

THE STRENGTHS OF HOTRONIC'S FOOTWARMER POWER PLUS!

SYSTEMS EXPLAINED

BATTERY PACK: VOLTAGE CUT OFF SYSTEM

1. To reduce potential of excessively low charge levels in Cells, "m" Series Battery Pack incorporates Voltage Cut Off System.
2. Battery Pack automatically shuts Off when Voltage Cut Off System detects current at or below Cut Off Level.
3. Cut Off Level in m4 Battery Pack is 3.9V (.9V per Cell).
4. Cut Off Level in m3 Battery Pack is 2.7V (again .9V per Cell).
5. Nominal Voltage in m4 Battery Pack is 4.8V (1.2V per Cell).
6. Nominal Voltage in m3 Battery Pack is 3.6V (again 1.2V per Cell).

RECHARGER: NEGATIVE DELTA V SYSTEM

1. "m" Series Recharger has ability to read Voltage in Battery Pack Cells.
2. When decline in Voltage is detected (Negative Delta V), Battery Pack is assumed to have a full charge.
3. Once detected, Recharger switches recharging rate from "full current" recharging to "trickle current" recharging to reduce potential of overcharging Cells.

RECHARGER: TRICKLE CURRENT RECHARGING SYSTEM

1. Trickle Current Recharging protects Cells from overcharging.
2. Trickle Current Recharging further enables each Cell to reach its full capacity potential.
 - a. Each Cell within Battery Pack self-discharges during extended periods of storage and inactivity (including prior to first use ever).
 - b. Because Cells self-discharge at various rates, charge levels within Cells often become "unbalanced" with other Cells in Battery Pack.
 - c. During subsequent recharging, one Cell may reach full charge before others, may cause brief decline in Voltage, may trigger Negative Delta V System, and may subsequently cause Recharger to switch to Trickle Current Recharging.
 - d. This early switch to Trickle Current Recharging causes Recharger LED to become Green and suggests Battery Pack is at full charge and full capacity potential. However, full capacity potential may not have been reached if removed from Recharger shortly after Green LED.
 - e. To reach full capacity potential, Trickle Current Recharging of Battery Pack MUST continue for 48 to 72 hours uninterrupted. (See RECHARGING BATTERY PACKS and CONDITIONING CHARGE in OPERATING INSTRUCTIONS.)

TROUBLESHOOTING

KEY TO TROUBLESHOOTING

1. *Symptom:* (As described by end-user or as seen by retailer.)
2. *Situation:* (The known cause which may or may not pertain to case-at-hand.)
3. *Solution:* (The recommended action to change or correct the symptom.)

BATTERY PACK: SETTING 4 KEEPS RESETTING TO SETTING 3

1. *Symptom:* When at Setting 4, Battery Pack keeps turning down to setting 3.
2. *Situation:* Battery Pack has two Settings 4. "Timed Setting 4" automatically resets to Setting 3 in three minutes. "Continuous Setting 4" must be deliberately selected and remains on Setting 4 until another Setting is deliberately selected.
3. *Solution:* See OPERATING INSTRUCTIONS and CAUTIONS REGARDING BURNS.

BATTERY PACK: LEDS ALL FLASH SIMULTANEOUSLY WHEN RECHARGING

1. *Symptom:* When Battery Pack is connected to Recharger, all Battery Pack LEDs begin flashing simultaneously and remain flashing until unplugged from Recharger.
2. *Situation:* A temporary or permanent short may exist within Battery Pack electronics. As this behavior has been known to self-correct in numerous instances, moisture from melting snow or otherwise may cause temporary short. A permanent short may result from loose male contact in Battery Pack Plug Hole.
3. *Solution:* DO NOT USE BATTERY PACK UNTIL SYMPTOMS CEASE. If unchanged, Battery Pack must be replaced.

BATTERY PACK: BATTERY PACK LED WILL NOT TURN ON, BUT WHEN RECHARGING, LED TURNS ON AND CANNOT BE TURNED OFF

1. *Symptom:* Battery Pack will not turn On, but when Recharging, Battery Pack LED turns On and cannot be turned Off.
2. *Situation:* Battery Pack ON Button is not functioning properly and is likely LOCKED in On position. Cause may be from impact or other malfunction. When charge level in Battery Pack becomes low enough, LED turns Off. When charge level becomes high enough, LED turns On automatically and cannot be turned Off.
3. *Solution:* Battery Pack must be replaced.

BATTERY PACK: LED CANNOT BE TURNED OFF

1. *Symptom:* Battery Pack LED cannot be turned Off.
2. *Situation:* Battery Pack ON Button is not functioning properly and is likely LOCKED in On position. Cause may be from impact or other malfunction. When charge level in Battery Pack becomes low enough, LED turns Off. When charge level becomes high enough, LED turns On automatically and cannot be turned Off.
3. *Solution:* Battery Pack must be replaced.

Troubleshooting continued... ↓↓↓

THE STRENGTHS OF HOTRONIC'S FOOTWARMER POWER PLUS!

BATTERY PACK:

DOES NOT LAST VERY LONG ON ANY SETTING

1. *Symptom:* When in use on any Setting, Battery Pack lasts only several hours before turning Off.
2. *Situation:* Cells within Battery Pack may be “unbalanced” and not reaching full capacity potential during recharging.
3. *Solution:* Condition Charge Battery Pack for 48 to 72 hours uninterrupted. See OPERATING INSTRUCTIONS. See above Systems Explained: Recharger: Negative Delta V System and Trickle Current Recharging System.

BATTERY PACK:

DOES NOT LAST AS LONG OR HEAT AS WELL AS IT DID LAST YEAR

1. *Symptom:* When in use on any Setting, Battery Pack lasts only several hours before turning Off, and heat generated in Element is not as warm as last year.
2. *Situation:* Cells within Battery Pack may be “unbalanced” and not reaching full capacity potential during recharging. This also negatively impacts heat generated in Element.
3. *Solution:* Condition Charge Battery Pack for 48 to 72 hours uninterrupted. See OPERATING INSTRUCTIONS. See above Systems Explained: Recharger: Negative Delta V System and Trickle Current Recharging System.

BATTERY PACK:

CAUSES RECHARGER LED TO TURN GREEN WITHIN 30 MINUTES

1. *Symptom:* Battery Pack causes Recharger LED to turn Green within 30 minutes.
2. *Situation ONE:* Cells in Battery Pack are at or are close to full charge before attaching to Recharger. Once Cells reach full charge, Negative Delta V is activated, Trickle Current Recharging begins, and Recharger LED becomes Green.
3. *Solution ONE:* No solution should be necessary as system is performing as it should.
4. *Situation TWO (Unbalanced Cells):* Cells in Battery Pack have become unbalanced during extended periods of storage or inactivity (including prior to first use ever). Cells are not reaching full capacity potential during Recharging. See above “m” Series Systems Explained: Recharger: Trickle Current Recharging.
5. *Solution TWO:* Condition Charge Battery Pack for 48 to 72 hours uninterrupted. See OPERATING INSTRUCTIONS. See above Systems Explained: Recharger: Negative Delta V System and Trickle Current Recharging System.

BATTERY PACK KEEPS TURNING OFF: TURNS ON AGAIN FOR SEVERAL MINUTES BEFORE TURNING OFF AGAIN

1. *Symptom:* Battery Pack keeps turning Off. Battery Pack turns On again for SEVERAL MINUTES before turning Off again.
2. *Situation:* Charge in Cells is LOW and close to Voltage Cut Off Level. Once Voltage reaches Cut Off Level, Battery Pack automatically turns Off. While Off, Cells are at rest and charge recovers to varying levels above Voltage Cut Off Level. The higher the recovered charge level attained, the longer the Battery Pack stays On again before declining to the Voltage Cut Off Level and automatically turning Battery Pack Off again.
3. *Solution:* Recharge Battery Pack as per OPERATING INSTRUCTIONS.

BATTERY PACK KEEPS TURNING OFF: TURNS ON AGAIN FOR SEVERAL SECONDS (OR SPLIT SECOND) BEFORE TURNING OFF AGAIN

1. *Symptom:* Battery Pack keeps turning Off. Battery Pack turns On again for SEVERAL SECONDS (or SPLIT SECOND) before turning Off again.
2. *Situation:* Charge in Cells is WELL BELOW Voltage Cut Off Level. When depressing ON Button, current is sent from Cells through Voltage Cut Off System which then detects low voltage and immediately turns Battery Pack Off again.
3. *Solution:* Recharge Battery Pack as per OPERATING INSTRUCTIONS.

BATTERY PACK KEEPS TURNING OFF: TURNS ON AGAIN BUT IMMEDIATELY TURNS OFF WHEN RELEASING ON BUTTON.

1. *Symptom:* Battery Pack keeps turning Off. Battery Pack turns On when depressing ON Button but IMMEDIATELY turns Off when releasing ON Button.
2. *Situation ONE:* Charge in Cells is WELL BELOW Voltage Cut Off Level. When depressing ON Button, current is sent from Cells through Voltage Cut Off System which then detects low voltage and immediately turns Battery Pack Off again.
3. *Solution ONE:* Recharge Battery Pack as per OPERATING INSTRUCTIONS.
4. *Situation TWO:* A loose contact is suspected where depressing ON Button enables contact (though sometimes randomly), and once ON Button is released, Battery Pack turns Off. However, this behavior may happen once or twice and not repeat itself again. This self-correction may indicate moisture from melting snow or otherwise as causing temporary short. See above Battery Pack: LEDs All Flash Simultaneously when Recharging.
5. *Solution TWO:* Depress ON Button several times and for as long as 10 seconds each time. If Battery Pack continues to turn Off when ON Button is released, Battery Pack may need to be replaced. If, after several days of continuing efforts fail to produce self-correction, Battery Pack needs to be replaced.

BATTERY PACK KEEPS TURNING OFF: TURNS ON AGAIN BEFORE EVENTUALLY TURNING OFF AGAIN BUT STAYS ON AGAIN FOR HOURS ONCE INSIDE WHERE WARM

1. *Symptom:* Battery Pack keeps turning Off EVENTUALLY after being turned On again. Once inside where warm, Battery Pack turns On and stays On for HOURS.
2. *Situation:* Charge in Cells is likely WELL ABOVE Voltage Cut Off Level and does not activate Voltage Cut Off System. However, during use, OFF Button is somehow depressed long enough to turn Battery Pack Off. (When ON Button is depressed, increase in Setting occurs.) While difficult to believe or accept, OFF Button comes into contact with something and turns Battery Pack Off. End-users have reported this phenomena as resulting from riding chair lifts and gondolas and while sitting on chairs at tables in lodges. End-users have also confirmed Battery Pack on right leg/boot turns DOWN a Setting or OFF completely whereas Battery Pack on left leg/boot turns UP a Setting.
3. *Solution:* End-user should become aware of potential for Setting change and consider re-locating Battery Pack attachment on boot. If attached on back of boot or on Strap Bracket attached towards back of boot, consider re-positioning Battery Pack further forward to avoid contact with chair lifts, gondolas, chair rungs, or other items.