

SYSTEMS CHECK

A) COLLECT ALL “MUST HAVE” ITEMS

Following tests CANNOT be performed properly without following MUST HAVE items:

- Known good Recharger.
- Known good Battery Pack.
- Known good Heating Element.
- Calibrated Infrared Thermometer.

NOTE: Using INFRARED THERMOMETER is a more accurate and consistent method of detecting heat than fingertips. However, temperature readings are significantly impacted by surrounding materials and ambient temperatures. Therefore, temperature readings may or may not be representative of temperatures attained in standardized testing conditions used to determine published temperature ranges.

B) COLLECT ALL COMPONENTS

To perform Systems Check of complete Foot Warmer S/e/m Series, ALL components of same Foot Warmer MUST be available at the same time (2 Battery Packs, 1 Recharger, and 2 Heating Elements).

C) INSPECT ALL COMPONENTS

- Visually inspect Recharger casing, Adapter Plug(s), Power Cords, and White Plugs.
- Visually inspect Battery Pack casing, top lid, ON-OFF Buttons, and male contacts inside plug hole.
- Visually inspect Heating Element plug, stress relief grommet, Power Cord, and Power Cord gluing and soldering to oval disk (if visible).
- **Are all visual inspection points in proper physical condition?**

NOTE:

If, at any of the following steps, a failure in any given item is found, it is not necessary to complete any of the remaining steps pertaining to that given item.

1) RECHARGER: SELF-TEST (S SERIES ONLY)

- Without Battery Packs attached, plug Recharger into known, good, live wall outlet.
- **Does Recharger perform Self-Test with brief Red, Green, then Off LED lights?**
- Plug Recharger into outlet several times to confirm properly functioning Recharger.
- Watch Recharger LEDs closely.

2) RECHARGER: POWER CORDS TEST

- With positive Self-Test confirmed and Recharger still plugged into wall outlet, attach known good Battery Pack to each Recharger Power Cord.
- **Does each corresponding Recharger LED turn on Red when known good Battery Pack is attached?**

3) BATTERY PACK: ON / OFF BUTTON TEST

- Briefly press-and-release ON and OFF Buttons several times.
- **Do ON and OFF Button(s) PHYSICALLY function properly?**

4) BATTERY PACK: CELLS TEST

- With known good Recharger plugged into outlet, attach each Battery Pack.
- **Does corresponding Recharger/Battery Pack LED (on known good Recharger) turn on Red for each attached Battery Pack?**
- Battery Pack MUST remain on Recharger to confirm following:
- Corresponding Recharger LED (either on Battery Pack – XLP – or Recharger – S Series) blinks/continuously lights up Red when Cells function properly, have a charge, and are taking a charge.
- Corresponding Battery Pack/Recharger LED FLASHES Red within 20 minutes when Cells are incompatible with Recharger (i.e. Battery Pack models prior to S/e/m Series) or are not functioning properly (XLP/S/e/m Series Battery Pack).

5) BATTERY PACK: SETTINGS TEST

- With Recharger still plugged into outlet and Battery Pack still attached to Recharger, recharge Battery Pack minimally for 10 minutes uninterrupted to ensure accurate test.
- After minimum 10 minute recharge, with Recharger still plugged into outlet and Battery Pack still attached to Recharger, turn Battery Pack ON to Setting 1, 2, 3, and 4 and then OFF from 4 to 3, 2, 1, and Off.
- **Does Battery Pack Setting function properly?**
- Battery Pack MUST be recharged minimally for 10 minutes uninterrupted or test results may be highly inaccurate.
- Battery Pack MUST remain on Recharger during Settings Test.

6) BATTERY PACK: HEAT TEST

- With positive tests confirmed for Recharger, Battery Pack Cells, and Battery Pack Settings, and after minimum 10 minute recharge or longer, remove Battery Pack from Recharger, plug known good Heating Element into Battery Pack, turn Battery Pack to Continuous Setting 4, and then wait for several minutes.
- **Does Battery Pack generate heat in Element?**
- Use Calibrated Infrared Thermometer to detect generated heat.
- Battery Pack MUST be recharged minimally for 10 minutes uninterrupted when using known, good, UNINSTALLED Heating Element.

7) HEATING ELEMENT: HEAT TEST

- Plug Heating Element into known, good, fully recharged Battery Pack, turn Battery Pack to Continuous Setting 4, and then wait several minutes.
- **USE A SCIENTIFIC, CALIBRATED THERMOMETER** to determine if Heating Element generates heat.

8) BATTERY PACK: DURATION TEST (NON BT)

- S-Series: Condition Charge Battery Pack (24 to 72 hours uninterrupted), remove from Recharger, let rest for minimally 1 hour, turn to Setting 3, plug in known good Heating Element, and set external timer for minimum published duration of Battery Pack model.
- XLP-C (non-BT): Recharge Battery Pack completely, remove from Recharger, let rest for minimally 1 hour, turn to Setting 3, plug in known good Heating Element, and set external timer for minimum published duration of Battery Pack model.
- Reset external timer for subsequent 15 minute intervals as needed.

• **Does Battery Pack duration fall within model’s published duration range for Setting 3?**

Battery Pack published duration range:

- For model XLP 1C is 210 to 615 minutes.
- For model S4+ is 300 to 450 minutes.
- For model e4 is 280 to 420 minutes.
- For model m4 is 280 to 415 minutes.
- Set external timer for minimum duration of Battery Pack model being tested. (See following chart.)
- When minimum duration is reached, check to confirm Battery Pack Continuous Setting 4 is still on and Element is still generating heat. Record results in chart below.
- When minimum duration is reached, also set timer for first 15 minute interval.
- When first 15 minute interval is reached, again check to confirm Battery Pack Setting 3 is still on. Record results.
- Continue using subsequent 15 minute intervals until Setting 3 is no longer On and Element is no longer generating heat.

Battery Pack Series →	XLP/S/e/m4	XLP C	Results
Published Duration Range →	S4+: 150 to 270 e4: 150 to 240 m4: 150 to 225	S3: 120 to 210 e3: 120 to 210 m3: 120 to 180	<input checked="" type="checkbox"/> #1 <input checked="" type="checkbox"/> #2
Minimum Duration →	150 minutes	120 minutes	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	165	135	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	180	150	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	195	165	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	210	180	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	225	195	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	240	210	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	255	225	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	270	240	<input type="checkbox"/> <input type="checkbox"/>
+15 minute interval	285	255	<input type="checkbox"/> <input type="checkbox"/>

9) BATTERY PACK: MAINTENANCE MODE

- Maintenance mode can be used with XLP Bluetooth Battery Packs to quickly determine the battery health.
 - Open the Hotronic Heat App and be sure that the Battery Pack in question is connected to the App via Bluetooth.
 - Select the ‘Settings’ button in the top left of the screen.
 - Choose Footwarmer under the ‘Your Product’ area.
 - Tap six (6) times on the Battery Pack you wish to test.
 - Enter password: Ho!tronic8364 to access Maintenance Mode
- If the ‘Age’ value has dropped below 80%, contact Hotronic for further information. Please have the Cycles information from Maintenance Mode as well as the Production Year Identifier from the back of the Battery Pack when you call or email.

SYSTEMS EXPLAINED

BATTERY PACK: VOLTAGE CUT-OFF SYSTEM

- To reduce potential of excessively low charge levels in Cells, S/e/m Series Battery Pack incorporates Voltage Cut Off System.
- Battery Pack automatically shuts Off when Voltage Cut Off System detects current at or below Cut Off Level.
- Cut Off Level in S/e/m4 Battery Pack is 3.9V (.9V per Cell).
- Cut Off Level in S/e/m3 Battery Pack is 2.7V (.9V per Cell).
- Nominal Voltage in S/e/m4 Battery Pack is 4.8V (1.2V per Cell).
- Nominal Voltage in S/e/m3 Battery Pack is 3.6V (1.2V per Cell).

RECHARGER: NEGATIVE DELTA V SYSTEM

- S/e/m Series Recharger has ability to read Voltage in Battery Pack Cells.
- When decline in Voltage is detected (Negative Delta V), Battery Pack is assumed to have a full charge.
- 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

- Trickle Current Recharging protects Cells from overcharging.
- Trickle Current Recharging further enables each Cell to reach its full capacity potential.
- Each Cell within Battery Pack self-discharges during extended periods of storage and inactivity (including prior to first use ever).
- Because Cells self-discharge at various rates, charge levels within Cells often become “unbalanced” with other Cells in Battery Pack.
- 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.
- 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.
- TO REACH FULL CAPACITY POTENTIAL, Trickle Current Recharging of S-Series Battery Pack MUST continue for 24 to 72 hours uninterrupted. (See RECHARGING BATTERY PACKS and CONDITIONING CHARGE in respective S/e/m Series OPERATING INSTRUCTIONS.) XLP Battery Packs do not require a conditioning charge

For further information, please feel free to contact us at:

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****Please see Warranty Claims & Return Procedures section for RA and return shipping information****