model no. 011-1981-2

MOTOMASTER 1933
ELIMINATOR®
MD

WORKSHOP SERIES

Battery Charger

IMPORTANT:
Please read this manual carefully before running this battery charger and save it for reference.

INSTRUCTION MANUAL

0099002118-00

WARRANTY

This MotoMaster Eliminator product carries a three (3) year warranty against defects in workmanship and materials. At its discretion, MotoMaster Canada agrees to have any defective part(s) repaired or replaced free of charge, within the stated warranty period, when returned by the original purchaser with proof of purchase. This product is not guaranteed against wear or breakage due to misuse and/or abuse.

Read and understand this instruction manual thoroughly before using the product. It contains important information for your safety as well as operating and maintenance advice.

Keep this instruction manual for future use. Should this product be passed on to a third party, this instruction manual must be included.

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NOTE:

If any parts are missing or damaged, or if you have any questions, please call our toll-free helpline at 1-888-942-6686.

TABLE OF CONTENTS

INTRODUCTION

This rugged MotoMaster® Eliminator® battery charger features advanced microprocessor technology making battery charging faster, easier, and safer than ever before. This manual will explain how to use the charger safely and effectively.
Please read and follow these instructions and precautions carefully.

SAFETY INFORMATION

- Read all instructions, warnings, and cautions printed on the battery charger, battery and vehicle or equipment using battery.
- Use the charger for charging lead-acid batteries only (such as those used in cars, trucks, motorcycles, boats, etc.).
- Battery chargers are not intended to supply power to a low-voltage electrical system or to charge dry-cell batteries commonly used in household appliances such as radios, toys, cameras, etc. Charging dry-cell batteries may cause them to burst and cause injury to persons and damage to property.
- Use of an attachment not recommended by the battery charger manufacturer may result in the risk of fire or electric shock.
- **DO NOT** disassemble the charger. Take it to a qualified service professional if service or repair is required. Incorrect assembly may result in fire or electrical shock.
- To reduce risk of electrical shock, unplug the charger from the outlet before attempting any maintenance or cleaning.
- **DO NOT** expose charger to rain or snow.
- **NEVER** charge a frozen battery. If battery acid becomes frozen, bring battery to a warm area and allow it to thaw before you begin charging.
- **NEVER** touch battery clamps together when the charger is on. This may cause a spark.
- **NEVER** operate a charger if it has received a hard blow, been dropped or otherwise damaged. Take it to a qualified professional for inspection.
- **NEVER** pull out the plug by the cord when unplugging the charger, as this may cause damage to the cord or plug.

PERSONAL SAFETY INSTRUCTIONS

- Make sure that someone is within range of your voice to come to your aid if needed while you work with or are near a lead-acid battery.
- Wear complete eye and clothing protection when working with lead-acid batteries.
- Avoid touching your eyes while working with a battery. Have plenty of fresh water and soap nearby for use in case battery acid contacts your eyes, skin or clothing. If this happens, wash immediately with soap and water, then get medical attention.

WARNING!
Handling the cord on this product or objects associated with the use of this product may expose you to lead. Wash hands after handling.

WARNING! RISK OF EXPLOSIVE GASES
Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason it is of the utmost importance that each time before using your charger, you read and follow the instructions provided exactly. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer.

- **NEVER** smoke or allow an open spark or flame in the vicinity of the battery or engine. Batteries generate explosive gases.
- Take care not to drop any metal tool or object onto the battery. This may result in a spark or short circuit across the battery or another electrical device that may cause an explosion.
- Remove all personal metal items, such as rings, bracelets, necklaces, and watches from your body while working with a lead-acid battery. A battery can produce a short circuit current high enough to weld such objects to metal, causing a severe burn.
- **NEVER** attempt to charge a frozen battery (see bullet point under Important Safety Instructions).
- **NEVER** overcharge a battery.
- **ALWAYS** operate the battery charger in an open, well-ventilated area.

AC ELECTRICAL CONNECTIONS

PLUGGING CHARGER IN

Your charger requires a 3-pin, grounded 120 V AC electrical wall outlet receptacle installed according to local codes and ordinances.

USING AN EXTENSION CORD

The use of an extension cord is NOT recommended. If an extension cord must be used, follow these guidelines:

- Make sure that the pins on the charger's power cord fit firmly into the extension cord and that the extension cord fits firmly into the receptacle.
- Check that the extension cord is properly wired and in good electrical condition.
- Make sure that the wire size is large enough for its length and for the AC ampere rating of the charger, as specified in the chart below.

MINIMUM RECOMMENDED EXTENSION CORD

Length of Cord, Metres (Feet)	AWG* Size of Cord
7.6 (25)	18
15.2 (50)	16
30.5 (100)	12
45.6 (150)	10

*AWG = American Wire Gauge

WARNING!
DO NOT operate the charger if it has a damaged power cord or plug. Have the cord replaced.

WARNING! RISK OF EXPLOSIVE GASES
Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason it is of the utmost importance that each time before using your charger, you read and follow the instructions provided exactly. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer.

PREPARING TO CHARGE

CHARGER LOCATION

- **DO NOT** expose charger to rain or snow.
- Locate the charger as far away from the battery being charged as the cables will permit.
- Be sure to position the power cord to prevent it from being stepped on, tripped over or damaged.
- **NEVER** place charger directly above battery being charged. Gases from the battery will corrode and damage the charger.
- **NEVER** set a battery on top of a charger.
- **NEVER** allow battery acid to drop on charger.
- **ALWAYS** charge a battery in a well-ventilated area.

BATTERY PREPARATION

- When removing battery from vehicle to charge it, always remove grounded terminal from battery first.
- Make sure all accessories in the vehicle are OFF in order to prevent sparks.
- Be sure that the area around the battery is well ventilated while being charged.
- Clean the battery terminals. Be careful to keep corrosion or battery acid from getting in or around your eyes.
- For batteries with removable vent caps, if required, add distilled water to each cell until the battery fluid reaches the level specified by the battery manufacturer.
- **DO NOT** overfill.
- For batteries without removable vent caps, carefully follow the manufacturer's charging instructions.
- Study all of the battery manufacturer's specific precautions and recommendations for charging and for recommended rates of charge.
- If the charger has an adjustable charge rate, charge battery at the lowest rate first.

WARNING!
Battery chargers may get hot during operation. DO NOT set charger on flammable materials like carpeting, upholstery, paper, cardboard, etc. Charger may damage leather and plastic.

BATTERY IN VEHICLE (NEGATIVE GROUNDED)

1. Before connecting and disconnecting the DC output clamps, remove the AC plug from the electrical outlet.
2. Check polarity of battery posts. A positive (POS, P, +) battery post usually has a larger diameter than a negative (NEG, N, -) battery post.
3. Connect the positive (red) clip from the battery charger to the positive (POS, P, +) ungrounded post of battery.
4. Connect the negative (black) clip to vehicle chassis (must be a heavy gauge metal part of the frame) or engine block away from battery. DO NOT connect clip to carburetor, fuel lines, or sheet-metal body parts.
5. Connect charger AC supply cord to electric outlet. (Reverse process to remove charger.)

BATTERY IN VEHICLE (POSITIVE GROUNDED)

1. Before connecting and disconnecting the DC output clamps, remove the AC plug from the electrical outlet.
2. Connect the negative (black) clip from the battery charger to the negative (NEG, N, -) ungrounded post of battery.
3. Connect the positive (red) clip to vehicle chassis (must be a heavy gauge metal part of the frame) or engine block away from battery. DO NOT connect clip to carburetor, fuel lines, or sheet-metal body parts.
4. Connect charger AC supply cord to electric outlet. (Reverse process to remove charger.)

NOTE:

NEVER allow the DC output clamps to touch each other. This may cause a spark.

Remove the AC plug from the electrical outlet before connecting and disconnecting the DC output clamps.

To reduce the risk of a spark near battery:

- Position AC and DC cords to reduce the risk of damage by hood, door, or moving engine part.
- Stay clear of fan blades, pulleys, and other parts that can cause injury.
- Check polarity of battery posts. A positive (POS, P, +) battery post usually has a larger diameter than a negative (NEG, N, -) battery post.

WARNING!

A spark near a battery may cause a battery explosion!
NOTE: a marine battery installed in a boat must be removed and charged on shore. To charge it onboard requires equipment specially designed for marine use.

BATTERY REMOVED FROM VEHICLE

1. Before connecting and disconnecting the DC output clamps, remove the AC plug from the electrical outlet.
2. Connect the positive (red) charger clip to the positive (POS, P, +) post of battery.
3. Attach at least a 60 cm (24˝) long 6-gauge (AWG) insulated battery cable to a negative (NEG, N, -) battery post.
4. Position yourself and the free end of cable as far away from battery as possible, then connect the negative (black) charger clip to the free end of cable. DO NOT face battery when making final connection.
5. Connect charger AC supply cord to electric outlet. (Reverse process to remove charger.)
6. When disconnecting chargers, ALWAYS do so in reverse sequence of connecting procedure and break first connection while standing as far away from battery as practical.

NOTE:

NEVER allow the DC output clamps to touch each other. This may cause a spark.

Check polarity of battery posts. A positive (POS, P, +) battery post usually has a larger diameter than a negative (NEG, N,-) battery post.

WARNING!

A spark near a battery may cause a battery explosion!
NOTE: a marine battery installed in a boat must be removed and charged on shore. To charge it onboard requires equipment specially designed for marine use.

START/STOP BUTTON

Press to immediately begin charging your properly connected battery. If the button is not pressed, charging should begin automatically in 30 seconds.

DIGITAL DISPLAY

The Digital Display gives a digital indication of voltage, % of charge, or alternator status. If you manually start or stop the charging process (by pressing the Start/Stop button), the display will show ***ON*** or ***OFF*** respectively for a few seconds before displaying the battery voltage.

DISPLAY MODE BUTTON

Battery % – The digital display shows an estimated charge percentage of the battery connected to the charger's battery clamps.

Alternator % (12 V only) – The digital display shows an estimated output percentage of the vehicle's charging system connected to the charger's battery clamps, compared to a properly functioning system. The alternator percent range is from 0% to 100%. Readings below 0% (13.2 V) will read ***LO*** and readings above 100% (14.6 V) will read ***HI***. If you get a ***HI*** or ***LO*** reading, have the electrical system checked by a qualified technician.

Voltage – The Digital Display shows the voltage at the charger battery clamps, in DC volts.

RATE SELECTION BUTTON

Use this button to select one of the following:

- **6 A Charge –** For charging small and large batteries. Not recommended for industrial applications.
- **50 A<>15 A Boost Charge –** For quickly adding energy to a severely discharged or large capacity battery prior to Engine Start, or for fast charging of larger batteries.
- **250 A Engine Start –** Provides additional amps for cranking an engine with a weak or run-down battery. Always use in combination with a battery.

LED INDICATORS

- **Charging (yellow) LED lit:**
  The charger is charging the battery.
- **Charged/Maintaining (green) LED lit:**
  The battery is fully charged and the charger is in maintain mode.
- **Red LED solid:** The connections are reversed.
- **Red LED blinking:** The charger has detected a problem with the battery.
  See the Troubleshooting section for more information.

BATTERY TYPE BUTTON

This selects the type of battery to charge.

- **Normal (Standard) –** Type of battery used in cars, trucks and motorcycles; also refers to most deep-cycle batteries used in boats and RVs. This is a flooded cell battery, which uses liquid battery acid to cover the internal plates. These batteries can, but not always, have vent caps.
- **AGM –** The Absorbed Glass Mat construction allows the electrolyte to be suspended in close proximity with the plate's active material. In theory, this enhances both the discharge and recharge efficiency. The AGM batteries are a variant of Sealed VRLA (valve regulated lead-acid) batteries. Popular uses include high-performance engine starting, power sports, deep-cycle, solar and storage batteries.
- **Gel –** The electrolyte in a GEL cell has a silica additive that causes it to set up or stiffen. The recharge voltages on this type of cell are lower than those for other styles of lead-acid battery. This is probably the most sensitive cell in terms of adverse reactions to overvoltage charging. Gel batteries are best used in VERY DEEP cycle application and may last a bit longer in hot weather applications. If the wrong battery charger is used on a gel cell battery, poor performance and premature failure will result.

CHARGING YOUR BATTERY

1. Follow the instructions in the Connecting Your Battery section to connect your battery, and then connect the charger to a live AC electrical outlet.
2. Upon power-up, the default selections for battery type will be AGM and the rate will be Boost Charge. If these are not preferred, select a different battery type (Standard or Gel) and for the rate choose 6 A Charge.
3. Press the Start/Stop button to begin charging immediately. If the Start button is not pressed within 30 seconds after power-up, and a battery is properly connected, the charging process will begin automatically.
4. When charging is complete,
   a. Or if done charging, press the Stop button, disconnect the charger from AC power, and disconnect the battery clamps following the instructions for disconnection in the Connecting Your Battery section.
   b. To keep the battery in maintain mode, do not press the Stop button, and leave all connections. For more information, see the Maintain Mode section.

BATTERY CHARGING TIMES

Ah – Amp Hour
CCA – Cold Cranking Amps
RC – Reserve Capacity
NR – Not Recommended

BATTERY SIZE/RATING			6 A CHARGE	50 A<>15 A BOOST CHARGE
Small Batteries		25-32 Ah	1¼-3¼ h	NR
Cars and Trucks	200-315 CCA	40-60 RC	3¾-4¾ h	¾-1 h
	315-550 CCA	60-85 RC	4¾-6 h	1-1¼ h
	550-1000 CCA	85-190 RC	6-11½ h	1¼-2½ h
Marine/Deep-Cycle		80 RC	6 h	1 h
		140 RC	9 h	1½ h
		160 RC	10 h	1¾ h
		180 RC	11 h	2 h

Times are based on a 50% discharged battery and may change, depending on age and condition of battery.

NOTE:

Charger will NOT begin charging if the solid Red LED is on, indicating the battery clamps are reversed.

See the Operation section for a complete description of the charger modes.

AUTOMATIC VOLTAGE DETECTION

The charger is equipped with Auto Voltage Detection, which automatically detects whether the battery is 6 V or 12 V and then charges accordingly.

ABORTED CHARGE

If charging cannot be completed normally, charging will abort. When charging aborts, the charger's output is shut off and the Red LED will blink. The digital display will show an error code (see Troubleshooting for a description of the error codes). To reset after an aborted charge, unplug the charger from the AC outlet, wait a few minutes and then plug it back in.

DESULFATION MODE

If the battery is left discharged for an extended period of time, it could become sulfated and not accept a normal charge. If the charger detects a sulfated battery, the charger will switch to a special mode of operation designed for such batteries, and the display will show ***SUL***. If successful, normal charging will resume after the battery is desulfated. Desulfation could take up to 10 hours. After 10 minutes in desulfation, the red LED will blink. After 10 hours, if desulfation fails, charging will abort, the display will show ***F02***, and the red LED will remain blinking.

COMPLETION OF CHARGE

Charge completion is indicated by the Charged/ Maintaining (green) LED. When lit, the charger has switched to the maintain mode of operation.

MAINTAIN MODE (FLOAT MODE MONITORING)

When the Charged/Maintaining (green) LED is lit, the charger has started maintain mode. In this mode, the charger keeps the battery fully charged by delivering a charge current when necessary. If the charger has to provide an excessive maintain current for a continuous 12 hour period, it will go into abort mode (see Aborted Charge section). This is usually caused by a drain on the battery or the battery could be bad.

MAINTAINING A BATTERY

This product charges and maintains both 6 V and 12 V batteries. The maintain mode technology allows you to safely charge and maintain a healthy battery for extended periods of time. However, problems with the battery, electrical problems in the vehicle, improper connections or other unanticipated conditions could cause excessive current draws. As such, occasionally monitoring your battery and the charging process is required.

USING THE ENGINE START FEATURE

Your battery charger can be used to jump start your car if the battery is low. Follow all safety instructions and precautions for charging your battery. Wear complete eye protection and protective clothing.

1. With the charger unplugged from the AC outlet, connect the charger to the battery following the instructions given in Battery in Vehicle section.
2. Connect the charger to a live grounded 120 V AC outlet.
3. With the charger plugged in and connected to the battery and chassis, press the Rate Selection button until the Engine Start LED is lit, and then press the Start button or wait 30 seconds to activate Engine Start mode. If a battery is properly connected, the Charging LED will light as well.
4. Crank the engine until it starts or 5 seconds pass. If the engine does not start, repeat. Do not crank during the cool down period (see below). This allows the charger and battery to cool down. **NOTE:** During extremely cold weather, or if the battery is under 2 V, charge the battery for 5 minutes before cranking the engine.
5. If the engine fails to start, charge the battery for 5 more minutes before attempting to crank the engine again.
6. After the engine starts, press the Stop button and unplug the AC power cord before disconnecting the battery clamps from the vehicle.
7. Clean and store the charger in a dry location.

ENGINE STARTING NOTES

During the starting sequence listed above, the charger is set to one of four states:

- **Wait for ready –** The charger charges the battery for 2 minutes before the Wait for Cranking state. While waiting for ready, the digital display shows ***ON*** and the engine can be cranked. For severely discharged batteries, it is not recommended to crank during this time.
- **Wait for cranking –** The charger waits until the engine is actually being cranked before delivering the amps for engine start. While waiting for cranking, the digital display shows ***rdy***.
- **Cranking –** When cranking is detected, the charger will automatically deliver up to its maximum output as required by the starting system for up to 5 seconds.
- **Cool Down –** After repeated cranking during a 3-minute ready period, the charger enters a mandatory 3-minute (180-second) cool down state. The digital display indicates the remaining cool down time in seconds. It starts at 180 and counts down to 0. After 3 minutes, the digital display will change from displaying the countdown to displaying ***rdy***. After 2 hours of Engine Starting, the unit will automatically exit from the Engine Start mode, just as if the Stop button had been pressed; the Charging LED will not be lit.

NOTE:

If you have charged the battery and it still will not start your car, do not use the Engine Start feature, or it could damage the vehicle's electrical system. Have the battery checked.

If the engine does turn over but never starts, there is not a problem with the starting system; there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.

WARNING!

Using the Engine Start feature WITHOUT a battery installed in the vehicle could cause damage to the vehicle's electrical system.

USING THE BATTERY VOLTAGE TESTER

1. With the charger unplugged from the AC outlet, connect the charger to the battery, following the instructions given in previous sections.
2. Plug the charger AC power cord into the AC outlet.
3. If necessary, press the Battery Type button until the correct type is indicated.
4. Read the voltage on the digital display. Keep in mind that this reading is only a battery voltage reading; a false surface charge may mislead you. Compare the reading to the following chart.

6 V BATTERY VOLTAGE READING	12 V BATTERY VOLTAGE READING	BATTERY CONDITION
6.4 or more	12.8 or more	Charged
6.1 to 6.3	12.2 to 12.7	Needs charging
Less than 6.1	Less than 12.2	Discharged

TESTER AND CHARGER

When first turned on, the unit operates only as a tester, not as a charger. Pressing the Start/Stop button or waiting 30 seconds from power-up activates the battery charger and deactivates the tester. Pressing the Start/Stop button again will shut off the charger and activate the tester.

TESTING AFTER CHARGING

After the unit has been changed from tester to charger, it remains a charger. To change the battery charger back to a tester, press the Start/Stop button.

POWER-UP AUTO START

The charger is equipped with an auto-start feature which is triggered only when the charger is first powered up. If the Start button is not pressed within 30 seconds, the unit will search for a battery. If the unit detects a battery that is properly connected, the unit will set the rate to Boost Charge and the battery type will be set to AGM. The charging process will automatically start, and the Charging (yellow) LED will light.

USING THE ALTERNATOR PERFORMANCE TESTER

1. With the charger unplugged from the AC outlet, connect the charger to the battery, following the instructions given in previous sections.
2. Plug the charger AC power cord into the AC outlet.
3. Start the vehicle, rev the engine at 2000 rpm for 30 seconds and turn on the vehicle's headlights or other accessories.
4. Set the Display mode button to Alternator %.
5. If the display gives a numeric percentage, the alternator is working properly. The percentage will be proportional to the voltage between 13.2 V and 14.6 V. If the display reads ***HI*** or ***LO***, refer to your vehicle's manual or have the electrical system checked by a qualified technician.

NOTE:

The battery tester is only designed to test batteries. Testing a device with a rapidly changing voltage could yield unexpected or inaccurate results.

MAINTENANCE

A minimal amount of care can keep your battery charger working properly for years.

- Clean the clamps each time you are finished charging. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion.
- Occasionally cleaning the case of the charger with a soft cloth will keep the finish shiny and help prevent corrosion.
- Coil the input and output cords neatly when storing the charger. This will help prevent accidental damage to the cords and charger.
- Store the charger unplugged from the AC power outlet in an upright position.
- Store inside, in a cool, dry place. Do not store the clamps clipped together, on or around metal, or clipped to the cables.

PROBLEM	POSSIBLE CAUSE	SOLUTION
The charger will not turn on when properly connected.	• AC outlet is dead.	• Check for open fuse or circuit breaker supplying AC outlet.
	• Poor electrical connection.	• Check power cord and extension cord for loose fitting plug.
	• Battery is defective.	• Have battery checked.
The battery is properly connected, but the Charging LED never lit.	The battery voltage is low.	Press the Start/Stop button to start charging.
Short or no start cycle when cranking engine.	• Drawing more than the Engine Start Rate.	• Crank time varies with the amount of current drawn. If cranking draws more than the Engine Start Rate, crank time may be less than 5 seconds.
	• Failure to wait 3 minutes (180 seconds) between cranks.	• Wait 3 minutes of rest time before the next crank, to allow the battery and charger to cool down.
	• Clamps are not making a good connection.	• Check for poor connection at battery and frame.
	• AC cord and/or extension cord is loose.	• Check power cord and extension cord for loose fitting plug.
	• No power at receptacle.	• Check for open fuse or circuit breaker supplying AC outlet.
	• The charger may be overheated.	• The thermal protector may have tripped and needs a little longer to close. Make sure the charger vents are not blocked. Wait and try again.
	• Battery may be severely discharged.	• On a severely discharged battery, use the Boost Charge setting for few minutes, to help assist in cranking.
I cannot select a 6 V or 12 V setting.	The charger is equipped with Auto Voltage Detection, which automatically detects the voltage and charges the battery.	No problem; this is normal.

NOTE:

For more information about troubleshooting or replacement parts, call toll-free: 1-888-942-6686.

CODE	DESCRIPTION	REASON/SOLUTION
F01	The battery voltage is still under 10 V (for a 12 V battery) or 5 V (for a 6 V battery) after 2 hours of charging.	The battery could be bad. Have it checked or replaced.
F02	The charger cannot desulfate the battery.	The battery could not be desulfated; have it checked or replaced.
F03	The battery was unable to reach the “full charge” voltage.	May be caused by trying to charge a large battery or bank of batteries on too low of a current setting. Try again with a higher current setting or have the battery checked or replaced.
F04	The connections to the battery are reversed.	The battery is connected backwards. Unplug the charger and reverse the connections to the battery.
F05	The charger was unable to keep the battery fully charged in maintain mode.	The battery won’t hold a charge. May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.
F06	The charger detected that the battery may be getting too hot (thermal runaway).	The charger automatically shuts the current off if it detects the battery may be getting too hot. Have the battery checked or replaced.
F07	The charger shut off because its internal temperature exceeds limit.	Make sure the charger does not have the side ventilation holes blocked. Move the charger out of the sun and into the shade.
F08	The battery voltage dropped too low during the maintain mode.	May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.

NOTE:
If you get an error code, check the connections and settings and/or replace the battery.

TECHNICAL SPECIFICATIONS

Input voltage	120 V AC
Input frequency	60 Hz
Input current	6 A cont., 65 A int.
Output voltage	6 V or 12 V
Output current	6 V/12 V DC 6 A/15 A cont., 50 A/250 A int.

Made in Mexico
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