LRCpH Quick Start Guide

Thank you for using the **DASCOR LRCpH** data logger for rumen pH, temperature, and ORP measurement. This quick-start guide shows the basic use of the logger. It is recommended that you read this guide completely before attempting to use the logger for the first time. For detailed instructions and troubleshooting, refer to the **LRCpH User's Guide**, and the **M1bv610 Software Manual**.

Description:

Type 3 Body   **Type 4 body**

The LRCpH data logger is a DASCOR M1b logger engine enclosed in a PVC case suitable for the rumen. The type 3 (T3) and type 4 (T4) versions differ mostly in the case style. T4s also include improved circuitry for lower noise and higher resolution from pH-3 to 9 (T3 units can be retrofitted, call DASCOR for details).

Install Software:

The software is provided as a self-extracting file, either on a CD or downloaded from www.dascor.com. To install the software on your PC, double click on the install file and follow the on-screen instructions.

To Open Unit:

To access the battery and communication port, you must remove the T3's cover, or the T4's end cap. Due to the watertight seal necessary, this may be difficult to do by hand. In this case use two rods or screwdrivers for leverage (see illustrations). Insertion holes are provided for this. When reassembling, be sure to screw the cover/cap on until seated completely, but not excessively tight.

To Replace Battery:

T3: Push (don't cut) the retaining strap (if any) off of the battery. Lift battery end up and pull out. Reverse process to install new battery.

T4: Push the battery holder up and pull out. Use a small screwdriver if necessary. Insert a new battery in this holder and slide it back in until it snaps in place.
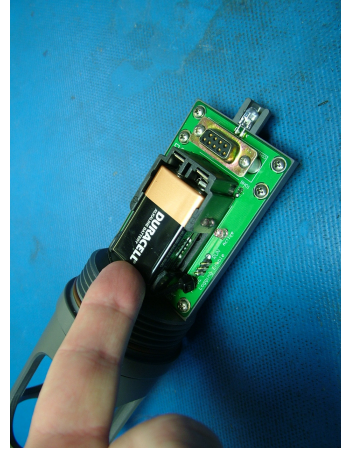
**Batteries will only seat when oriented correctly.
Use only Alkaline or Lithium 9volt batteries.**

Install a pH Sensor:

Remove the protective shroud by unscrewing it from the end of the body. Insert the sensor into the center hole so that the tabs and slots align. Turn 1/4 turn clockwise until you feel it lock in place. Lightly greasing the sensor's O-rings with plumber's grease or Vaseline will make this easier, but **DO NOT** get any on the metal parts of the connectors. **DO NOT** attempt to remove any of the other sensors exposed at the front. Replace the shroud by screwing it back fully on the body. If a hemi-glass sensor is used, you may wish to use a spacer ring to extend the shroud.

Connect to a PC:

The connector cable has a black dongle (SIA) at the **LOGGER** end of the cable. Plug the other end (DB9F) into the serial port of the PC or use the USB adapter provided. Follow the instructions in the **Software Manual** to install it. Start the communication software by double clicking the **M1b-v610** icon. Select the **'Defaults'** tab to set the COMM port used and data file preferences, then click the **'Log On'** button on the **'Log On'** tab screen. Now plug the black SIA end (DB9M) of the cable to the logger as shown. If every thing is correct, the logger's LED will light and the software will read the logger's header data.
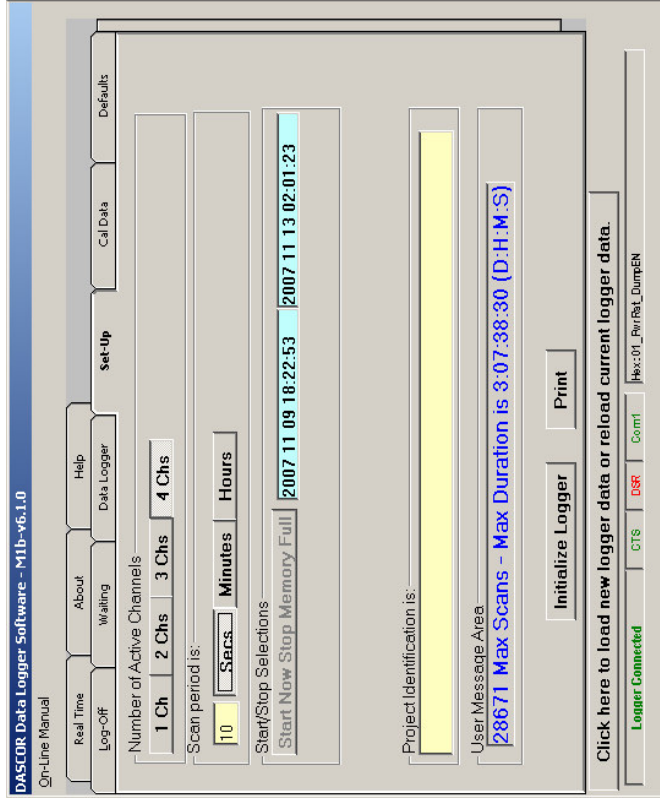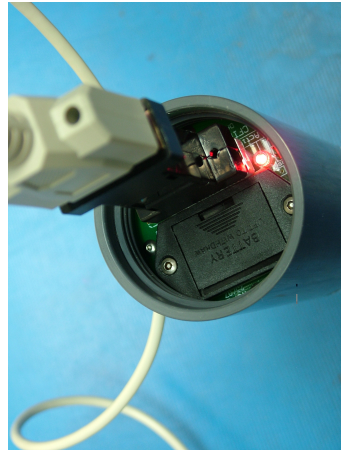
Set Up a Test:

With the logger attached to the PC and the software running, select the **'Set-Up'** tab. Select the number of channels to record and the scan interval. Then click on the **'Initialize Logger'** button. When the logger has been programmed, the screen will change and tell you to disconnect the logger and wait for the first blink of the LED. The logger's LED will blink 15 seconds after it is set up (changeable on the **'Defaults'** screen), then again each time it wakes up to take a measurement.
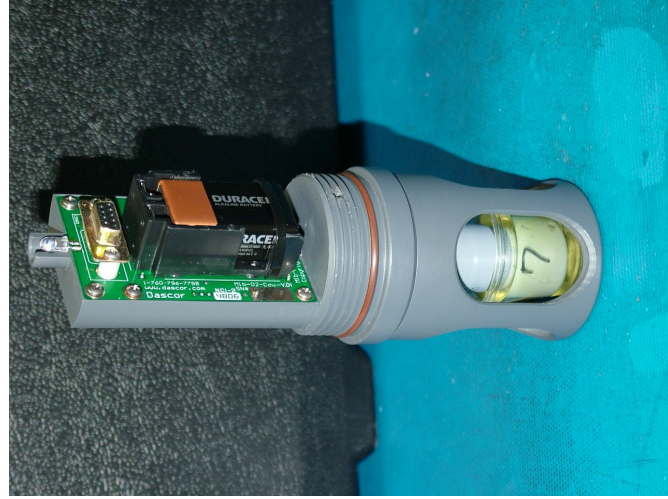
Download the Data:

To download the measured data, connect the logger, select the **'Data Logger'** tab, then click on the **'Download'** button and select the appropriate actions. The test does not have to be completed, (i.e., there is unused memory) to have the data downloaded. However, downloading will end the test. The data will be in "**.csv**" format readable by most spreadsheet programs. The actual data will be in two sets of columns: **'raw mV'** readings, and **'Engineering Units'**, which are derived from the calibration data in memory. See the **M1bv610 Software Manual** and **LRCpH User's Guide** for detailed information.

Calibration:

The temperature, battery voltage, and ORP/Redox are calibrated at the factory and should not require recalibration for several years. However, pH sensors vary greatly and calibration data should be taken before and after each test. Use the start and end calibration points to correct the test data for drift due to use and aging. The pH calibration data preloaded in the logger is for a theoretical perfect new sensor and is there only for reference. Two methods are described below. **Method 2** is suitable for any logger. **Method 1**, however, is best only for T4 loggers and T3 units upgraded with anti-noise circuitry. Try both and choose the best for you.

Note: For either method, do not handle the logger during the calibration. Your electric field and skin capacitance will be picked up by the pH sensor.

Method 1:

With the logger attached, click on the **'Real Time'** tab. Select **'Display in Milli-Volts'**. Place the sensor in pH-7 and click the **'Start RT Display'** button. After the **'R.T. Data'** has settled, (one minute for a new sensor, two or more minutes for an older sensor) select the **'Accumulate Statistics'** box. After the counter has reached 25-100 (as required to get a stable average value), deselect this box. Use the value shown under **'Average'** for the pH-7 data point. Repeat this process with pH-4 for the second data point. The pH scale is a simple straight line fit to these two points.

Method 2:

Setup the logger to take data at 10-second intervals. **Disconnect** the COM cable to eliminate injected noise from the PC. Let stand with sensor in pH-7 solution for three minutes, then move to pH-4 solution for three minutes noting the times for each solution. Download this test data and use the averaged values (channel 1, mV's) for the last minute of each pH solution as the calibration points. The pH scale is a simple straight line fit to these two points.

This method can be combined with a real test run. Simply set up for the test, but place the sensor in each of the calibration solutions before and then after the test run, noting the times. Be sure to allow sufficient time for several data points after letting the sensors settle for at least one minute.
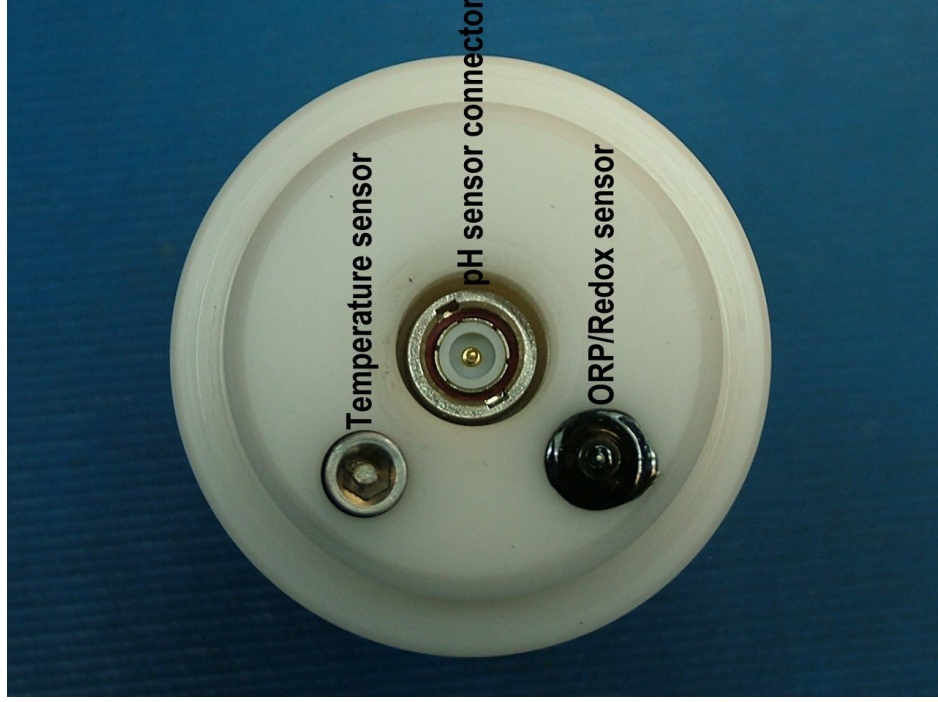
Use in the Rumen:

Attaching weights to the vertical bars on the shroud, insertion into the rumen, and analysis of the data are covered in detail in the **LRCpH User's Guide**.

Maintenance:

Cleaning: Care should be taken to prevent rumen material from entering the logger or contaminating the pH sensor contacts. Always rinse and dry the logger completely before changing the sensor or opening the case. Wipe the front end of the logger clean to allow the temperature and ORP sensors free contact with the rumen fluid.

Battery: The battery should last for 5 to 20 test runs depending on the setup parameters. It should be replaced when the **Vbat** channel shows that the battery voltage is less than **8.0** volts. Data taken when the battery is less than **7** volts is not reliable, and battery capacity below 8.0 volts is unpredictable. Batteries are cheap compared to lost test data!

Storage: Always clean the pH sensor glass and store wet in pH-4 solution, or preferably, storage solution. Be sure to keep the metal contacts clean and dry. Store the logger dry. The battery should be removed. Some circuitry in the logger is always on, and will drain the battery needlessly.

Temperature sensor

pH sensor connector

ORP/Redox sensor