



**HOTSTART®**

# Hotstart Battery Charger System

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## Installation & Operation Manual

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Hotstart  
Battery Charger System





# **HOTSTART®**

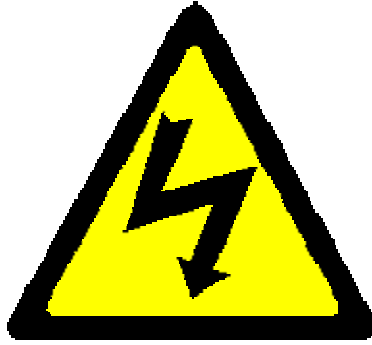
**HOTSTART  
E. 5723 Alki Avenue  
Spokane Valley, WA 99212**

**Customer Support: (509) 536-8660**

## **NOTICE**

**When ordering replacement parts for your heating system, always reference the heating system's Model Number and Serial Number.**





**⚠ CAUTION**

ALL CONNECTIONS IN THE JUNCTION BOX SHOULD BE CHECKED PRIOR TO INSTALLATION. VIBRATION DURING SHIPMENT CAN CAUSE SCREWS TO LOOSEN. ALL CONNECTIONS IN THE JUNCTION BOX SHOULD BE CHECKED AT REGULAR INTERVALS. EXCESSIVE VIBRATION WILL EVENTUALLY CAUSE CONNECTIONS TO LOOSEN.

WIRING TO CHARGING SYSTEM TO BE PERFORMED BY A QUALIFIED ELECTRICIAN AND CONFORM TO ALL NATIONAL, STATE AND LOCAL ELECTRICAL CODES.

THE AC GROUNDING LUG MUST BE USED FOR SAFETY ON ALL INSTALLATIONS.



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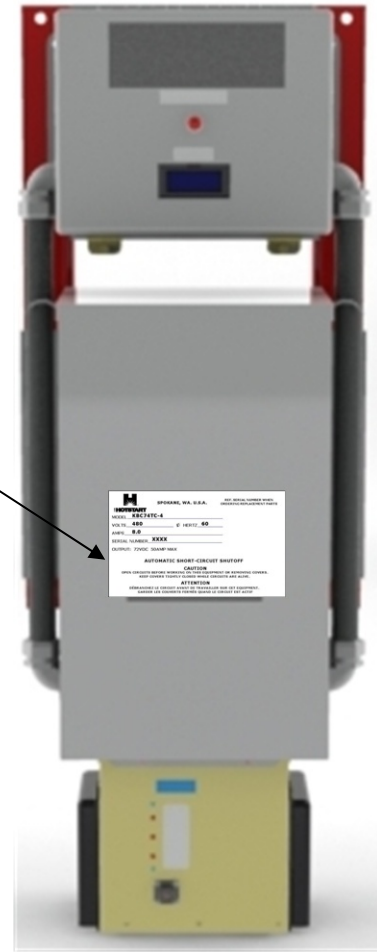
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# Identifying Your System

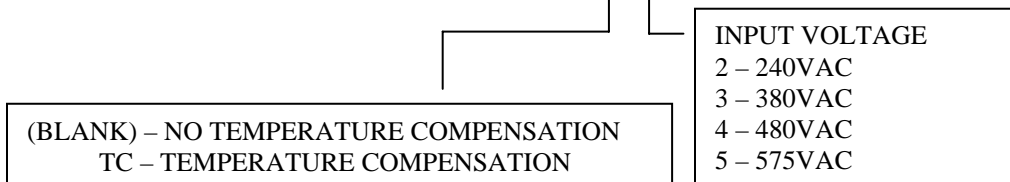
Each Hotstart Battery Charger System has an identification plate located on the front of the unit. An example of the identification plate is shown below. When ordering replacement parts, be sure to reference your battery charger system's model and serial number shown the identification plate.

	SPOKANE, WA. U.S.A.	REF. SERIAL NUMBER WHEN ORDERING REPLACEMENT PARTS
<b>MODEL</b> KBC74TC-4		
<b>VOLTS</b> 480	1 $\phi$ HERTZ 60	
<b>AMPS</b> 8.0		
<b>SERIAL NUMBER</b> XXXX		
<b>OUTPUT: 72VDC 50AMP MAX</b>		
<b>AUTOMATIC SHORT-CIRCUIT SHUTOFF</b>		
<b>CAUTION</b>		
OPEN CIRCUITS BEFORE WORKING ON THIS EQUIPMENT OR REMOVING COVERS. KEEP COVERS TIGHTLY CLOSED WHILE CIRCUITS ARE ALIVE.		
<b>ATTENTION</b>		
DÉBRANCHEZ LE CIRCUIT AVANT DE TRAVAILLER SUR CET EQUIPIMENT. GARDER LES COUVERTS FERMÉS QUAND LE CIRCUIT EST ACTIF		



## MODEL NUMBER BREAKDOWN

MODEL – KBC74XX-X



# The Hotstart Battery Charger

The Hotstart Battery Charger System is designed for Locomotive and Industrial engines that require battery startup. The Hotstart Battery Charger System is designed and constructed for ease of operation and requires minimal maintenance. It is a permanently installed system with no battery disconnecting required. It uses solid state circuitry assuring high reliability.

## NOTICE

**The Hotstart Battery Charger is designed to maintain a DC voltage. It is not designed for restoring batteries that are completely drained, damaged, or corrupted. Drawing more than 50 Amps for an extended length of time will cause the circuit breaker to trip.**

## The Charger

The Hotstart battery charger is designed to convert single phase AC power from a line source to a controlled DC voltage output. Battery voltage and charge current are monitored continuously by solid state circuitry to provide high charge current when the battery is drained, and trickle charge current when it is full.

As the battery charges, its need for charge current diminishes. The control module senses the battery voltage and tapers the charge current. The digital panel meter displays the amperage delivered to the battery. Additionally, there is a CHARGE light and a FULL light that indicate relative charge levels (refer to the Startup Section for details on these lights). The charger will continue to taper the charge current and maintain a trickle charge of 2-5 Amps. The level of trickle charge will change based on the battery's needs and will automatically revert to higher charge levels if the battery's voltage drops.

This 50 Amp variable controlled automatic charging system is overload protected. The circuit breaker box houses two circuit breakers, which independently protect the charger transformer's primary and secondary windings. The DC output is controlled and protected by an internal current limiting system. No switches, timers, or adjustments are required.

The Hotstart Battery Charger measures 37" x 13.5" x 8.5" and weighs 130 lbs.

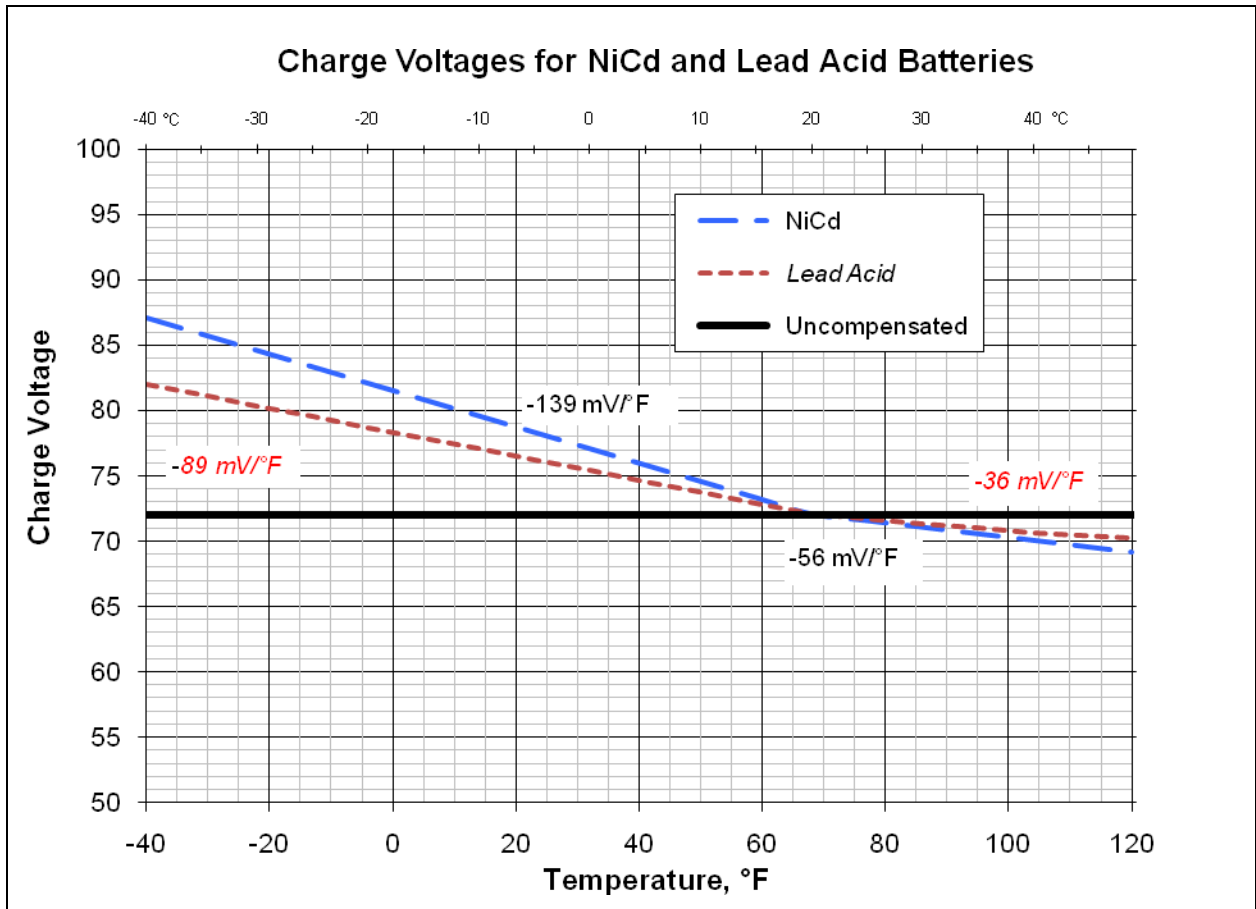


## Battery Temperature Compensation

Battery chargers with a TC in the model number have a feature that will automatically adjust the output voltage as a function of battery temperature with an optional temperature probe cable. The temperature probe is mechanically attached to one of the battery interconnect posts, and the other end of the cable is plugged into the connector located on the front face of the Control Module.

Both NiCd and lead acid chemistries are supported with Voltage/Temperature curves suited for each. The type of the probe determines whether the charger is set up for NiCd or lead acid charging. In either case, at room temperature (70 °F), the voltage is set to 72 Volts. As the temperature of the battery decreases, the voltage increases. As temperatures increase above room temperature, the voltage applied to the battery decreases at a lower rate. If the temperature probe is disconnected from the Control Module, the charger reverts to a constant 72V regardless of the battery temperature.

The part number for the NiCd cable is TPCN-XX and the lead acid is TPCL-XX.



**▲ CAUTION**

The Hotstart battery charger must not be used as a booster during locomotive startup. High levels of current will result in exceeding the design limits of the unit. The circuit breakers will not react quickly enough to prevent damage to the control module.

**NOTICE**

It is not recommended to use the Hotstart battery charger to power accessories. These loads will divert some of the current that is intended for battery charging, and will prevent the battery from reaching a full state of charge. The Hotstart battery charger is designed to provide automatic, unattended maintenance charging of the battery system.

## **Charger Control Module**

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The lowest section of the Battery Charger is the Control Module. It contains the solid state circuitry that automatically adjusts the current delivered to the battery. It is wired to the transformer, the ammeter and the battery leads.

<b>Model</b>	<b>KBC74-X</b>	<b>KBC74TC-X</b>
<b>Replacement Part Number:</b>	<b>PRP224014-001</b>	<b>PRP224014-101</b>

# Installation and System Start-Up

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The Hotstart Charger System comes pre-wired for ease of installation. This section describes proper installation of the basic Hotstart Battery Charger. If you need additional assistance installing or starting your particular system application, please contact:

**Customer Service at (509)536-8660**

## Basic System Installation

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Basic installation requires:

1. Mounting the battery charger
2. Connecting the AC power source to the charger's AC power circuit breaker terminals L1 and L3
3. Connecting the battery leads to the battery charger terminal blocks at +BATT and -BATT
4. Installing the temperature probe cable (optional)
5. Testing the operation of the charger

### CAUTION

**Vibration during shipment of the Hotstart Battery Charger System can cause screws in the control box to loosen. Please check all connections in the control box.**

### Mounting

The Hotstart battery charger should be mounted in an area away from exposure to direct moisture and dust contamination. Such an environment can cause internal corrosion or restricted air flow and shorten the life of the charger. The charger should be mounted in a vertical position with the control module at the bottom and breaker box at the top. This will allow any moisture to run off and not enter the interior of the charger. Also, this positions the air intake/exit openings downward.

### Main Power Supply

Connect the specified single-phase voltage to the breaker located in the main breaker box of the battery charger system. The main power source (240/380/480/575V AC) supplies the charger's power transformer. This transformer drops the primary voltage to a suitable secondary voltage for charging the battery and operating the control circuit of the battery charger. The transformer and control circuits are overload protected. The primary and secondary windings of the transformer are breaker protected. Wiring information is listed on the wiring diagram (in Appendix A).

### Transformer Primary Winding Breaker

This breaker is located inside the breaker box which is above the transformer housing. It protects the power transformer from overloading and short circuits.

<b>Replacement Part Number:</b>	<b>PRP231023-020</b>	<b>(240V)</b>
	<b>PRP231023-015</b>	<b>(380V)</b>
	<b>PRP231023-010</b>	<b>(480V)</b>
	<b>PRP231024-010</b>	<b>(575V)</b>

### Transformer Secondary Winding Breaker

This breaker is inside the breaker box. It protects the power devices in the control circuit. The breaker box lid has a green light that indicates when this breaker is active.

**Replacement Part Number: PRP231022-050**

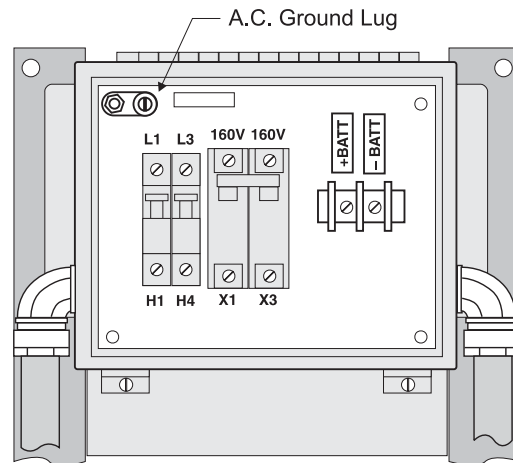
### Connection Breaker Box

#### AC

A breaker box and breaker is supplied for your AC power input at terminals L1, L3 and the ground lug. The breaker supplied is sized for the input voltage.

#### DC

The same breaker box is supplied to connect the B+ (+BATT) and B- (-BATT) battery leads. A terminal strip is marked inside for connecting the appropriate leads.



### Temperature Probe Cable (Optional)

One end of the temperature probe cable is mechanically attached to an interconnect on the battery. The plug end is attached to the connector located on the control module. Since the details of the battery attachment varies for different battery types, refer to the detailed installation instructions that come with each temperature probe cable.

## Charger System Start-Up

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- Step 1** Check and tighten all electrical connections.
- Step 2** Energize the battery charger by turning the breaker switch on.
- Step 3** The green light on the breaker box lid illuminates when the secondary power breaker is on (active).
- Step 4** Observe the three red indicator lights on the charger:
- The ammeter will show the charging amperage.
  - The POWER light illuminates any time power is applied to the charger.
  - The CHARGE light indicates the charger is charging the battery at 5 Amps or more.
  - The FULL light indicates the battery is fully charged. As the battery approaches its full charge, both lights may be on. When the battery is fully charged, the CHARGE light will turn off.

<b><i>NOTICE</i></b>
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**If parasitic loads on the battery (lights, instruments, etc.) exceed a few Amps, the FULL light will not illuminate.**

# System Maintenance & Troubleshooting

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This section describes maintenance and troubleshooting procedures for the Hotstart Battery Charger System.

## System Maintenance

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### **WARNING**

**Disconnect all power prior to performing any system maintenance.**

#### Electrical Connections

Excessive vibration will eventually cause terminals to loosen. Periodically check and tighten all electrical connections.

#### System Mounting

Excessive vibration may cause mounting bolts to loosen. Periodically check and tighten all mounting bolts.

#### Cleaning Cooling Passages

In the event the forced air cooling passages get a dust or lint buildup, wipe the exterior surfaces with a clean dry cloth. The interior cooling passages can be blown clean with dry air. Never attempt to use liquid cleaners inside the unit.

## Troubleshooting

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Symptom	Possible Causes	Solutions
Charger is not charging	Main breaker tripped	Reset or test circuit breaker
	Secondary breaker tripped	Reset or test circuit breaker
	No power	Test the line power source

## Replacement Parts List

<b>BATTERY CHARGER REPLACEMENT PARTS</b>					
	<b>ALL MODELS</b>	<b>240V</b>	<b>380V</b>	<b>480V</b>	<b>575V</b>
TRANSFORMER	-	PRP235037-000	PRP235037-001	PRP235037-000	PRP235043-000
PRIMARY BREAKER	-	PRP231023-020	PRP231023-015	PRP231023-010	PRP231024-010
SECONDARY BREAKER	PRP231022-050	-	-	-	-
CONTROL MODULE WITHOUT TEMPERATURE COMPENSATION	PRP224014-001	-	-	-	-
CONTROL MODULE WITH TEMPERATURE COMPENSATION	PRP224014-101	-	-	-	-
ADAPTER	PRP229060-001	-	-	-	-
PILOT LIGHT	PRP231004-002	-	-	-	-
BREAKER BOX	-	PRP229109-001	PRP229109-003	PRP229109-004	PRP229109-002

## **Appendix A**

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This appendix includes the drawings that pertain to your particular Hotstart Battery Charger system. Replacement part numbers are included on these drawings. These drawings are located in the back of this manual:

- Complete assembly drawings
- Control box assembly drawings
- Control box wiring diagram