

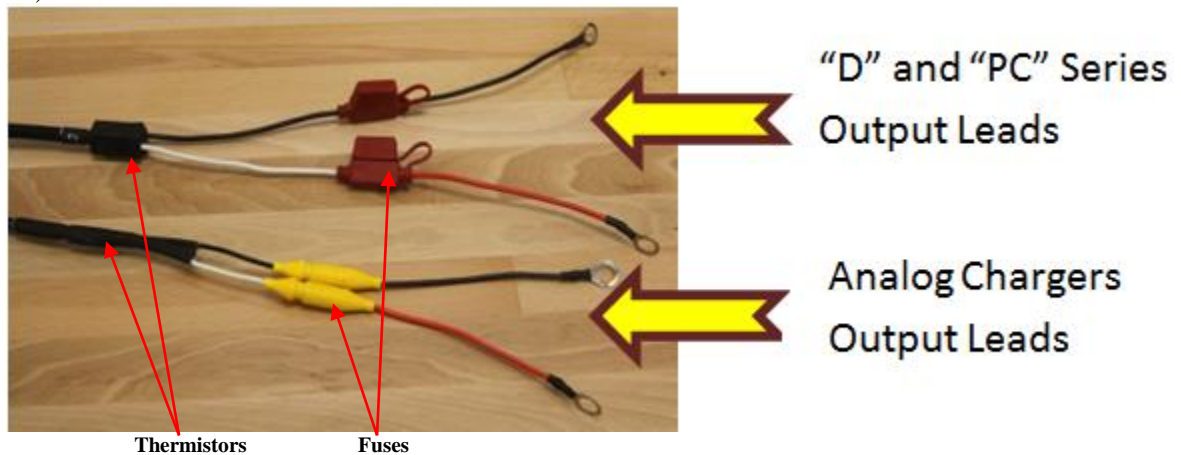
# Battery Chargers

Minn Kota battery chargers are not serviceable in the field. However; by following these steps, repair centers can determine if a charger is operating properly. For safety purposes, battery chargers require voltage to be present for charging to commence (8 volts for older analog/pre-2009 chargers, 4 volts for digital chargers, and .5 volts on most current PC chargers).

## Testing Charger for Proper Output

**Step 1.** Verify the charger battery leads are properly connected to the battery. (Red to positive, black to negative.)

**Step 2.** Verify the in-line 30 amp fuses are not blown and that the fuse holder is not melted. Verify that neither the AC power cord nor the DC battery output leads have been extended incorrectly (splicing the battery output leads between the charger and the thermistor voids the warranty). If the DC battery leads are not long enough, they should be brought to a terminal block and extended from the terminal block with 12 AWG (minimum) wire. The maximum extension is 15 feet. (Minn Kota offers an accessory kit for the purpose of extending the output leads.)



**Step 3.** Using a VOM (multi-meter), measure the voltage of the battery prior to plugging in charger. Note this measurement for future reference. *(For safety purposes, chargers must sense voltage before they start the charging sequence. Older chargers must read over 8 volts for charger to operate, but this changed to 4 volts mid-year during 2009. The most recent PC chargers only require a .5 volt reading.)*

**Step 4.** Plug in charger to 110-volt AC power (220-volt for some of the international models only). Using a VOM, again measure the voltage at the battery. The voltage should be slowly increasing as you watch the VOM. The battery voltage should continue to rise until the battery reaches the full float voltage of 13.2. (This may take several hours depending on the battery state of discharge and the specific model on-board charger being used.)

**Step 5.** If the battery voltage does not gradually increase when the charger is plugged in, the charger is not functioning properly OR the battery is defective.

# PRECISION CHARGERS (PC)

**MK106PC, MK110PC, MK212PC, MK220PC, MK230PC, MK318PC, MK330PC, MK345PC, MK440PC, MK460PC**

## SELECTING BATTERY TYPE:

The charger can be manually switched between 4 different modes: Gel Cell, Flooded Lead-Acid, AGM/High performance AGM, and Equalize.

In order to optimize the performance of your batteries or to prevent damage, you will need to properly set each charger bank for the correct battery type (each bank can be independently set). The factory default setting is Flooded Lead-Acid.

### To set the battery type:

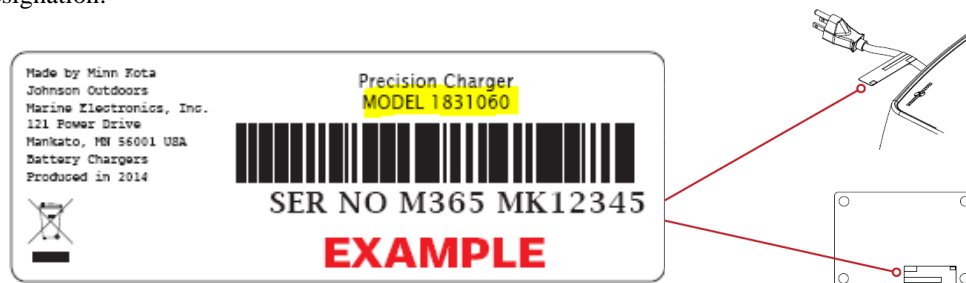
- 1) Plug the charger AC cord into an AC outlet.
- 2) During power up all LEDs will turn on, then the GREEN power LED and 1 YELLOW LED will temporarily remain on. This YELLOW LED will indicate the current battery type.
- 3) To change battery type press and hold the Battery Selection button until the YELLOW LED indicates the desired battery type, then release the button. The battery type will be saved even if the AC cord or DC output cords are disconnected.

Only Flooded Lead-Acid batteries should be equalized. The charger will only allow selection of the Equalize Mode if the previous selection was Flooded Lead-Acid. To set Equalize Mode, press and hold the Battery Selection button until all 3 YELLOW LEDs are lit, then release the button. Once in Equalize Mode, the equalize process will only be performed one time. Once this cycle is completed or if the cycle is interrupted (by unplugging the AC or a DC cord) the charger will revert back to the Flooded Lead-Acid battery type.

**⚠️ WARNING** – Battery type is factory preset for Flooded Lead-Acid. If you are using alternate type batteries, select Gel or AGM/High Performance AGM. Failure to do so could result in damage to your battery and/or cause acid leaks.

## ERROR CONDITIONS:

Please note that the indicator lights and error conditions are different for the newer PC models than earlier PC models (*current models start with 183xxxx versus the older models that start with 182xxxx*). The serial number decal should have the model designation:



### **Newer/current PC models (model designation 183xxxx):**

**Ⓜ️ RED solid LED is lit.** Check battery connection:

- Check polarity of leads to battery.
- Check connections to battery and fuses in output cord.
- Check voltage at battery. The bank will not charge a battery below .5 volts or above 16 volts. The bank will not charge a battery in this condition.

**Ⓜ️ RED LED is flashing with solid 25% YELLOW LED.** Low-voltage time expired.

- Check to make sure there are no power loads on the battery.
- Check the fluid in the battery and add fluid per battery manufacturer's specifications.
- If the voltage of the battery does not increase above 10.5 volts, then the bank will shut down and will not charge. The battery should be tested.

**Ⓜ RED LED and 25% YELLOW LEDs are alternately flashing.** Charger error.

- The charger is falsely sensing that the battery has been disconnected. Then it reconnects and repeats the process. This is usually due to attempting to charge a fully charged battery or during charger startup at cold temperatures. Allow the battery to slightly discharge and the ambient temperature to warm over 40 degrees Fahrenheit for proper charging sequences. Current software has addressed this error code.

**Ⓜ RED LED is flashing with solid 50% YELLOW LED.** Bulk time expired.

- Check to make sure there are no heavy or large loads on the battery.
- Check the fluid in the battery and add fluid per battery manufacturer's specifications.
- If the voltage of the battery does not increase to the absorption voltage in 30 hours, then the bank will shut down and will not charge. The battery should be tested.

**Ⓜ RED LED is flashing with solid 75% YELLOW LED.** Temperature sensor error.

- Reset the charger by unplugging the AC cord. Wait for all LEDs to turn off, then plug in the AC cord and try again.
- Check to make for damaged temperature sensor/thermistor on the output cord. (Later models do not have an external temperature sensor/thermistor on the output cord like is shown in the picture on **Page 1.**)

**Ⓜ RED LED is flashing with solid 25% and 75% YELLOW LEDs.** Charger is overheated.

- Reset the charger by unplugging the AC cord. Wait for all LEDs to turn off and allow to cool.

**Flashing GREEN LED and flashing 25% YELLOW LED** indicates the battery is less than 10.5 volts and the charger is in low power safety mode. Full charging will begin once the battery reaches 10.5 volts. If the battery does not rise above 10.5 volts, then make sure all loads are disconnected from the battery and try again.

**Indicator lights will not illumine.**

- Check the AC power at the outlet.
- Make sure the GFCI for the outlet has not tripped.
- If an extension cord is being used, check the AC power at the end of the extension cord.

**Charger powers up and then turns off.**

- If an extension cord is being used, check the AC power at the end of the extension cord.
- Extension cord AWG is too small. See table below:

	25' AC Ext. Cord	50' AC Ext. Cord	100' AC Ext. Cord
<b>MK106PC/MK110PC/MK212PC/MK106D/MK210D</b>			
AWG Size	18	18	16
<b>MK440PC/MK345PC/MK440D</b>			
AWG Size	16	12	10
<b>MK220PC/MK230PC/MK318PC/MK330PC/MK220D/MK315D/MK330D</b>			
AWG Size	16	16	12
<b>MK460PC</b>			
AWG Size	14	12	10

**Older PC models (model designation 182xxxx):**

A solid **Ⓜ RED LED** for each bank is lit if any of the following apply:

- No battery is connected to an output cord. This may also indicate a blown fuse in the fuse holder.
- The battery is connected reverse polarity.
- A short circuit.
- The battery voltage is below 4 volts. The bank will not charge a battery in this condition.
- The battery voltage is above 16 volts. The bank will not charge a battery in this condition.

A **flashing Ⓜ RED LED with solid 25% YELLOW LED** indicates the battery voltage did not rise above 10.5V after 3 hours. The battery may be damaged and will not continue to be charged.

A **flashing Ⓜ RED LED with solid 50% YELLOW LED** indicates the charging in Bulk Mode exceeded 20 hours. The battery may be damaged and will not continue to be charged.

A **flashing Ⓜ RED LED with solid 75% YELLOW LED** indicates there is a damaged temperature sensor on the output cord. The bank will not operate if this occurs.

A **flashing Ⓜ RED LED with solid 25% and 50% YELLOW LEDs** indicates a fault within the charger. The bank will not operate if this occurs.

## DIGITAL ONBOARD CHARGERS

MK106D, MK110D, MK210D, MK220D, MK230D, MK315D, MK330D, MK345D,  
MK440D, MK460D

### ERROR CONDITIONS:

A **solid RED light** for each bank is lit if any of the following apply:

- No battery is connected to an output cord. This may also indicate a blown fuse in the fuse holder.
- The battery is connected reverse polarity.
- A short circuit.
- The battery voltage is below 4 volts. The bank will not charge a battery in this condition.
- The battery voltage is above 18 volts. The bank will not charge a battery in this condition.

A **flashing RED light** is lit for each bank if there is a damaged temperature sensor on the output cord. The bank will not operate if this occurs.

**Flashing RED and GREEN lights** are lit for each bank if any of the following apply:

- The battery voltage does not rise above 10.5V after 3 hours. The battery may be damaged and will not be charged.
- Charging in Bulk Mode exceeds 20 hours. The battery may be damaged and will not be charged.

## ON-BOARD ALTERNATOR BATTERY CHARGERS

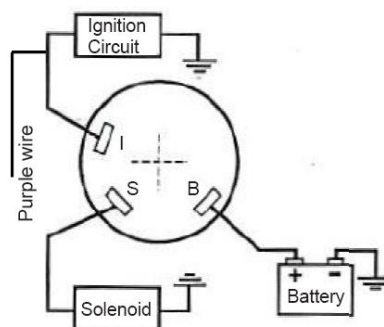
MK 1DC, MK 2DC, MK 3DC

### CHARGING REQUIREMENTS:

In order to achieve full output from the DC Alternator Charger, the minimum input from the engine alternator must be as follows:

- MK 1DC: 12 amp minimum
- MK 2DC: 25 amp minimum
- MK 3DC: 35 amp minimum

**NOTE:** For this DC Alternator Charger to function, the purple ignition wire must be connected to the Ignition Circuit. This can be any +12v source that is only energized when the ignition key is turned on. Use the quick connect terminal provided.



# PORTABLE DIGITAL (PD) BATTERY CHARGERS

## MK 105PD, MK 110PD

A **YELLOW LED** indicates the progress of charging.

A **flashing GREEN LED** indicates battery is fully charged, in Maintenance Mode and ready to use.

A **solid GREEN LED** indicates battery is fully charged, in long term Maintenance Mode and ready to use.

A **solid RED LED** indicates there is an issue with the battery connection.

- Check polarity of leads to battery.
- Check connections to battery and fuses in output cord.
- Check voltage at battery. The bank will not charge a battery below 4 volts or above 18 volts.

A **flashing RED LED** indicates a temperature sensor error.

- Reset the charger by unplugging the AC cord. Wait for all LEDs to turn off. Plug in the AC cord.
- If still not working, call the Minn Kota Service Department at 1-800-227-6433.

**Flashing RED and GREEN** lights indicate that the battery may be damaged.

- Check to make sure there are not any loads on the battery.
- Check the fluid in the battery and add fluid if necessary.
- If the battery voltage does not rise above 10.5 volts in 3 hours, or if the absorption voltage does not increase to 14.4 volts (at 77° F), the charger bank will shut down and will not charge. The battery should be tested.
- If still not working, call the Minn Kota Service Department at 1-800-227-6433.

**Indicator lights will not illuminate.**

- Check the AC power at the outlet.
- Make sure the GFCI for the outlet has not tripped.
- If an extension cord is being used, check the AC power at the end of the extension cord.

**Charger powers up and then turns off.**

- If an extension cord is being used, check the AC power at the end of the extension cord.
- Very low AC voltage is supplied to the charger.
- Extension cord AWG is too small. See table below:

	25' AC Ext. Cord	50' AC Ext. Cord	100' AC Ext. Cord
<b>MK106PC/MK130PC/MK212PC/MK106D/MK210D</b>			
AWG Size	18	18	16
<b>MK440PC/MK345PC/MK440D</b>			
AWG Size	16	12	10
<b>MK220PC/MK230PC/MK318PC/MK330PC/MK220D/MK315D/MK330D</b>			
AWG Size	16	16	12
<b>MK460PC</b>			
AWG Size	14	12	10

## ANALOG CHARGERS (Last made in 2010)

### MK105P

A YELLOW light is lit to indicate the battery is charging.

A GREEN light is lit for each bank to indicate any of the following:

- The battery is fully charged and in maintenance mode.
- There may be a blown fuse in the fuse holder.
- No battery is connected to an output lead.

A RED light is lit if any of the following apply:

- A short circuit.
- The battery is connected reverse polarity.

### MK110P and MK210P

A GREEN power light is lit to indicate AC power is applied.

A YELLOW light is lit to for each bank to indicate the battery is charging.

A GREEN light is lit for each bank to indicate the battery is fully charged and in maintenance mode.

A RED light for each bank is lit if any of the following apply:

- No battery is connected to an output lead. This may also indicate a blown fuse in the fuse holder.
- The battery voltage is below 4.0 volts (mid-year 2009 this voltage changed from 8v down to 4v).
- The battery is connected reverse polarity.

### MK106

A GREEN power light is lit to indicate AC power is applied.

A YELLOW light is lit to indicate the battery is charging.

A GREEN light is lit to indicate the battery is fully charged and in maintenance mode.

A RED light for each bank is lit if any of the following apply:

- No battery is connected to an output cord. This may also indicate a blown fuse in the fuse holder.
- The battery is connected reverse polarity.
- A short circuit.

RED and GREEN lights are lit simultaneously for each bank if any of the following apply:

- The battery voltage is below 4 volts. The bank will not charge a battery in this condition.
- A damaged temperature sensor on the output cord. The bank will not operate if this occurs.

### MK110, MK210, MK315, MK220, and MK330

A GREEN power light is lit to indicate AC power is applied.

A YELLOW light is lit for each bank to indicate the battery is charging.

A GREEN light is lit for each bank to indicate the battery is fully charged and in maintenance mode.

A RED light for each bank is lit if any of the following apply:

- No battery is connected to an output lead. This may also indicate a blown fuse in the fuse holder.
- The battery voltage is below 4.0 volts (mid-year 2009 this voltage changed from 8v down to 4v).
- The battery is connected reverse polarity.

RED and GREEN lights are lit simultaneously for each bank if any of the following apply:

- The battery voltage is below 4.0 volts (mid-year 2009 this voltage changed from 8v down to 4v).
- A damaged temperature sensor on the output lead. The bank will not operate if this occurs.

### MK230, MK345, MK460, MK440

A GREEN power light is lit to indicate AC power is applied.

A YELLOW light is lit for each bank to indicate the battery is charging.

A GREEN light is lit for each bank to indicate the battery is fully charged and in maintenance mode.

A RED light for each bank is lit if any of the following apply:

- No battery is connected to an output lead. This may also indicate a blown fuse in the fuse holder.
- The battery is connected reverse polarity.

RED and GREEN lights are lit simultaneously for each bank if any of the following apply:

- A short circuit.
- The battery voltage is below 4.0 volts (mid-year 2009 this voltage changed from 8v down to 4v).
- A damaged temperature sensor on the output lead. The bank will stay in maintenance mode if this occurs.