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# CamLight Systems Model ACM-40F

## 5-20 cell (6V-24V) NiCd/NiMH Battery Pack Auto-Cutoff Module

The CamLight Systems ACM-40F Auto-Cutoff Module is connected between a 5-20 cell (6V-24V) NiCd or NiMH battery pack and the load used to discharge it. It safely and accurately monitors your pack's voltage level as it discharges and disconnects the load when the battery pack has reached the selected cutoff voltage.

It can be used for pack conditioning, capacity testing, or, taking advantage of the high current rating of the ACM-40F, safely testing new motors or drive train setups in a robot or electric vehicle.

The ACM-40F's integral fan can be used to cool the battery pack or load during a discharge. Only a small fraction of the fan's capacity is used to cool the ACM-40F so the exhaust air stays cool.

The ACM's small size and low weight allows you to take it wherever you need to discharge. No need for AC power or another battery to worry about, the ACM runs itself from the battery pack being discharged.

- Safely monitors a 5-20 cell (6V-24V) NiCd/NiMH battery pack as it discharges down to one of eight selectable cutoff voltages.
- The fan cools your battery pack or load while discharging.
- Maximum continuous discharge = 40 amps, using external loads.
- Solid-state output, no relay contacts to arc or stick together.
- Protected from short-circuits, reversed polarity, over-temperature, over-current, and surge current conditions.

### To discharge your 6V-24V NiCd or NiMH battery pack:

1. Select a cutoff voltage by moving one of the DIP switches to the down (ON) position:

With this # of cells...	With this pack voltage...	For this cutoff...	Push <b>down</b> this DIP switch
5	6V	4.5V	1
6	7.2V	5.4V	2
7	8.4V	6.3V	3
8	9.6V	7.2V	4
10	12V	9.0V	5
12	14.4V	10.8V	6
15	18V	13.5V	7
20	24V	18.0V	8

**Note: Be sure that only one DIP switch is in the down (ON) position and that it is all the way down!! Your packs can be drained to <2V if no cutoff is selected (no switch is down), or if multiple switches are in the down (ON) position.**

2. Connect the battery pack to be discharged. The connections are marked on the circuit board near the wire leads.  
**Note: If the LED lights up red (reversed polarity), disconnect the pack immediately and reverse the leads.**
3. If using an external load, connect that next. If not using an external load, the pack will be discharged by the ACM-40F's fan and LED, approximately 80mA (at 6V) to 370mA (at 24V).
4. Press the white *Start* button (to the right of the DIP switches) to begin discharging. The green *Discharging* LED signals that the pack is now being discharged. The LED and the fan will turn off when the cutoff is reached.

### Notes on using the ACM-40F:

- The ACM-40F is protected from reversed polarity battery connections but the full discharge current will flow if the pack is connected "backwards". Since the cutoff-voltage detecting circuitry isn't working when the polarity is reversed, the pack will discharge down to less than 2 volts. Please connect the battery pack before connecting an external load to be sure that the polarity is correct. This will also prevent arcing damage to your connectors caused by current immediately starting to flow when the pack is connected (if the polarity is reversed).
- **Never exceed 35V at the battery connections!**
- Make sure to connect the battery pack and load to the proper leads. If you connect the load to the battery pack leads (and vice-versa), the unit will appear to turn on as soon as the battery pack is connected (LED lights up green and the fan starts running). But, the cutoff circuitry isn't being supplied with power if this happens and your battery pack will be discharged down to less than 2 volts. **To prevent confusion, we highly recommend using one type/size of connector for the load wires and another type/style for the battery pack wires.**
- If the inrush current exceeds 250A when starting the ACM-40F, the protection circuitry will turn off the ACM-40F in a few microseconds. Disconnect and

reconnect the battery pack to reset the ACM-40F before pressing the *Start* button again. If the unit won't turn on (the green LED just "blips"), you must reduce the inrush current level to under 250A by reducing the load or adding inrush current limiters.

- If using motors or incandescent lamps as loads, you might have to hold down the *Start* button for a second or two when beginning a discharge. This allows the battery pack voltage to rise back up after the inrush current has pulled it down to below the cutoff voltage. Otherwise, the ACM-40F will think the pack is already discharged and immediately shut off when you release the *Start* button.
- The fan's speed changes with the pack voltage. This is normal.
- The ACM-40F has 4 black washers and a rubber foot on one side that allow you to position it vertically (LED, DIP switches, and *Start* button facing up) without scratching a tabletop or having the unit "walk" away due to fan vibration. The horizontally blowing fan then allows for cooling the pack or load.
- Do not leave the pack connected to the ACM-40F for a long time after discharging is complete. The unit only draws 2mA-15mA when off, but over many hours or days that could possibly over-discharge a pack.
- Don't bend the wire leads sharply when using or storing the ACM. Over time, this will weaken and break the copper strands of the wire.

### Specifications for the ACM-40F Auto-Cutoff Module

- Eight cutoff voltages are available for 5, 6, 7, 8, 10, 12, 15, and 20-cell packs, selectable via a DIP switch.
- Cutoff voltage is set to 0.9V/cell.
- Maximum continuous discharge = 40 amps, using external loads.
- Maximum discharge current for 3AH or smaller battery packs = 50A (12V-24V only to ensure high enough fan speed for self-cooling).
- The ACM can also be used on its own to slowly discharge a battery pack. The discharge current without external loads = 80mA (at 6V) to 370mA (at 24V).
- Solid-state output, no relay contacts to arc or stick together.
- Integral fan cools your battery pack or load while discharging (24CFM at 12V).
- A green LED indicates the pack is discharging. If the LED lights up red when you connect the battery pack, the leads need to be reversed.
- No need for AC power or another battery to run the ACM. It powers itself from the battery pack being discharged.
- Protected from short-circuits, reversed polarity, over-temperature, over-current, and surge current conditions.
- Supplied with 12AWG silicone-insulated wire leads.
- All switch settings and connections are clearly marked.
- Current drawn from the pack when off = 2mA at 6V, 15mA at 24V.
- Absolute maximum battery pack voltage = 35V
- Maximum surge current (protection circuitry disconnects the load) = 250A
- Size = 2.5" cube, Weight = 6 ozs.

**If you have any questions, check the web site at [www.camlight.com](http://www.camlight.com) or contact us at (212) 579-1901 (9am-9pm EST) or via e-mail at [info@camlight.com](mailto:info@camlight.com).**