INTELLIGENT MULTICHARGER MK11 PRODUCT DATA SHEET

PRODUCT OVERVIEW

The Multicharger is an intelligent 3 bank combined pulse charger/discharger designed specifically for use with nicad (NiCd) or Nickel Metal Hydride (NiMH) camcorder batteries. Each charge bank is completely independent of the others, and so simultaneous 3 way charging is possible. Because each bank is separately controlled, then it is possible, for example, to have one battery on normal charge, one battery on discharge and another on pulse charge. Each charge bank is based upon the well proven circuitry of the Keene Pulse charger, making use of a special IC together with switch mode technology to deliver a highly efficient charge with the minimum of wasted heat. It has a number of built in safety features to ensure that your batteries are always treated correctly.

Your battery contains a number of cells. Over time, the electrolyte inside these cells can crystallise or "fur up", a bit like the element on a kettle. When this happens the capacity of the pack is reduced and its voltage may be lowered. The special pulse charge applied by this unit helps to get rid of this problem by returning the electrolyte to its normal state and rebalancing the cells.

INSTRUCTIONS FOR USE

Power

Connect the unit to a suitable supply. The input socket is on the side of the unit near the on/off switch. You can use either the Car cigar lighter lead or the ac mains adapter (both supplied). The ac adapter supplied with the unit is able to work from any mains voltage anywhere in the world from 110v through to 250v. (note - the unit requires 13.8vDC at an absolute minimum continuous current of 3 Amps. It will very quickly ruin any supply rated at less than this!). Switch the unit on and you should see a green LED next to the input socket illuminate, confirming that power is present and that the unit is working.

Charge

Place your battery(s) onto the charger and briefly depress the charge switch. The “function” LED and the “charge” LED should both be constantly illuminated, indicating that normal charge has commenced. Normal charge will continue until the unit detects full charge on the battery and it will then go into a "pulse charge" mode for a further 3 hours. During this period the battery is pulsed with a 4 second burst of charge once every 30 seconds. It is this unique feature which ensures that all of the cells are at their maximum possible potential. The charge LED will Illuminate as each charge pulse charge is applied.

Discharge

If you wish, you can select discharge at any point during normal charge or pulse charge by briefly depressing the discharge button for the appropriate bank. If selected, this should cause the “function” LED to flash and the centre “discharge” LED to be illuminated. This has started the full charge cycle and discharge will continue until the correct critical voltage is reached. The unit will then automatically revert back to normal charge, followed by pulse charge, followed by trickle/keep full charge. *Note*; once engaged, discharge can only be cancelled by either switching off the power to the unit completely, or by removing and then replacing the battery.

Selecting discharge as described above will always result in the battery being charged after discharge has completed. If you wish, you can use the Multicharger to discharge only without recharge, This is achieved simply by removing the power supply connection or by switching the unit off. The centre LED will illuminate, indicating that discharge is occurring. When this LED is no longer illuminated, discharge is complete. As with all Keene dischargers, the unit will automatically shut off at the correct point without over discharge, and so can safely be left unattended.

Understanding the display

OFF  ON - CONSTANTLY  FLASHING - SEE TEXT FOR RATE 

DISCHARGE BEFORE CHARGE	 CHARGE DISCHARGE FUNCTION	This mode is selected by briefly depressing the “Discharge before charge” button. The Discharge LED is constantly illuminated and the Function LED flashes (On 1 3/8th sec. off 1/8th sec). Once the battery has been discharged down to the correct critical voltage the unit will automatically revert to normal charge.
DISCHARGE ONLY	 CHARGE DISCHARGE FUNCTION	This is achieved simply by leaving the battery on the Multicharger without power connected. The Discharge LED will be the only one illuminated and all switches will be inoperative. When this LED is no longer illuminated, discharge is complete. As with all Keene dischargers, the unit will automatically shut off at the correct point without over discharge, and so can safely be left unattended.
NORMAL CHARGE	 CHARGE DISCHARGE FUNCTION	Both LED’s are continuously illuminated. A constant charge current will be applied to the battery until full charge is detected.
PULSE CHARGE	 CHARGE DISCHARGE FUNCTION	Pulse charge is applied for 3 hours after normal charge has completed. The Function LED will flash (On 1/8th sec, off 1/8th sec) and the charge LED will illuminated only as the pulse is applied (On 4 sec’s, off 30 sec’s).
CHARGE COMPLETE	 CHARGE DISCHARGE FUNCTION	When the Pulse charge is finished, the Function LED will continue to flash (on 18th sec, off 1/8th sec) but the charge LED will no longer illuminate. This mode will continue indefinitely until either the battery is removed or a new charge cycle is started. A very gentle holding charge is applied during this time to ensure that the battery is kept at its optimum potential prior to use.
		The Charge LED will be the only one illuminated. This situation will only occur during the first 13 minute “hold off

OVER VOLTAGE	CHARGE ■ DISCHARGE □ FUNCTION □	period" of normal charge. It is an indication that the terminal voltage of the battery on charge will have exceeded that which the Multicharger considers to be correct for normal charge. It will continue to monitor the voltage and, if it is still too high at the end of the hold off period, it will terminate charge and revert to the charge complete status. If this happens repeatedly it is better to engage discharge and restart the whole charge cycle.
CHARGE PENDING	CHARGE □ DISCHARGE □ FUNCTION ▒	The function LED will flash very slowly (on 1/8th sec, off 1 3/8th sec). This occurs if the terminal voltage of the battery is lower than that which the Multicharger considers safe to charge. In this mode the Multicharger applies a very gentle charge to the battery to see if it can bring the terminal voltage up to a safe level. This mode will continue indefinitely until either the battery is removed or the terminal voltage rises sufficiently, at which point normal charge will automatically be engaged.

HINTS AND TIPS

There is a deliberate "hold-off period" during which the "Delta v" and "Over voltage" charge termination circuitry is deliberately disabled for the first 13 minutes of each charge cycle. This is to prevent the false tripping off that can sometimes occur on other chargers when a battery is being charged for the first time. During this time delay period, you may find that the charge light stays on for a while even if you remove the battery.

Over voltage protection is one of the inbuilt safety features of the Multicharger. This circuit monitors the battery terminal voltage during charge and, if it climbs higher than a preset safe limit, it will suspend charge. This circuit is important as batteries in poor condition tend to have a high internal resistance and present a naturally higher terminal voltage under charge. If over voltage occurs during the hold off period the only LED to be illuminated will be "charge", all others being extinguished. If over voltage occurs after the hold off period, charge will be terminated and the LED's will indicate charge complete. If this happens repeatedly it is best to discharge the battery again before charging. You may find that this happens more regularly with 7.2v batteries such as the DSM ultimate range.

If you remove the battery and then replace it very quickly, the unit can get conflicting messages about whether the terminal voltage is actually falling or rising. If this happens, then as a safety feature it may go into the "charge pending mode" whilst it further monitors the voltage. (see LED ref. grid). If left, this mode will continue for about 5 minutes before the normal charge process engages. If you want to reset the unit before this time simply remove both the battery and the supply cable for about 30 seconds.

As a safety feature, the charge pending mode will also be engaged if the terminal voltage of the battery that you wish to charge is already lower than the critical discharge level. This means that a high current charge will not be supplied to a battery that may have one or more cells short circuit. During the charge pending cycle, a very gentle charge is applied to the battery to see if the terminal voltage can be lifted to the required level. If successful, the unit will then automatically go into the normal charge mode.

The unit is designed to charge camcorder packs with a capacity of between 1000mAh and 3300mAh. (4500mAh packs will not physically fit onto the existing charge plate).

If you have a battery that is performing particularly badly, then charge it and discharge it two or three times in succession. This should help to restore its full capacity.

If you remove one battery that has completed its charge cycle and replace it with another uncharged battery, the LED status will remain as it was for the battery you have just removed, ie the Multicharger

does not yet know that you have replaced it with a different battery. In order to start the cycle you will need to briefly depress either the “start charge” switch, or if you prefer, the “discharge before charge” switch. (If powered, normal charge will automatically follow discharge). It is normal for both the battery and the casing of the unit to become warm during operation.

How do I know when charge is complete ?

Normal charge is indicated by both the “Function” LED and the “charge” LED being continuously illuminated. When normal charge is complete the function LED will start to flash and the Charge LED will come on for about 4 seconds, once every 30 seconds indicating that Pulse charge is now being applied. Pulse charge is applied for 3 hours following the end of normal charge. When Pulse charge is complete the charge LED will not illuminate at all and the function LED will continue to flash at the same rate, indicating that a very gentle “keep full” holding charge is now being applied to the battery.

If you are pushed for time you can remove and use the battery as soon as the normal charge cycle is complete - for it will be at least as fully charged as it would be on the mains charger supplied with the camcorder.

SPECIFICATION

SUPPLY VOLTAGE :(Multicharger)	12-18v DC
SUPPLY VOLTAGE: (AC supply)	110v -250v ac
SUPPLY CURRENT:	3.0A minimum (Multicharger DC input)
CHARGE TIME FOR 1000mAh BATTERY:	75mins from discharged state
DISCHARGE TIME FOR 1000mAh BATTERY:	3-4 hours typical (Discharge only) 4-5 hours typical (Discharge before recharge)
DISCHARGE VOLTAGE THRESHOLD	5.0v +/- 5% (Discharge only) 5.3v +/- 5% (Discharge before recharge)
OVER VOLTAGE THRESHOLD	9.88v
CHARGE CURRENT:	1.2A constant
FULL CHARGE DETECT:	Negative delta v with over voltage & time backup protection.

Please note; Keene Electronics reserve the right to alter this specification without giving prior notification