DisChargePlus

OPERATING INSTRUCTIONS

Introduction:
The **DisChargePlus** battery discharger is designed to measure the remaining capacity, or useful energy for which a 36- or 48-volt lead acid, or lithium battery set is capable. The discharge rate, time, and shut-off voltage are programmable.

Specifications:

- Operates from battery voltage, either 36- or 48-volt battery packs (no AC power required)
- Electronically controlled (uses microcontroller)
- Programmable voltage or time shut-off - 3 rates of discharge
- LCD digital display for easy reading
- Built-in thermal protection
- 8-foot DC cord with cord wrap brackets
- Large 200-amp clamps for battery connections

FSIP ELECTRONICS
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Important Safety Instructions:

- Before using discharge unit, read all instructions and cautionary markings on electric vehicle, battery, battery charger, and all accessories using battery.
- Position the discharger on a foundation of stone, brick, concrete or grounded metal.
- To reduce the risk of fire, do not use the discharger near flammable materials or vapors.
- Do not expose discharge unit to rain or snow.
- Use of an attachment not recommended or sold by the discharge unit manufacturer may result in a risk of fire, an electric shock, or injury to persons.
- Ensure DC cords are located so that they will not be stepped on, tripped over, or otherwise subjected to damage or stress.
- Do not operate discharge unit with damaged cords or clamps; replace them immediately.
- To permit free air flow for cooling, allow eighteen inches (18") minimum between the discharger and any wall or other equipment.
- Do not touch the back or sides of the case during or just after operation of the discharge unit. A large amount of energy is being dissipated by the unit and the case will become hot.
- NEVER disconnect the clamps from the batteries while the unit is operating. The resulting arcing could cause an explosion resulting in personal injury, and property damage.
- Do not operate discharge unit if it has received sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.
- Do not disassemble discharge unit; take it to a qualified service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- Disconnect discharge unit from batteries before attempting any maintenance or cleaning.

Proper Care and Use of Batteries:

⚠ **CAUTION:** Always wear protective eye shields and clothing when working with batteries. Batteries contain acids which can cause bodily harm. Do not put wrenches or other metal objects across the battery terminal or battery top. Arcing or explosion of the battery can result. Do not wear jewelry when working around batteries. Arcing can cause severe burns.

New lead acid batteries will not deliver their full performance until after several cycles.

The tops of the batteries and battery hold downs must be kept clean and dry at all times to prevent excessive self-discharge and flow of current between the battery post and frame.

For wet cell batteries, maintain the proper electrolyte level by adding water when necessary. Never allow the electrolyte level to fall below the top of the battery plates. Electrolyte levels fall during discharge and rise during charging. Therefore, to prevent the overflow of electrolyte when charging, add water ONLY AFTER the batteries have been fully charged. DO NOT OVERFILL. Old batteries require more frequent additions of water than new batteries.

Do not over discharge the batteries. Excessive discharge can cause polarity reversal of individual cells, resulting in complete battery failure.

Using the DisChargePlus:
Testing should be done in a cool, clean, dry, and well-ventilated environment. Position the discharger on stone, brick, concrete or grounded metal.

⚠ **DANGER: To reduce the risk of fire, do not use the discharger near flammable materials or vapors.**

The purpose of using a discharge unit on battery sets is to determine battery capacity, and to find defective cells or batteries in the set.

For Lead Acid Batteries:
Battery energy is measured in minutes obtained upon discharging a fully charged 36- or 48-volt battery set. This standard is used by all major battery manufactures' of lead acid deep cycle marine, golf car, or floor scrubber type batteries.

- 36-volt
    - Load: 25, 56, or 75 amps
    - Shut off voltage: 31.5 volts (1.75 volts per cell)
- 48-volts
    - Load: 25 or 56 amps
    - Shut off voltage: 42

For Lithium Batteries:
NOTE: If when connected to the battery set the discharger reads "Out of range" and your discharger was manufactured prior to **Feb. 2023** (see date code) it will need a chip upgrade.

The only difference from a lead acid test is that the shut off voltage will be different. Adjust the shut off voltage to the point just before the BMS disconnects the load. If the BMS disconnects the discharger, test data will be lost. Find out this setting from the manufacturer.

1. Before the test, fully charge the battery pack. It is important that all the batteries in the pack are fairly even. Monitor each battery by voltage toward the end of the charge cycle. Any battery (or batteries) that are 3/4–1-volt lower than the rest of the pack should be charged individually.

2. To start the test, observe polarity, red+ black –, and connect the clamps to the pack.

IMPORTANT: Make sure the posts are clean, and the clamps are tight. Bad connections will cause the unit to fault, and the cycle to be interrupted with a "system failure" message.

3. The solenoid will close, and the system voltage will be displayed, along with the rate of discharge. Press the START/STOP/PAUSE button. The cycle will start, and the running time and battery volts will be displayed.

4. The cycle may be interrupted by pressing the button and restarted by pressing it again. If it is not pressed again, the discharger will shut off. The fan will continue to run for about 3 minutes after shutting down.

DANGER: Never move the clamps while the red LED is lit, the resulting arcing can cause injury and damage to personnel and equipment.

In case of an over temp, "OT" will be displayed, and the cycle will pause until the temperature comes down, then restart. To avoid intermittent starting and stopping, tests should be conducted at temperatures below 95 degrees Fahrenheit.

5. When complete, minimum voltage, actual voltage, and cycle time can be viewed by using the MENU button. Cycle time refers to the time it took to reach the programmed shut off voltage. To figure capacity, you must know how many minutes the battery is rated for at the discharge rate selected, you then divide the actual time by the rated time to find the percent capacity.

Example: An 18-cell battery set is rated at 107 minutes at a 75-amp discharge rate. The actual time it took to reach 1.75 volts per cell is 90 minutes therefore capacity is 84%.

Identifying Defective Cells/Batteries:
During the discharge cycle, batteries should be monitored by voltage individually, and should stay fairly even. Batteries that drop faster than the others are probably defective. Batteries that fall much below 1.75 volts per cell (lead acid) should be replaced. Bad batteries are obviously related to lower capacity ratings. Some experience is required to judge if the pack capacity is sufficient for the actual use, it will be subjected to.

Reprogramming the Discharger:
Time Adjustment (5-990 minutes): Press and hold the MENU button until the time is displayed. Press the START/STOP/PAUSE button to initiate change, then press either button to increase or decrease time. Stop pressing, and time will be held in memory.

Shut Off Voltage: Press the button a second time after MAX TIME is displayed. Raise or lower shut off voltage in the same fashion.

Discharge Rate: Press the button 4 times, select 25, 56 or, 75 amps on 36-volt pack – 25, or 56 amps on a 48-volt pack.

History:
The discharger holds 14 previous tests in the history menu. To access, press the MENU button 5 times. The display will show run time, start voltage, and shut off voltage. The first record is the last cycle run.

Attention:
The cable length and size are critical to voltmeter accuracy - do not change. Clamp tightness is also critical. If the clamps become hot during discharging have them replaced.

WARNING: Failure to disconnect clamps from battery pack before moving or driving equipment will result in damage to cords, clamps, and equipment.