Improved CDC Backpack Aspirator—Model 1412

Instructions

Background information

The "CDC Backpack Aspirator" was originally developed by the U. S. Public Health Service to collect indoor-resting adult mosquitoes such as Aedes aegypti. It is suitable for agricultural entomologic studies as well. Fine mesh cups are available for the collection of very small specimens.

We have followed the basic CDC design but made several improvements including the use of an ultra-light backpack frame, a more rugged neoprene hose, and collection cups made of high density polypropylene and stainless steel screening. Other improvements include the incorporation of a state-of-the-art gel-cell battery and the inclusion of a recharging unit.

Operational Details

Operation is simple. Insert a collection cup with a slight twisting motion into the wand until it fits snugly. The blower is turned on with the switch located in the wand. After collections have been made, remember to close the collection cup before turning the blower off. If the unit is to be shipped, it is a good idea to remove the fuse (see below) so the suction motor cannot accidentally start and the battery go into a state of deep discharge. Figure 1 below gives intake speed and battery voltage as a function of run time.

Charging information

The unit comes supplied with a 12 VDC 17 AmpHr Gel-Cell battery. A new and fully-charged battery will provide power for ca. 3 hours of continuous use. The blower motor consumes about 5.1 amps per hour when running. As batteries age, you can expect some loss of capacity and run times will decline accordingly. Currently the PN 1412 ships with a fully automatic charger (PN 2.70) that for input takes 100-220 VDC, 50/60 Hz and outputs 12 VDC at a rate of 5 Amps per hr (the instructions for use are shipped with the charger). No worries about overcharging. First it bulk charges then tappers off the voltage until full charge is reached. Then it goes into float mode and here the battery can be left on indefinitely . Charger has LEDs of indicate charging mode. Has cooling fan and is fuse protected; the unit is supplied with an extra fuse (250 volt 6.0-6.3 amp, 5 x 20 mm fast acting).

Calculating charging times

The hours you run your unit multiplied by the hourly consumption of electricity (5.1 amps per hr) is the amount of current you have taken out of the battery. A new and fully-discharged battery will have spent ca. 17 AmpHrs. Chargers put back electricity at a rate of about 90% of their rated capacity, e.g., 4.5 amps per hr. So if your battery is down about 10 amps (e.g., after having been run for about 2 hrs), the charge time at a 4.5-amp per hr rate would be 10 amps divided 4.5 amps per hr or approximately 2-1/3 hrs.

Remember, your aspirator battery is a 12 VDC battery, and must be charged at that voltage, regardless of the charging rate you may use.

Fuse protection On the side of the metal housing there is located a fuse holder. Replacement fuses should be rated at 10 amps.

Spare parts Extra cups (specify fine or regular mesh), replacement parts, and batteries are available. If you have any questions, difficulties, or comments, please contact us via letter, telephone, fax, or e-mail.

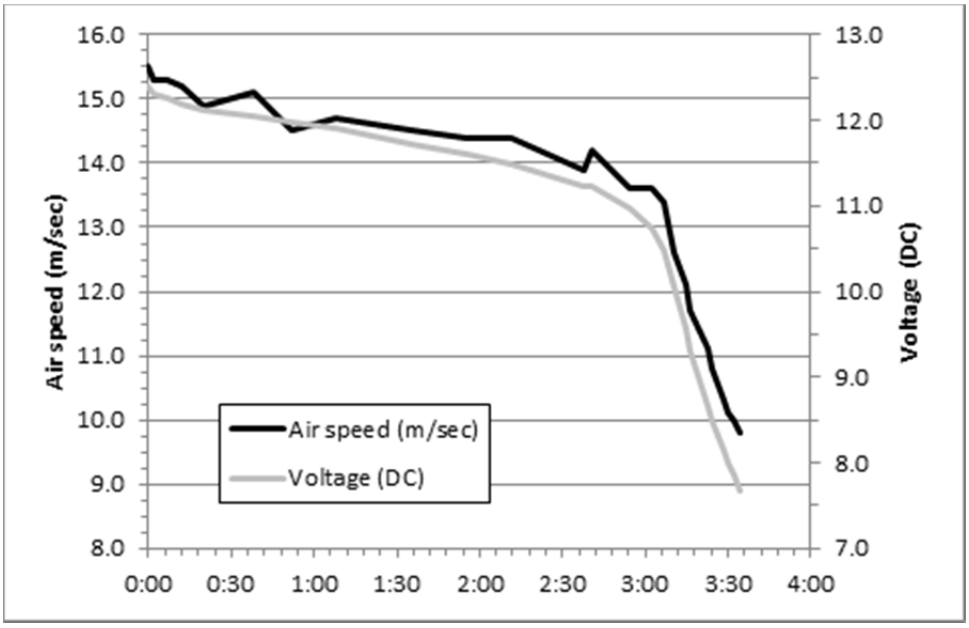


Figure 1. Plot of air intake speed and battery voltage as a function of run time. You can see that the runtime is about a little more than 3-1/4 hours, If you use ca. 13 m/sec as the cutoff speed.

Some Useful References

Clark, G. G., H. Seda, and D. J. Gubler. 1994. Use of the "CDC backpack aspirator" for surveillance of *Aedes aegypti* in San Juan, Puerto Rico. J. Am. Mosq. Control. Assoc. 10(1): 119-124.

Control of Dengue - Vector Topics # 2. Available from Vector Biology and Control Division, Bureau of Tropical Diseases, Center for Disease Control, DHHS, Atlanta, GA 30333.

Service, M. W. 1977. Mosquito Ecology- Field Sampling Methods. John Wiley and Sons. New York, New York.

UNIVERSAL TWELVE-VOLT, FIVE-AMP BATTERY CHARGER—MODEL 2.70

Instructions

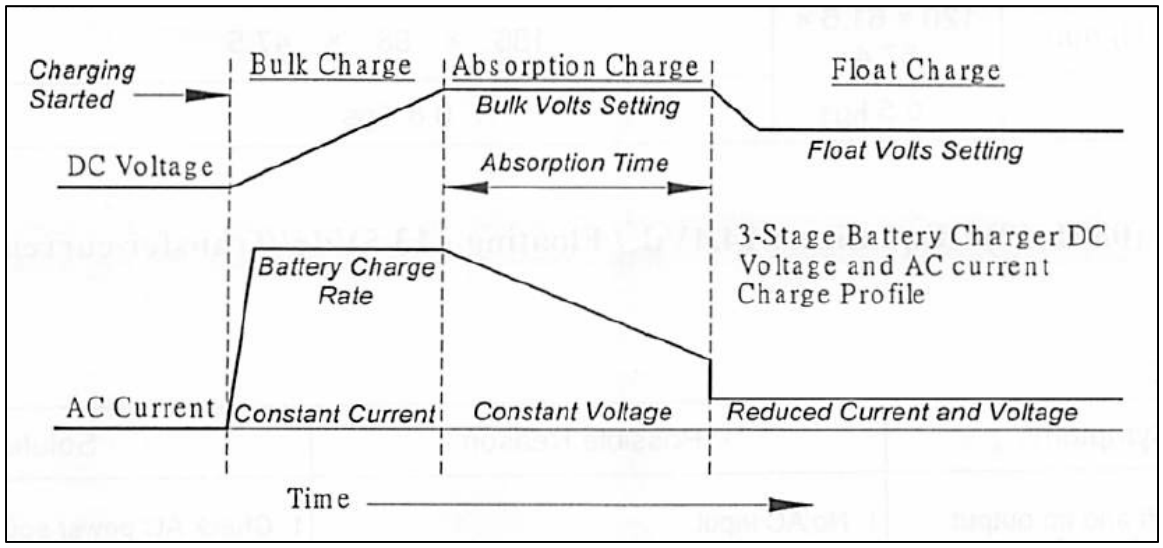
Cautions

1. Before using the battery charger—please read all instructions and cautionary markings on the charger.
2. Use the battery charger in a well ventilated area—for indoor use only.
3. To avoid the risk of injury, charge only 12 volt lead-acid or gel cell type rechargeable batteries that have a minimum capacity of 12 Amp; smaller batteries can be damaged by the 5 amps of charger output.
4. Beware of correct polarity, red to positive and black to negative.
5. Slight surface warming of charger is normal.

Instructions for charging

1. FIRST! Connect the red and black terminals or alligator clips to the positive and negative battery terminals, respectively.
2. Plug the charger into the AC power source (mains); any voltage between 90 and 240 VAC, 50/60 Hz is suitable.
3. Switch the charger to the on position; the switch is near the AC power cord.
    a. The RED LED will indicate power on.
    b. If the battery is discharged, a second LED will light ORANGE indicating that charging is occurring (during bulk charge and adsorption charge phases, see figure below). During these phases, the cooling fan will on fast speed. Voltage is 14.6 ± 0.2 VDC.
    c. When the second LED turns GREEN the battery is fully charged; charger puts out reduced voltage (13.7 ± 0.2 VDC) and current. During the float charge phase, the battery will NOT harmed if left indefinitely. Fan speed will be at slow speed while the charger is in the float charge phase.
4. Shut off charger and disconnect the charger from the AC power source (mains).
5. FINALLY! Remove the charger's terminals from the battery terminals.

Charging curve



Troubleshooting

Problem and Symptoms	Possible Reasons	Solution
If power RED LED indicator is off and no output voltage when connected to AC mains and charger is switched on:	1. No AC input. 2. Fuse blown. 3. Charger malfunction.	1. Check AC power. 2. Replace fuse if blown (replace with 250 volt 6.0-6.3 amp, 5 x 20 mm fast acting). 3. Contact us.
If AC power is normal. But charging LED is not ORANGE:	1. Reversed polarity (will blow fuse). 2. Loose fuse in holder. 3. Charger malfunction.	1. Replace fuse. 2. Tighten. 3. Contact us.
If AC power is normal. But charging LED remains ORANGE for a long time:	1. Battery malfunction (may be in deep discharge condition). 2. Charger malfunction.	1. See below for possible recovery from deep discharge. If impossible to recover from deep discharge, replace battery. 2. Contact us.
If the charge rate LED goes immediately to GREEN:	1. The battery is fully charged. 2. Battery malfunction.	1. Great, battery is ready to use. 2. Replace battery.

Useful resources

1. See : http://johnwhock.com/resources/battery-tutorial/
2. Battery and Charger tutorial:

http://johnwhock.com/wp-content/uploads/2012/09/tutorial_BatteryChargers.pdf

3. Recovery Charge After Deep Discharge:

http://johnwhock.com/wp-content/uploads/2012/09/tutorial_RecoveryCharge.pdf