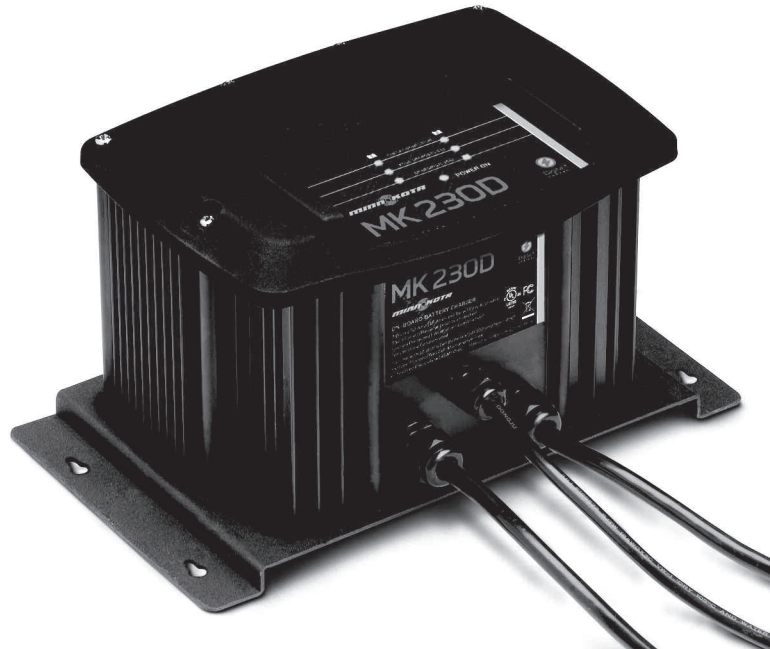




Anywhere. Anytime.



**OWNER'S MANUAL FOR
MINN KOTA ONBOARD
BATTERY CHARGERS
Models: MK230D, MK345D,
MK440D, MK460D**

Service Information:

Please call our service department at 1.800.227.6433 if you have any problems with your battery charger. A technical support representative will be happy to assist you.



Compliant with FCC
PART 15, Class B

1. SAFETY INFORMATION

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS!

This manual contains important safety and operating instructions applicable to the safe and efficient use of your Minn Kota battery charger.

The Minn Kota battery charger is a powerful electrical device. If incorrectly installed, configured or operated, the battery charger can damage batteries and / or electrical equipment. Please read thoroughly the instructions and safety information contained in this manual before operating the battery charger.

WARNING: RISK OF EXPLOSIVE GASES

WORKING IN THE VICINITY OF A LEAD ACID BATTERY IS DANGEROUS. BATTERIES CONTAIN SULFURIC ACID AND PRODUCE EXPLOSIVE GASES. A BATTERY EXPLOSION COULD RESULT IN LOSS OF EYESIGHT OR SERIOUS BURNS. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.

TO REDUCE THE RISK OF BATTERY EXPLOSION, FOLLOW THESE INSTRUCTIONS AND THOSE PUBLISHED BY THE BATTERY MANUFACTURER FOR ANY EQUIPMENT YOU INTEND TO USE IN THE VICINITY OF THE BATTERY. REVIEW CAUTIONARY MARKINGS ON THESE PRODUCTS AND ON ENGINE, MOTOR OR OTHER EQUIPMENT REQUIRING BATTERY USAGE.

Use of an attachment not recommended or sold by Johnson Outdoors Inc. may result in risk of fire, electric shock, or injury to persons or property.

The charger is not intended for use by young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the charger.

To reduce risk of damage to electric plug or cord, pull by the plug rather than the cord when disconnecting the battery charger.

An extension cord should not be used unless absolutely necessary. Use of the improper extension cord could result in a risk of fire or electric shock. If extension cord must be used, make sure:

- a) That pins of plug of the extension cord are the same number, size and shape of those of the plug on the battery charger;
- b) That extension cord is properly wired and in good electrical condition;
- c) That wire in extension cord is proper size as follows:

Minimum recommended AWG wire size for various length extension cords used with the Minn Kota battery charger:

Length of Cord in feet	25	50	100
AWG Size	16	14	12

Do not operate the battery charger with a damaged cord or plug.

Do not operate the battery charger if it has received a sharp blow, been dropped or otherwise damaged in any way.

Do not disassemble the charger. Incorrect reassembly may result in a risk of electric shock or fire.

To reduce risk of electric shock, unplug the charger from outlet before attempting any maintenance or cleaning. Disconnecting the leads will not reduce this risk.

To reduce risk of shock or spark, never touch the ring terminals together while the charger is plugged into an outlet or extension cord.

External connections to the battery charger shall comply with the United States Coast Guard electrical regulations (33CFR183, Sub Part 1).

2. PERSONAL PRECAUTIONS

Consider having someone close enough nearby to come to your aid when you work near a lead acid battery.

Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.

Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.

If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water

for at least 10 minutes and get medical attention immediately.

Never smoke or allow a spark or flame in vicinity of battery, engine, motor or other flammable or explosive equipment.

Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short circuit battery or other electrical part that may cause explosion.

Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead acid battery. A lead acid battery can produce a short circuit current high enough to weld such items, causing severe burn.

Use the Minn Kota battery charger for charging and maintaining FLOODED / WET CELL, MAINTENANCE FREE, AND AGM / STARVED ELECTROLYTE batteries only. It is not intended to supply power to low voltage electrical systems other than for charging and maintaining batteries. Do not use the charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.

NEVER charge a frozen battery.

3. PREPARING TO CHARGE

1) If necessary to remove battery from boat or vehicle to charge or maintain, always remove grounded terminal from battery first (if applicable). Make sure all accessories in the boat or vehicle are off, so as not to cause an arc.

2) Be sure area around battery is well ventilated while battery is being charged or maintained.

3) Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

4) Add distilled water in each cell until battery acid reaches level specified by battery manufacturer ONLY AFTER the battery has been charged. Adding water to a discharged battery may result in acid leaking out of the battery and causing injury to persons and damage to property. Do not overfill. Study all battery manufacturers' specific precautions; however, make sure to REPLACE ALL CELL CAPS after refilling so that water evaporation is avoided. Water will evaporate over time if cell caps are not replaced after refilling. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instructions.

NOTE: The battery fluid level should be checked every 30 days

5) Study all battery manufacturers' specific precautions while charging and recommended rates of charge.

4. DC CONNECTION PRECAUTIONS

1) The Minn Kota charger will only charge 12 volt 6 cell lead acid batteries. Do not connect the output of the charger to any other voltage or type of battery.

2) The charger's DC output terminals are designed to be permanently mounted and connected to batteries.

3) Connect and disconnect DC output terminals only after removing the AC plug from the electric outlet.

4) The charger output leads must be connected with the correct polarity for the charger to function. The RED lead must be connected to the POSITIVE terminal of the battery and the BLACK lead must be connected to the NEGATIVE terminal of the battery. **See section 6 under "CONNECTING THE BATTERIES TO THE CHARGER" for proper connection procedure.**

5. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

The Minn Kota battery charger should be grounded to reduce risk of electric shock. The charger is equipped with an electric AC power cord with a grounded plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER – Never alter AC cord or plug provided – if it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

CAUTION – To reduce risk of fire or electric shock, connect battery charger directly to grounding receptacle (three-prong). An adapter should not be used with battery charger.

6. INSTALLING THE BATTERY CHARGER

CHOOSING THE MOUNTING LOCATION:

For optimum performance, the charger should be mounted flush on a bulkhead in a protected area away from rain or spray. Do not mount the charger above batteries as lead-acid batteries give off corrosive gasses which will damage the charger over time. Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery. Also, as with most electrical devices, do not mount the charger below the waterline of the boat or directly adjacent to fuel tanks.

Each DC output cord is six feet long. Make sure that all DC output cords can reach the batteries and that the AC power cord can reach a power source. When using an extension cord, make the AC connection to the charger outside of the battery compartment as far away as practical to reduce the risk of a spark igniting gasses in the compartment.

Each output cord is equipped with a temperature sensor. By monitoring external temperature, the battery charger adjusts the charging profile of the battery to assure full charge without overcharging or undercharging the battery. Attempting to lengthen or shorten the output wires could damage the temperature sensor and affect the charger output.

If the DC battery leads are not long enough, they may be lengthened by splicing and soldering 12 AWG (minimum) wire. Each splice should be covered with dual wall adhesive lined heat shrink tubing to protect the joint from corroding. The splice should be made between the fork in the output cable and the fuse holder. The fuse holder should always remain within 7" of the battery terminals. The maximum extension length is 15 feet. You may contact the Minn Kota Service Department with any questions. Do not splice the AC power cord, as this voids the three year Limited Warranty.

Even though the Minn Kota charger is capable of operating in a high ambient temperature environment, a minimum of six inches of unobstructed area should be allowed on all sides of the unit for proper air circulation and cooling. Proper cooling and circulation will allow the charger to operate at peak efficiency.

MOUNTING THE CHARGER:

Due to the weight of the charger and the pounding that boats routinely endure, take the time to securely mount the charger to prevent damage. Mounting with nuts, bolts and washers is preferable to mounting with screws. Use the largest diameter bolts possible

CAUTION – Because the body of the battery charger is metallic, do not directly mount the charger to the hull of an aluminum boat. Use a means of isolation (such as wood or plastic) to prevent the charger body as well as mounting fasteners from coming in contact with the aluminum boat structure or hull. Doing so will eliminate any risk of electrolysis that may occur when AC power is connected to the charger.

The Minn Kota charger is provided with 4 keyhole slots and 4 permanent mounting holes. The keyhole slots may be used as a temporary means of holding the charger to mark the locations of the permanent mounting holes. After marking the locations, set the charger aside and drill the holes. Apply a marine grade silicone sealant in each of the drilled holes to create a waterproof seal. Then secure the charger in place using the mounting hardware.

Your battery charger is supplied with an AC plug holder designed to hold the power cord plug when not in use. Mount the AC plug holder with four screws in a convenient dry site to prevent corrosion to the AC plug and to prevent the AC plug from making contact with the battery posts.

CONNECTING THE BATTERIES TO THE CHARGER:

WARNING – MAKE SURE THE CHARGER IS DISCONNECTED FROM AC POWER BEFORE CONNECTING THE BATTERIES TO THE OUTPUT CORDS.

CAUTION - Before making any connections to batteries in a confined space (such as a battery compartment of a boat), open the door or hatch of the compartment and allow it to air out for 15 minutes. This allows any gasses that have accumulated in the compartment to escape.

FOLLOW THESE STEPS WHEN THE BATTERY CHARGER IS *INSTALLED IN A BOAT OR VEHICLE*. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

1. Position AC and DC cords to reduce risk of damage by hood, door, or moving engine parts.
2. Stay clear of fan blades, belts, pulleys and other parts that can cause injury to persons.
3. Check polarity of battery posts. POSITIVE (POS, P, +) battery post is usually larger in diameter than NEGATIVE (NEG, N, -) post.
4. Determine which post of the battery is grounded (connected) to the chassis (if any). If negative post is grounded to the boat hull or chassis (as in most vehicles), see (5) below. If positive post is grounded to the boat hull or chassis, see (6) below. If neither is grounded, the order in which the output leads are connected does not matter.
5. For negative-grounded boat or vehicle, connect POSITIVE (RED) output terminal to POSITIVE (POS, P, +) ungrounded post of battery first. Then connect NEGATIVE (BLACK) output to NEGATIVE (NEG, N, -) grounded post of battery.
6. For positive-grounded boat or vehicle, connect NEGATIVE (BLACK) output to NEGATIVE (NEG, N, -) ungrounded post of battery first. Then, connect POSITIVE (RED) output terminal to POSITIVE (POS, P, +) grounded post of battery.
7. When disconnecting charger, disconnect AC power cord from electric outlet first.
8. When disconnecting output terminals from battery posts, always do so in reverse sequence of the connecting procedure while as far away from battery as practical.

FOLLOW THESE STEPS WHEN BATTERY IS *OUTSIDE BOAT OR VEHICLE*. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR BATTERY:

1. Check polarity of battery posts. POSITIVE (POS, P, +) battery post is usually larger in diameter than NEGATIVE (NEG, N, -) post.
2. Connect POSITIVE (RED) output terminal to POSITIVE (POS, P, +) post of battery.
3. Connect NEGATIVE (BLACK) output terminal to NEGATIVE (NEG, N, -) post of battery.
4. Do not face battery when making final connection.
5. When disconnecting charger, disconnect AC power cord from electric outlet first.
6. When disconnecting output terminals from battery posts, always do so in reverse sequence of the connecting procedure while as far away from battery as practical.
7. A marine (boat) battery does not need to be removed and charged on shore. However, instructions must be followed for location of charger when permanently mounted or used on board.

Each output bank is independent and isolated from one another and the AC input. The Minn Kota charger can charge independent batteries or combinations of batteries hooked in series or parallel without disconnecting the batteries from any switches or wires / straps joining the batteries. See diagram on page 8.

CAUTION - Due to the high charging current of the Minn Kota charger, it is recommended that each output be connected to only one battery. Connecting 2 banks to one battery may cause excessive heating in the battery and could cause acid leakage or battery explosion.

7. OPERATING INSTRUCTIONS

Make sure the charger is properly mounted and the DC output cords are connected properly to the batteries. Double check the polarities of the output cords and make sure the correct bank of the charger is connected to the correct battery.

INDICATOR LIGHTS:

To begin charging, connect the charger to AC power. All lights will turn on momentarily. The following will be displayed on the charger:

A GREEN power light is lit to indicate AC power is applied. Each bank has YELLOW, GREEN, and RED lights to indicate charging status and error conditions.

Minn Kota's Multi-Stage Charging has three modes of operation that deliver a fast, precise charge profile by automatically controlling current and voltage without overcharging your batteries.

Stage 1: Bulk Mode

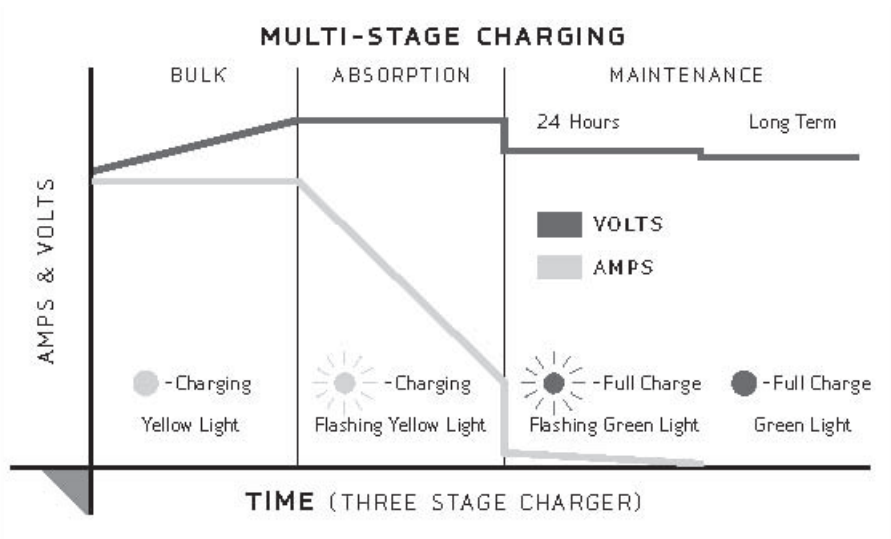
During this stage, the charger delivers full current until the battery reaches ~75% charge. A YELLOW light is lit for each bank to indicate the battery is charging in the Bulk Mode.

Stage 2: Absorption Mode

The charging current tapers down while the battery voltage is held at 14.4V at 77°F. A flashing YELLOW light is lit for each bank to indicate the battery is charging in the Absorption Mode.

Stage 3: Maintenance Mode

When the battery reaches full charge, the charger voltage is dropped to 13.4V at 77°F. A flashing GREEN light is lit for each bank to indicate the battery is in Maintenance Mode and ready to use. After 24 hours, the charger automatically turns off and a GREEN light is lit for each bank to indicate the battery is in long term Maintenance Mode and ready to use. The charger will automatically turn on when the battery voltage drops below 12.6V.



Error Conditions:

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

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

2) 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.

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

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

NOTE – A 12 volt battery with an open-circuit voltage below 4 volts has either been discharged to the point of internal damage, may be heavily sulfated, or may have internal shorted cells. Attempting to charge a battery in this state is dangerous. The battery should be replaced.

CAUTION – If a RED light is lit, disconnect the AC power from the charger immediately. Determine the reason based on the above information and take the necessary corrective action to remedy the situation. If you are unable to remedy the situation and need help, call the Minn Kota Service Department at 1.800.227.6433 and a technical support representative will be happy to assist you.

CAUTION – We recommend that you not recharge your battery, (or batteries), with the watercraft or motor lower unit in the water during electrical storms. Severe damage to the motor or charging system may occur if lightning strikes nearby or if storm related high voltage conditions exist.

CAUTION – Generators with a modified square wave output can damage this MINN KOTA charger. Generators with a sine wave output can be used to power this charger.

WARNING – TO REDUCE RISK OF ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THOSE CONTAINED IN THE OPERATING INSTRUCTIONS.

INLINE FUSE:

Each output cord has inline fuses on the RED and BLACK leads located near the ring terminals. These fuses serve as protection from surges and short circuits caused by a damaged charger output cable. If a fuse blows, replace it with the exact type and rating of the original fuse. Improper battery connections will normally not cause a fuse to blow since this is handled by the chargers internal circuitry.

8. MAINTENANCE / CLEANING / STORAGE INSTRUCTIONS

Check battery charger for dirt, oil, battery corrosion, etc. Use a water and baking soda solution for cleaning corrosion. Wipe clean using a dry cloth.

Check ring terminals for dirt, oil, and battery corrosion; then disconnect from battery posts and clean as necessary with water and baking soda solution and dry with a clean cloth.

When the charger is not in use, coil the power cord to prevent damage.

If power cord or plug becomes damaged, you may contact the Minn Kota Service Repair Department for service repair information. Otherwise, dispose of the battery charger in compliance with local law. Damaged cords and plugs can cause electric shock or electrocution.

When storing the battery charger, store in a clean dry area.

NOTE – This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

CAUTION – Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

9. TROUBLESHOOTING

PROBLEM:

Check Connection (Red) light comes on.

SOLUTION:

- 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.
- If still not working, call the Minn Kota Service Department at 1-800-227-6433.

PROBLEM:

Check Connection (Red) light is flashing.

SOLUTION:

- The temperature sensor in the output cord is damaged. Check to make sure the output cord is not damaged. If the output cord was extended, check to make sure the procedure in Section 6 was followed.
- If still not working, call the Minn Kota Service Department at 1-800-227-6433.

PROBLEM:

Indicator lights will not illuminate.

SOLUTION:

- Check the AC power at the outlet.
- Make sure the GFCI(Ground Fault Circuit Interrupter) o the outlet has not tripped.
- Check the AC power at the end of the extension cord.
- If still not working, call the Minn Kota Service Department at 1-800-227-6433.

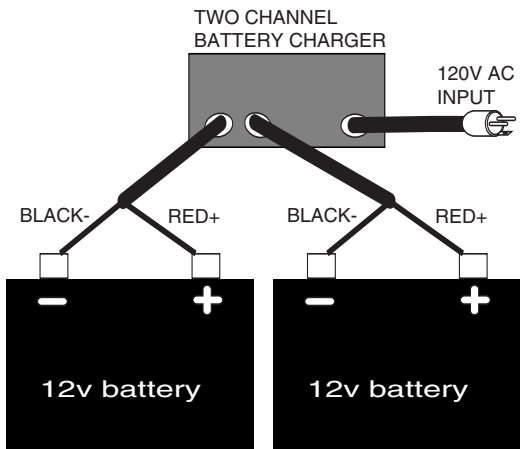
PROBLEM:

The red and green lights are flashing.

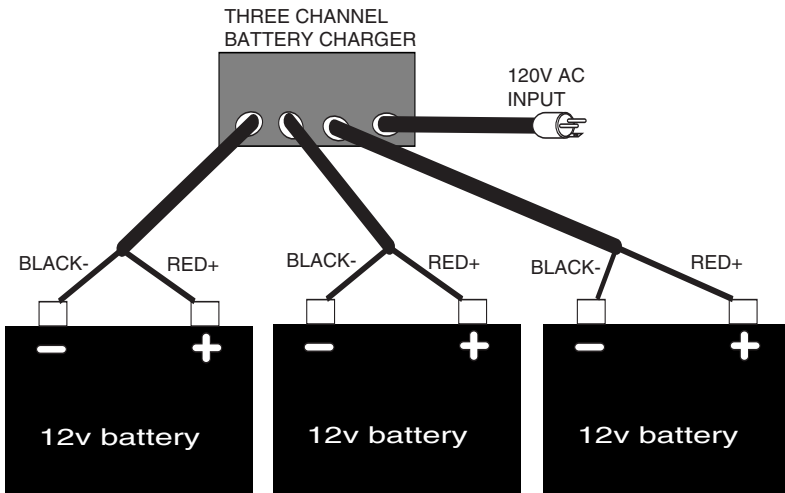
SOLUTION:

- 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 voltage of the battery does not increase above 10.5 volts after 3 hours or does not increase to the absorption voltage of 14.4 volts in 20 hours, then the 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.

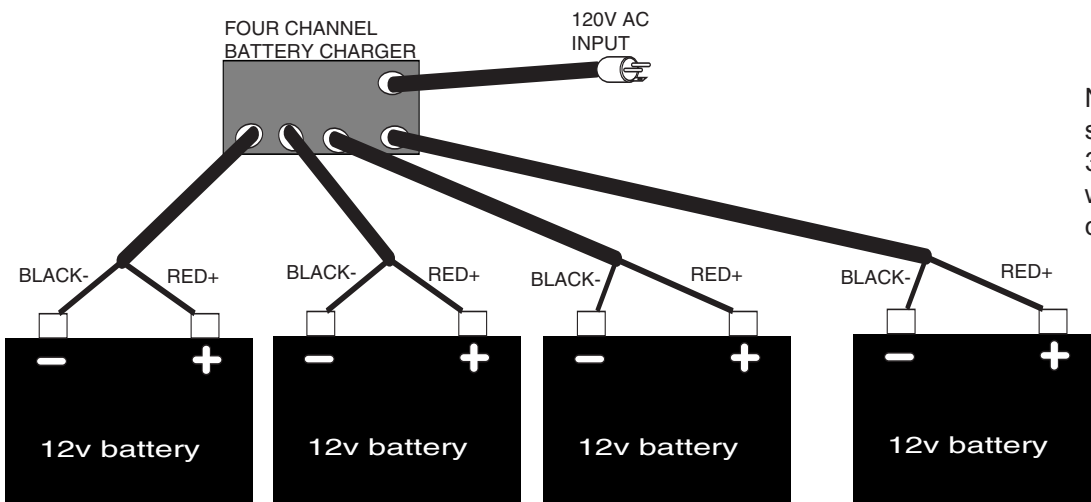
Specifications:										
Model	Part No.	System Volts	Banks	Output per Bank (amps)	Total Output (amps)	Input Cable	Output Cable	Size L x W x H	Weight (lbs)	Input Current (120VAC, 60Hz)
MK230D	1822305	12 / 24	2	15	30	18AWG - 6'	14AWG - 6'	11-3/4" x 6-3/4" x 7"	17	5A
MK230DS	1822304	12 / 24	2	15	30	18AWG - 8.5'	14AWG - 6'	11-3/4" x 6-3/4" x 7"	17	5A
MK345D	1823455	12 / 24 / 36	3	15	45	18AWG - 6'	14AWG - 6'	11-3/4" x 6-3/4" x 8"	22	7A
MK345DS	1823454	12 / 24 / 36	3	15	45	18AWG - 8.5'	14AWG - 6'	11-3/4" x 6-3/4" x 8"	22	7A
MK460D	1824605	12 / 24 / 36 / 48	4	15	60	16AWG - 6'	14AWG - 6'	14-1/2" x 6-3/4" x 8"	31	10A
MK460DS	1824604	12 / 24 / 36 / 48	4	15	60	16AWG - 8.5'	14AWG - 6'	14-1/2" x 6-3/4" x 8"	31	10A
MK440D	1824405	12 / 24 / 36 / 48	4	10	40	18AWG - 6'	16AWG - 6'	11-3/4" x 6-3/4" x 8"	22.5	7A



NOTE: If batteries are connected in series for 12/24 - 24V, the series connection wire should be left in place during charging.



NOTE: If batteries are connected in series for 12/24 - 24 - 24/36 - 36V, the series connection wire should be left in place during charging.



NOTE: If batteries are connected in series for 12/24 - 24 - 24/36 - 36V - 36/48 - 48v, the series connection wire should be left in place during charging.

LIMITED THREE YEAR WARRANTY:

Johnson Outdoors Marine Electronics, Inc. warrants to the original purchaser that the purchaser's entire Minn Kota® battery charger is free from defects in materials and workmanship appearing within three (3) years after the date of purchase. Johnson Outdoors Marine Electronics, Inc. will, at its option, either repair or replace, free of charge, any parts found to be defective during the term of this warranty. Such repair or replacement shall be the sole liability of Johnson Outdoors Marine Electronics, Inc. and the sole remedy of the purchaser for breach of this warranty.

This limited warranty does not apply to chargers used commercially, nor does it cover normal wear and tear, blemishes that do not affect the operation of the charger, or damage caused by accidents, abuse, alteration, modification, misuse or improper care or maintenance. The cost of normal maintenance or replacement of parts which are not defective are the responsibility of the purchaser.

To obtain warranty service in the U.S., the charger and proof of original purchase (including the date of purchase), must be sent to Minn Kota®'s factory service center at 121 Power Drive, Mankato, MN 56001. Any charges incurred for service calls, transportation or shipping/freight to/from the Minn Kota® Factory Service Center, labor to haul out, remove, re-install or re-rig products removed for warranty service, or any other similar items are the sole and exclusive responsibility of the purchaser. Warranty service can be arranged by contacting the factory at: 1.800.227.6433, 1.507.345.4623 or fax 1.800.527.4464.

Chargers purchased outside of the U.S. must be returned prepaid with proof of purchase to Johnson Outdoors Canada, 4180 Harvester Road, Burlington, Ontario Canada L7L 6B6, Phone 1.905.634.0023.

Note: Do not return your Minn Kota® charger or parts to your retailer. Your retailer is not authorized to repair or replace them.

THERE ARE NO EXPRESS WARRANTIES OTHER THAN THESE LIMITED WARRANTIES. IN NO EVENT SHALL ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, EXTEND BEYOND ONE YEAR FROM THE DATE OF PURCHASE. IN NO EVENT SHALL JOHNSON OUTDOORS MARINE ELECTRONICS, INC. BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations and/or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other legal rights which vary from state to state.

"WARNING: This product contains chemical(s) known to the state of California to cause cancer and/or reproductive toxicity."



Look for us on the web at <http://www.minnkotamotors.com>