IQ3000

Owner's Manual

Victor engineering

```
NMBR OF CELLS= 6
OK=1 CHANGE=2
```
7. Press [1] for "OK"

```
CHRGE RATE= 3.8A
OK=1 CHANGE=2
```
8. Let's reset the charge rate to 4 amps. Press [2] to change the rate.

```
CHRGE RATE=XX.XA
ENTER 00.1 - 16.0
```
9. Type in [0],[4],[0]

```
CHRGE RATE= 4.0A
OK=1 CHANGE=2
```
10. Press [1] for "OK"

```
STOP @ DROP=.060V
OK=1 CHANGE=2
```
11. Press [2] for "Change"
(This tells the IQ how hard to push the battery before it cuts off)

```
STOP @ DROP=.XXXV
ENTR .003 - .999
```
12. Type in [0],[1],[5]

```
STOP @ DROP=.015V
OK=1 CHANGE=2
```
13. Press [1] for "OK"

14. Key [2] is set!

This is our recommendation for a discharge program.
Setting quick key [3] to discharge your pack at 20 amps:

```
QUICK KEYS=1-5
CREATE=x EDIT=#
```
1.Press [x] to create a new program.

```
PRESS QUICK KEY
```
2.Press [3] to program quick key [3].

```
FULL BATT MENU=1      QUICK KEYS=3
SPEC FUNCTIONS=2
```
4.Press [2] to select discharge.

```
VOLTAGE CUTOFF=1
TIMED=2
```
5. Press [1] to select voltage cut-off.

```
VOLTAGE CUTOFF=1
TIMED=2
```
6. Press [1] for" C "type cell.

POWER CONNECTION

The IQ3 is computerized and as such, requires a reasonably clean, smooth power source. The power supply should be rated at 13.8-19.8V output @ app. 10+ Amps.

Due to their unstable and often unsafe nature it is strongly recommended not to use a lead acid (car) battery.

To connect the IQ3, attach the included pair of wires first to the color coded plugs labeled "power" on the IQ3 and then to the power supply.

CONNECTING A BATTERY PACK

To connect a battery pack for charge, discharge or cycling use the included alligator leads in the following manner:

1. Connect the first positive lead (red) to the port labeled (+) NiCd/Motor and then to the positive tab on the battery.
2. Connect the first negative lead (black) to the port labeled (-) NiCd/Motor and then to the negative tab on the battery.
3. For the most accurate results (especially critical when discharging) connect your second positive lead to the port labeled SENSE/METER and then to the battery.
4. Connect the second negative lead in the same manner.

When charging or discharging at rates in excess of 25 (as used during comp-u-flex and Lin-D-Flex discharge) amps use the following wiring procedure to bypass the internal fuse.

1. Connect the first positive lead (red) to the port labeled (-) AUX and then to the positive tab on the battery.
2. Connect the first negative lead (black) to the port labeled (-) NiCd/Motor and then to the negative tab on the battery.
3. For the most accurate results (especially critical when discharging) connect your second positive lead to the port labeled SENSE/METER and then to the battery.
4. Connect the second negative lead in the same manner.

THE CARRYING HANDLE

The carrying handle serves the dual purpose as an angled stand when flipped all the way back. This serves to provide maximum air circulation around the heat sink and put the LCD display at an easy to read angle.

COMMON KEY FUNCTIONS

All commands given to the IQ3 are done through the telephone style key pad. The IQ will generally prompt you to enter any necessary information, however, there are a few commonly used keys that it helps to remember.

[0]
The [0] key has several functions. Primarily it turns the unit on. If the [0] key is pressed while performing a function, it serves as an "abort" choice key, giving you the option to cancel the operation. Repeated pressing of the [0] key will return the unit to the main menu screen.

[5]
The [5] key toggles the unit between time display or mAh when you are performing or reviewing the results of a charge or discharge.

[2]
Increases charge/discharge rate .1A increments during operation.
(the key must be pressed for a minimum of 2 seconds and released when desired value is reached)

[3]
Increases charge/discharge rate 1A increments during operation.
(the key must be pressed for a minimum of 2 seconds and released when desired value is reached)

[8]
Decreases charge/discharge rate .1A increments during operation.
(the key must be pressed for a minimum of 2 seconds and released when desired value is reached)

[9]
Decreases charge/discharge rate 1A increments during operation.
(the key must be pressed for a minimum of 2 seconds and released when desired value is reached)

Key Combinations

[1] & [2]
Pressing & holding these keys simultaneously will cancel the auto-trickle function when a charge is in progress.

[1] & [3]
Pressing & holding these keys simultaneously will cancel the mAh limit. The mAh limit is set by cell type to cancel charging after a maximum value has been reached. This can be cancelled for special circumstances.

[4] & [5]
Pressing & holding these keys simultaneously will display the input voltage. This may be done anytime.
Note: pressing the [4] & [5] key simultaneously will also toggle time display to mAh. Press [5] to return to time display if you like.

[5] & [6]
Pressing & holding these keys simultaneously will toggle the beeper option off/on.

[7] & [8]
Pressing & holding these keys simultaneously will freeze the display screen. Whereas the IQ3 may rotate between a series of menu choices ,the results of a battery test, etc. , pressing this combination will hold the screen display for extended viewing. The values displayed may change, as the IQ3 will continue working and monitoring in the "background".

[*] & [#]
Pressing these keys simultaneously will turn the IQ3 off.

GETTING STARTED

After connecting the power leads press [0] to turn the unit on. The greeting screen will briefly flash followed by the main menu access screen and then hold at the quick key screen.

```
QUICK KEYS=1-5
CREATE=* EDIT=#
```

This screen allows easy, 1 key access to your custom charge or discharge programs. To access a program, press keys [1], [2],[3],[4] or[5]. The IQ3 comes pre-programmed with NiCD charge [1], NiMH charge [2] and discharge [3].

To get accustomed with your unit, you can re-program the keys with the default settings. This step by step guide will show you how the menus are displayed and how to use and change the settings of your unit. The following tutorial displays the menu option displayed on the IQ3000 above the key choice to push and explanation. After you have gained some experience with the default settings, feel free to alter the settings as you wish.

This is our recommendation for a basic NiCD charging function.
Setting quick key [1] to charge a six cell pack with comp-u-flex:

```
QUICK KEYS=1-5
CREATE=* EDIT=#
```
1.Press [x] to create a new program.

```
PRESS QUICK KEY
```
2.Press [1] to program quick key [1].

```
FULL BATT MENU=1      QUICK KEYS=3
SPEC FUNCTIONS=2
```
3.Press [1] to select the battery menu

```
CHARGE=1 DISCH=2
CYCLE=3
```
4.Press [1] to select charge.

```
PEAKED=TIMES=2       NiMH/PEAK/CHRG=5
TRKL=3 THERMAL=4     COMPU-U-FLEX=6
```
5. Press [6] to select comp-u-flex.

```
C OR D CELL=1
AA OR OTHER=2
```
6. Press [1] for" C "type cell.

```
NMBR OF CELLS= 6
OK=1 CHANGE=2
```
7. Press [1] for "OK"

```
PEAK=1
THERMAL=2
```

8. Press [1] for (voltage) peak detection

```
CHARGE RATE=3.0A
OK=1 CHANGE=2
```

9. Let's reset the charge rate to 5 amps. Press [2] to change the rate.

```
CHRGE RATE=XX.XA
ENTER 00.1 - 16.0
```

10. Type in [0],[5],[0]

```
CHRGE RATE= 5.0A
OK=1 CHANGE=2
```

11. Press [1] for "OK"

```
DISCH RATE= 25.0A
OK=1 CHANGE=22
```

12. Press [1] for "OK"
(This is the calculated pulse strength of the negative burp)

13. Congratulations! You have just programmed Quick key [1] to automatically charge your 6 cell battery, using comp-u-flex, at 5.0 amps etc. with 1 key stroke. The IQ3 automatically returned you to the "quick key" menu so you can use, program or edit you quick key settings. The quick key setting will remain in memory whenever you power-up the IQ3. To run this program just press [1] when the quick key menu is displayed.

This is our recommendation for a basic re-peak program.
Setting quick key [2] to charge a six cell NiMH pack:

```
QUICK KEYS=1.5
CREATE=X EDIT=#
```

1. Press [x] to create a new program.

```
PRESS QUICK KEY
```

2. Press [2] to program quick key [2].

```
FULL BATT.MENU=1      QUICK KEYS=3
SPEC FUNCTIONS=2
```

3. Press [1] to select the battery menu

```
CHARGE=1 DISCH=2
CYCLE=3
```

4. Press [1] to select charge.

```
PEAKED=1 TIMES=2      NIMH/PEAK/CHRG=5
TRKL=3 THERMAL=4      COMPU-U-FLEX=6
```

5. Press [5] to select NIMH/PEAK/CHRG.

```
C OR D CELL=1
AA OR OTHER=2
```

6. Press [1] for" C "type cell.

YES (enabled).

6. Exit "OPTIONS" menu by pressing a "0".

Once enabled, all discharges within the system will change into variable rate. To change the standard CYCLE or GRADING cycles into the highly desirable FLEX CYCLE, enable both Comp-U-Flex and Lin-D-Flex from the OPTIONS menu.

CAUTION: HIGH Discharge Surge is independent of cell type and the selected Nominal rate. Do not forget to disable it when you are preparing to discharge smaller cells. They may be damaged by the high surge discharge.

Motor Functions

For all motor functions (Break-in and Current Test), connect the motor to the jacks designated as NiCd/Motor. Here are the following motor functions available:

Motor Break In- Uses variable voltage to run the motor through a range of RPM's
Current Test- For checking amp draw with constant (adjustable) voltage. Also useful for running lathes and other motor driven equipment.

Motor functions can be accessed through the following manner:

```
FULL BATT.MENU=1    QUICK KEYS=3
SPEC.FUNCTIONS=2
```
1. Select "Special Functions" [2] from the charge menu.

```
TESTS=1
UTILITIES=2
```
2. Select "Tests" [1] from this menu.

```
QUICK BATT TEST=1   FULL TEST/COMPUT    MOTOR TEST=3
4 MINUTE MAX        ER BAT GRADING=2
```
3. Select "Motor Test" [3] from this menu.

```
CURRENT MEAS=1      SPD CNTRL TEST=3
BREAK-IN=2
```
4. Select either "Current Measure" [1] or "Break-In" [2] from this menu.

The IQ3 is the most advanced power management system available. With this unit you will be able to get more out of you batteries than ever before as well as perform other utilities exclusive to this unit.

Your IQ unit can perform all these functions:
Charge 1-15 cells @ .01-16A @ .1A resolution.
Linear and reflex charge algorithm s with timed, delta voltage, or compu-flex peak detection programs.
Discharge 1-15 cells @ .01-40A constant current or ≥100A interval current.
Linear and exclusive Lin-D-Flex discharge algorithm s to simulate virtually any track condition to train and rejuve-nate your cells.
Cycle and grade your cells or packs to train, revitalize and check their performance.
Beak-in and/or tune motors with specialized software.
Test your speed control's efficiency.
DVM (digital volt meter) accurate to ±.001V

With easy to bolt-on hardware you can:
Zap voltage into your batteries with the IQ-ZZAPP unit.
Match and cycle up to 8 cells with the IQX8
Print graphs and labels of all functions with the Serial Port Interface.
Store and compare all of your packs info with the Track Pack PC software.
Charge with thermal peak detection with the Thermal Probe.
Re-magnetize your magnets with new portable industrial strength magnetizer (coming soon)!!
Add new software with simple EPROM change.
Have your unit upgraded (never obsolete)

The IQ3 system is controlled through a series of easy to use and understand menus. Each menu contains choices or functions that are visible on the LCD screen shown below. You respond to the menu choices by pressing the necessary keys on the keypad.

Also viewable on the face panel are fuse lit LED's (to the right of the display), alerting you to a blown fuse. When the LED is lit, replace the designated fuse before continuing use.

* Always disconnect all power leads prior to servicing the unit!
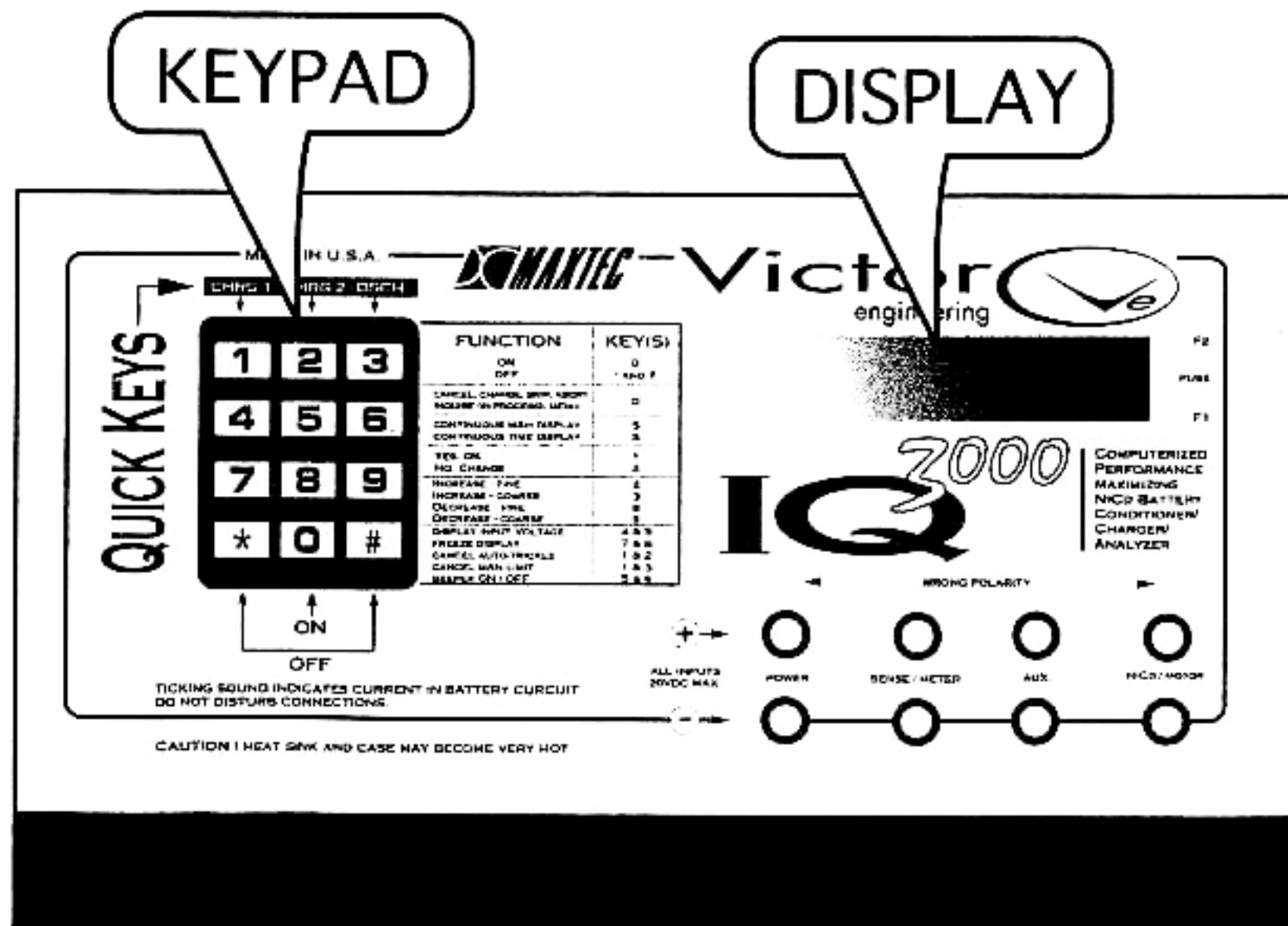
`DISCHENDED@5.08V` `PESENTLY 7.39V` | `DSCHRGE TTE 06:00s` `SUPPLIED 200HAH` | `AVERAGE    6.61V`

3. When the pack is finished charging a loud beep will be heard and the following screens will be displayed in rotation. The first screen shows the voltage ended at and current voltage (5.08 and 7.39 in this example). The second screen displays the total discharge time and mAh supplied. The third screen displays the packs average voltage.

4. Press [0] to return to the main menu and then [3] if you would like to return to "Quick Keys"

Temperature Self Monitoring

The IQ3 has the ability to sense the temperature of it's heat sink. If the temperature of the heat sink reaches 100 degrees Celsius the screen below is displayed.

`USE COOLING FAN` `C---I----------H`   C = Cool
T = Current Temperature
H = Hot

This screen will be flashed every 10 seconds and the beeper will sound. This does not mean that the function in process has been interrupted.

The bottom line of the warning screen represents a temperature gauge, the span of the gauge is approx. 25 degrees Celsius. The function in progress will not be interrupted until the "T" (Temperature) reaches the "H' (Hot) limit.

If a cooling fan is placed so that it blows across the right hand side of the unit, the unit will cool long before the operation on progress would be interrupted.

Under normal operating circumstances, the temperature alarm will never be displayed. When charging and/or discharging several packs back to back, or at high amperage rates, it is suggested that a cooling fan be used.

> Now that you know the fundematals of using the unit, the features to follow will be described in a shorter manner. As with all menu's of the IQ3000, the menus are self explanitory.

Cycling Cells/Packs

"Cycling" is an important conditioning process used to refresh batteries and rid them of memory. The cycling process consists of three functions: an initail discharge, charge and final discharge. These steps are repeated as many times as you wish with an adjustable time delay to provide the neccessary rest between cycles.

From the main menu, here are the steps involved to cycle a battery.

`CHARGE/DISCH-1` `SPECIAL FUNCTIONS-2` | `SCRIPT ACCESS-3`

1. Select the "Charge/Discharge" option [1]

`CHARGE-1 DISCH-2` `CYCLE-3`

2. Select the "CYCLE" option [3]

3. The screens that follow are self explanatory and are programmed in the same manner as the previous charge and dishcharge scripts.

Full Test / Computer Grading

The "Full Test/Computer Grading" program is ideal for comparing and measuring battery performance. It is similar to the cycle function by charging and discharging, however, there is no option for repeated testing/grading. The advantage of this program is that the IQ3000 will measure and provide additional information about the batteries performance.

Holeshot Voltage- The first screen at the completion of the test will show the packs initial "unloaded" voltage.
First Lap Voltage- The second screen displays the initial loaded voltage of the pack you can expect to experience on the first lap.
Internal- On the second screen, the "internal" resistance is displayed as a true value in mOHMS (unlike other machines that only estimate).
FINL DISCH- The runtime in minutes and seconds the pack has.
SUPPLIED- The true mAh rating of the pack.

FNL DS AVR- The average voltage of the pack throughout the discharge process.

PK CHRG- The amount of chagre (in mAh) accepted durring the charge process.

PRINT LABELS- Available only with the serial port interface installed!

COMP-U-FLEX Auto-Adaptive Flex Charge

COMP-U-FLEX is the most advanced type of "burp" charge. It uses "Smart Peak Prediction", which unlike "standard peak detection" charges the pack closer to the actual peak than conventional delta-peak charging. The adaptive "burp" charging adapts the burp interval and duration to the momentary internal resistance of the NiCd during the charge process. This feature delays the point of sudden height rise, extending the capacity of the cell.

COMP-U-FLEX charge can also be used with the Thermal Cut-off feature (optional Thermal Probe is required) with batteries that have the tendency to false peak (usually from over-discharging)

To Use Comp-U-Flex:

PEAKED=1 TIMES=2   NIMH/PEAK/CHRG=5
IPK=3 THERMAL=4   COMP-U-FLEX=6

1. Select "COMP-U-FLEX" [6] from the charge menu.

PEAK=1
THERMAL=2

2. Select from the desired cut-off method. You must have the thermal probe to use the thermal peak detection function.

LIN-D-FLEX Variable Rate Discharge

LIN-D-FLEX Discharge method approximates the race conditions and when used together with COMP-U-FLEX Charge, further enhances the process of keeping the Internal Resistance of the Ni-Cd at the lowest possible level, thus reaching the maximum battery performance and lifetime expectancy.

LIN-D-FLEX Discharge cycles through 3 different current rates in the following manner:

1. NOMINAL CURRENT PERIOD (20 sec.) - current you normally select (type. 20-30A)
2. SURGE CURRENT PERIOD (2 sec.) - selected by user up to 99A
3. 1/2 NOMINAL CURRENT PERIOD - duration computed by the system to precisely average the overall current to the Nominal rate

The setting for the surge rate should be equal to the surges on the track. If the ESC torque (current) limiter is used, then the surge should be set at the same value. If not, (ESC is wide open at full throttle) it should be set between 50 and 70 Amps).

In order to select and set up LIN-D-FLEX , follow these steps:

FULL BATT.MENU=1   QUICK KEYS=3
SPEC.FUNCTIONS=2

1. Select "Special Functions" [2] from the charge menu.

TESTS=1
UTILITIES=2

2. Select "Utilities" [2] from this menu.

DVM=1 OPTIONS=2   ZZAP=4
THERMOMTER=3   BATTERY SELECT=5

3. Select "Options" [2] from this menu.

1REFLEX CHG   NO
2D-FLEX DS   NO

4. Press "1" to toggle Reflex (Comp-U-Flex) "Yes" or "No" or press "2" to toggle D-Flex (Lin-D-Flex) "Yes" or "No"

HIGH CURRENT XXA
OK=1 CHANGE=2

5. Change Surge (High Current) to the desired value. At this point you will return to the OPTIONS menu with the D-FLEX set at

`# OF CELLS= 6`
`RECHARGE?`

7. Press [1] for "OK"

`DSCHG CUTOFF= 5.10V`
`06: 1 CHANGE-2`

8. Press [1] for a 5.10v discharge cut-off. You can adjust this to increase or decrease the remaining power you wish to leave in the battery. 5.10v is recommended.

`DISCH RATE= 20.0A`
`04: 1 CHARGE-2`

10. Press [1] for "OK"

11. The quick key is set!

CHARGING A PACK

First connect the battery pack to be charged as discussed earlier. You can either run you quick key [1] from the quick key menu or re-enter your desired settings from the main menu. To access the main menu at any time, press [0].

`QUICK KEYS= 1`
`CREATE=# EDIT=#`

1. To run your program press [1]

`CHARGING @5.00A`
`00:01:12    8.45V`

2. The following menu will be displayed. The number on the upper right is the charge amperage. The number on the lower left indicates charge time in hours : minutes : seconds. The number on the lower right indicates the pack's current voltage. The example shows a pack that has been charging for 1 minute and 12 seconds at 5 amps. It's voltage is currently 8.45volts.

* a ticking noise can be heard indicating the current flow. You can abort this charge by pressing [0] and then when prompted, press [0] again.

`PEAK VOLT= 9.24V`   `CHRG TIME= 02:34S`   `TRICKLE CHRG @10A`
`OFF CHRG= 8.68V`   `ACCEPTED 2560mAh`   `00:01:29    8.68V`

3. When the pack is finished charging a loud beep will be heard and the following screens will be displayed in rotation. The first screen show the peak charge voltage and current voltage (9.24 and 8.68 in this example). The second screen displays the total charge time and mAh accepted. The third screen displays the trickle charge status of amps, time and voltage.
* The trickle charge screen will not display if you cancel it. Keys [1]&[2]

4. Press [0] to return to the main menu and then [3] if you would like to return to "Quick Keys"

DISCHARGING A PACK

First connect the battery pack to be charged as discussed earlier. You can either run you quick key [3] from the quick key menu or re-enter your desired settings from the main menu. To access the main menu at any time, press [0].

`QUICK KEYS= 3`
`CREATE=# EDIT=#`

1. To run your program press [3]

`CUTOFF VOLTAGE`   `YES-1    NO-2`
`REQUIRED?`

2. If the sensor leads are not connected you will get the following screen. Either connect the leads and press [1] or do not connect them(press [2])