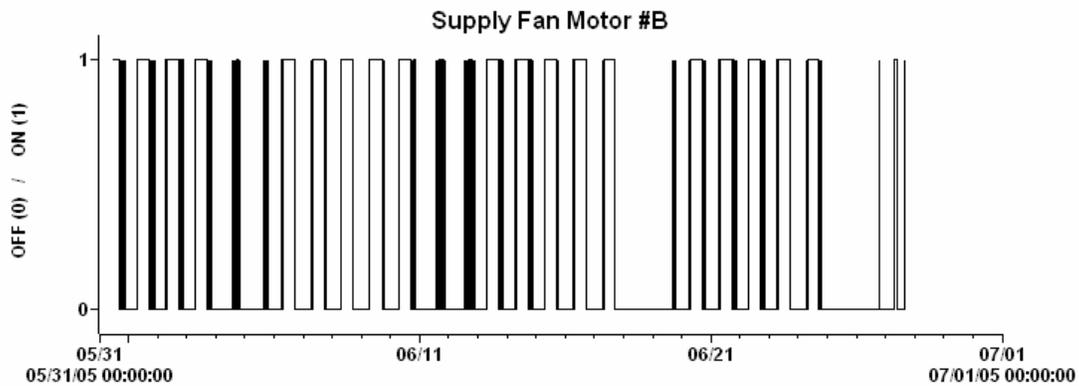


Figure 6: Data graph in Boxcar software

Data Analysis

1. On the graph above (*figure 6*) the value of 0 means the motor was off and the value of 1 means that the motor was on. The date and time are shown on the horizontal axis and the on/off status is shown on the vertical axis.
2. To view a numeric table of the data, select *View Details* from the *Window* menu.
3. Some important questions to consider when analyzing the motor run-time data include:
 - How do the recorded on/off times compare to building occupancy times or the controls schedule? Is the motor running while the building is unoccupied? Is the motor running when is scheduled to be off?
 - How long are intervals between which the motor turns on and off? If they are extremely short, the motorized equipment may be over-cycling, which can cause excessive equipment wear and may waste energy.
 - Does the data make sense? If something seems implausible, it may be a sign that the logger was disturbed during the study.

Export the Data to a Spreadsheet

The data can be exported to a spreadsheet ready ASCII format. Once the data has been exported, it can be opened in the spreadsheet software for further analysis and comparison of multiple data sets.

1. **In the File menu select Export.** Choose to export the file as a Microsoft EXCEL Text file, Microsoft EXCEL spreadsheet file, Lotus 123 file or to another custom file type.
2. **Click the *EXPORT* button.** It is located at the lower left corner of the screen.
3. **In the *Save As* screen enter a filename.** Choose the location to save the file.
4. **Open the exported file in the spreadsheet software application.** If you are using EXCEL, be sure to select *ALL FILES* in the *Files of Type* field in the *Open* screen.

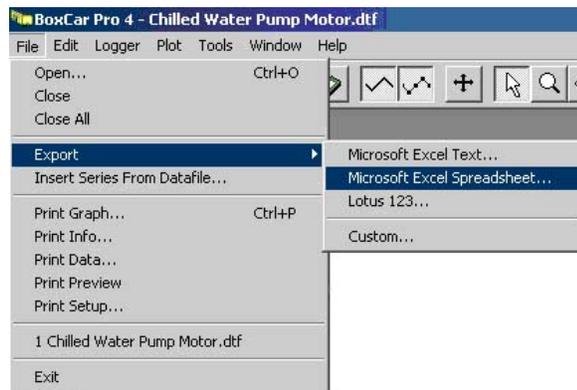


Figure 7: Export menu