MIDTRONICS

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167-000757EN-A

MSP-070C
70A Battery Maintainer

USER GUIDE

Contents

Safety Guidelines

For safe, efficient, and accurate charging and testing, review the safety and operating instructions in this manual before using the analyzer. In addition, follow all manufacturers' instructions and BCI (Battery Council International) safety recommendations.

1 General Safety Precautions

⚠ CAUTION

Risk of explosive gases

Batteries generate explosive gases during normal operation, and when discharged or charged.

1.1 To reduce risk of battery explosion, follow these safety instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of a battery. Review cautionary marking on these products and on the engine, and on the vehicle or equipment containing the battery.

⚠ CAUTION

Charging a non-rechargeable battery may cause the battery to burst.

To reduce the risk of injury, only charge rechargeable lead-acid type batteries including maintenance-free, low-maintenance, or deep-cycle batteries.

If you are uncertain as to the type of battery you are attempting to charge, or the correct procedure for checking the battery's state of charge, contact the seller or battery manufacturer.

1.2 Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.

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

1.4 Position the AC and DC leads to avoid tripping over them and to prevent damage from moving engine parts; protect from heat, oil, and sharp edges.

1.5 Do not operate the charger if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to a qualified service center.

1.6 Do not disassemble charger; take it to a qualified service center when repair is required. Incorrect reassembly may result in a risk of electric shock or fire.

1.7 To reduce risk of electric shock, unplug the charger from the AC outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.

1.8 Connect and disconnect the battery leads only when the AC supply cord is disconnected.

1.9 Do not overcharge the battery.

1.10 Charge the battery in a dry, well-ventilated area.

1.11 Never place articles on or around the charger, or locate the charger in a way that will restrict the flow of cooling air through the cabinet.

1.12 An extension cord should not be used unless absolutely necessary. (See paragraph 4.2)

1.13 Have a damaged cord or plug replaced immediately.

1.14 Do not expose the charger to rain or snow.

2 Personal Precautions

2.1 The MSP-series chargers are not to be used by people with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

2.2 Children should be supervised to ensure they do not play with the appliance

2.3 Always have someone within range of your voice, or close enough to come to your aid, when working around lead acid batteries.

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

2.5 Wear complete eye protection, clothing protection, and wear rubber soled shoes. Place damp cloth over battery to protect against acid spray. When ground is very wet or covered with snow, wear rubber boots. Avoid touching eyes while working near battery.

2.6 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters the eye, immediately flush with cold running water for at least 10 minutes, and seek medical attention.

2.7 NEVER smoke or allow a spark or flame in vicinity of a battery or engine.

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

2.9 Before working with a lead-acid battery, remove personal metal items such as rings, bracelets, necklaces, watches, etc. A lead-acid battery can produce a short circuit current high enough to weld such items causing a severe burn.

⚠ CAUTION

Non-rechargeable batteries may burst when charging causing personal injury and damage.

To avoid electrical shock or burn, never alter the charger's original AC cord and plug. Disconnect plug from outlet when charger is idle.

The charger is not intended to supply power to a low-voltage electrical system other than applications using rechargeable, lead-acid type batteries. Do not use the battery charger for charging dry-cell batteries commonly used with home appliances. These batteries may burst and cause personal injury and property damage.

2.10 **NEVER** charge a frozen battery; thaw it out first.

3 Preparing To Charge The Battery

3.1 If it is necessary to remove the battery from vehicle to charge it, always remove the grounded terminal from the battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.

3.2 Be sure the area around the battery is well ventilated while the battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other nonmetallic material as a fan.

3.3 Clean the battery terminals. Be careful to keep corrosion from coming into contact with your eyes.

3.4 For flooded cell batteries, add distilled water in each cell until the battery acid reaches the level specified by the manufacturer. This helps purge excessive gas from the cells. Do not overfill. For a battery without caps, carefully follow the manufacturer's recharging instructions

3.5 Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.

4 Grounding & Power Cord Connections

Recommended minimum AWG size for extension cords for battery chargers*					
AC input rating Amps		**AWG* size of cord**			
Equal or greater than:	**But less than:**	**Length of cord, feet (m)**			
		25 (7.6)	50 (15.2)	100 (30.5)	150 (45.6)
8	10	18	14	12	10
10	12	16	14	10	8
12	14	16	12	10	8
14	16	16	12	10	8
16	18	14	12	8	8

**American Wire Gauge*

4.1 The **charger must be grounded** to reduce risk of electric shock. The charger is equipped with an electric cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

⚠ DANGER

Hazardous voltage.
An improper connection can result in electric shock

To avoid electrical shock or burn, never alter the charger's original AC cord and plug. Disconnect plug from outlet when charger is idle.

IF THE PLUG DOES NOT FIT THE OUTLET, HAVE A PROPER OUTLET INSTALLED BY A QUALIFIED ELECTRICIAN.

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

a. that the pins on plugs of the extension cord are the same number, size, and shape as those of the plug on the charger;

b. that the extension cord is properly wired and in good electrical condition;

c. that the wire size is large enough for the AC ampere rating of charger.

5 Charger Location

Not for permanent installation: Modifying this charger for permanent installation in a vehicle or installing this charger in a vehicle for permanent use is not recommended.

⚠ WARNING

In the event of fail device may generate and emit sparks.

Only charge rechargeable flooded maintenance-free, low-maintenance or deep-cycle batteries.

The MCC-Series is **NOT** designed outside use or for wet location mounting. The charger must always be protected from direct contact with water.

5.1 The charger must be located in an area with sufficient air space to allow unrestricted airflow in and around the charger.

5.2 Locate the charger as far away from the battery as the charger cables permit.

5.3 Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.

5.4 Never allow battery acid to drip on the charger when taking gravity readings or filling a flooded cell battery.

5.5 Operate the charger only in a well-ventilated area that is free of dangerous vapors.

5.6 Store the charger in safe, dry location and maintain it in perfect condition.

5.7 Do not set the battery on top of the charger or where its acid might drip onto the charger.

6 DC Connection Precautions

6.1 When attaching the charger clamps, be certain to make the best possible mechanical as well as electrical connection. This will tend to prevent the clamps from slipping off the connections, avoid dangerous sparking, and assure safer and more efficient charging. The clamps should be kept clean.

⚠ DANGER

Hazardous voltage.
Can cause death or serious personal injury.

Setting the switches to "OFF" does not always disconnect the charger electrical circuit from the AC power cord or the DC charger clamps.

7 Installing The Battery

⚠ CAUTION

Risk of explosive gases.

A spark near the battery may cause a battery explosion. Follow these steps when the battery is installed in the vehicle to reduce the risk of explosion.

7.1 Locate the charger as far away from the battery as the charger cords permit and position the AC and DC cords to avoid stepping on or tripping over them and to prevent damage by moving engine parts.

7.2 Turn **OFF** all vehicle loads, including door lights, and correct any defects in the vehicle's electrical system that may have caused low battery.

7.3 First connect the **POSITIVE (RED)** clamp from the charger to the **POSITIVE (POS., P, +)** ungrounded post of the battery. Then connect the **NEGATIVE (BLACK**) clamp to the **NEGATIVE (NEG., N,–)** post of the battery. Do not connect the clamp to the carburetor, fuel lines, or sheet-metal body parts.

8 Removing the Battery

8.1 If it is necessary to remove the battery from the vehicle or equipment, always remove the grounded terminal from the battery first.

⚠ CAUTION

Risk of explosive gases.

A spark near the battery may cause a battery explosion. Follow these steps when the battery is installed in the vehicle to reduce the risk of explosion.

⚠ CAUTION

Risk of explosive gases.

Make sure all vehicle loads are **OFF** to prevent a possible arc.

8.2 Check the polarity of battery posts.

8.3 Connect the **POSITIVE (RED)** charger clamp to the **POSITIVE (POS., P, +)** post of battery.

8.4 Position yourself and the free end of cable as far away from the battery as possible—do not face the battery when making the final connection—then connect the **NEGATIVE (BLACK)** charger clamp to the free end of the cable.

8.5 When disconnecting the charger, always do so in the reverse sequence of the connecting procedure; break the first connection while staying as far away from the battery as practical.

9 Maintenance & Storage

Follow these guidelines to protect the charger and test cables from damage and premature wear:

9.1 The grease, dirt, and sulfation that build up on battery terminals are highly corrosive and can damage the clamps over time. Before connecting the clamps, ensure accurate test readings and protect the clamps by cleaning the battery case and terminals using a wire brush and a mixture of water and baking soda.

9.2 Periodically clean the clamps using a mixture of baking soda and water, or a mild hand-soap, and a small bristle brush.

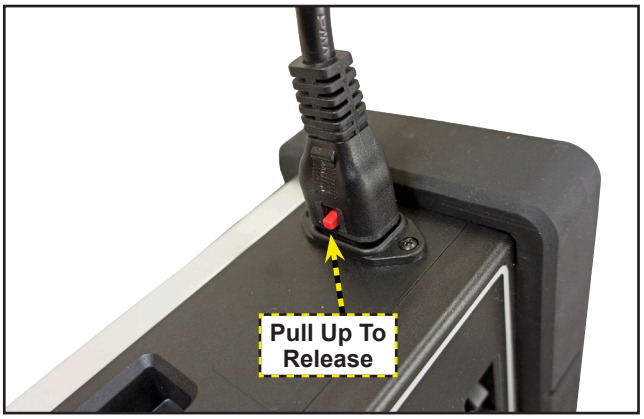
9.3 Clean the battery terminals. If stud adapters are required, fasten them with the proper tool. Do not use the battery clamps to tighten adapters.

9.4 Never remove the clamps from a battery to abort an active charging session. Always press the red **STOP** button before removing the clamps.

9.5 Do not leave the clamps laying in battery acid.

Locking Power Cord

Always use the red tabs on each side of the power cord connector to release/remove it from the charger's power socket.



Storage

Always store the charger in safe, dry location and maintain it in perfect condition.

When not in use, always keep the charger on the stabilizing base that came with the unit. Make sure it is secured using the two (2) included Phillips-head screw and the appropriate threaded holes.

Wireless Safety

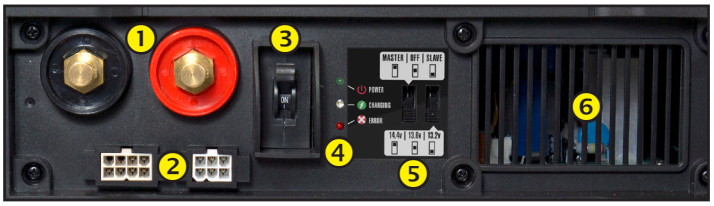
The operation of this equipment is subject to the following two conditions.

1. This equipment or device may not cause harmful interference.
2. This equipment or device must accept any interference. Including interference that may cause undesired operation.

Connections & Controls

The Midtronics MSP-070C converts 120-240 volts nominal AC to a selectable (14.4 VDC, 13.6 VDC, or 13.2 VDC) voltage for use as a power supply. After the unit has detected the battery is fully charged and current is not being drawn from the vehicle, it will shut down the ouput to conserve energy and protect the vehicle.

Back View



1 Charging Cable Connections

Insert and rotate the charge cable quick connectors clockwise 180° to lock them onto the Quick Connector Locking Post.

2 CAN Bus Cable Connections

3 Circuit Breaker

4 Indicator LEDs

Power Charging Error

5 Selectable Voltage Switches

Status	*Voltage*
Master: Unit operates standalone and can control other slave units	14.4v
Off: Not used	13.6v
Slave: Unit is controlled by another device via CAN port. Output matches controlling unit	13.2v

6 Cooling Vent

Side View

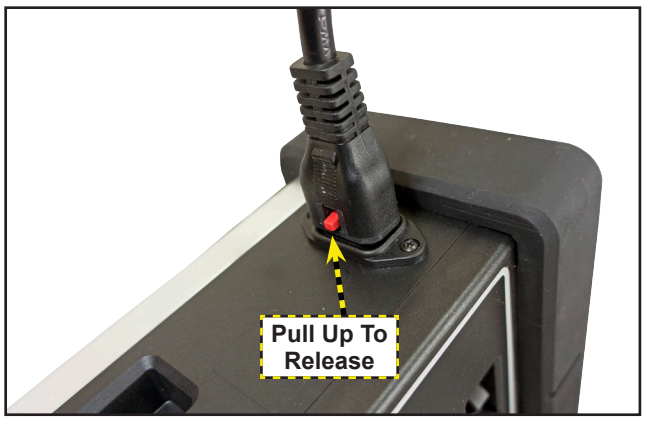
1 Cooling Fans

2 On/Off Switch

3 C14 Power Cable Plug-in

Locking Power Cord

Always use the red tabs on each side of the power cord connector to release/remove it from the charger's power socket.



1. Insert the control connector.
2. The connection process is complete when all three cables are connected to the charger.

Connecting To A Battery

IMPORTANT: When charging an AGM battery, do NOT use the 14.4v setting.

1. Identify battery terminal polarity (Negative: NEG, N /Positive: POS, P, or +).
2. With the MSP unplugged, connect the positive clamp (red) to the positive battery terminal and the negative clamp (black) to the negative battery terminal.
3. Plug the power cord into a grounded 120-240 Vac outlet and turn ON the power swtich.

Disconnecting From A Battery

1. Turn OFF the MSP power switch.
2. Unplug the MSP from the 120-240 Vac outlet.
3. Disconnect the positive (red) clamp from the positive battery terminal and the negative clamp (black) from the negative battery terminal.

Product Specifications

Operating Parameters

Input Voltage	110V – 240V~, 50 – 60 Hz, 12A max.
Output 1	14.4VDC max., 70A max.

Charge Cables

- 2m (Standard)
- 3m
- 5m

Power Cord

Accepts locking C13 connector for region-specific power cables:

- United States: EMA 5-15 termination, rated at 15A/125V UL CSA

Applications

- Automotive
- Heavy-Duty
- Power Sports
- Group 31
- Commercial 4D/8D

Battery Chemistries

- Lead acid
- AGM
- EFB

CCA Range

- 100 – 2000 CCA

Dimensions

(without handle or base)

- Height: 4.80 in (12.19 cm)
- Width: 13.1 in (33.27 cm)
- Length: 12.0 in (30.48 cm)
- Weight:18 lbs

Safety

- UL1236, IEC 60335

EMC

- EN61000-6-4 (Emissions) CISPR 11 Class A
- EN61000-6-2 (Immunity)
- EN61000-3-2 (Harmonics)
- EN61000-3-3 (Flicker)
- CEC, California Energy Commission

Protection Features

- Reverse polarity
- Non-12V battery connection
- Clamp connection
- Battery voltage too low (<5.5V)
- Clamp high temperature detection

Error Codes

Error codes are transmitted via the red LED on the side of the charger. The number of flashes correspond with the error code number (Example: Two [2] flashes = Error Code 02)

Code	Description	Action
01	Reverse polarity	Correct clamp connections to battery (Red to + / Black to –)
02	Connection problem	Correct connections & restart charge sequence
03	Non 12V battery connected	Connect to 12V
04	Battery voltage too low (<5.5V)	Battery deeply discharged or may be damaged. consider replacing battery
08	Internal current failure	Switch unit off then on again. If fan is not running call for service.
09	Internal voltage failure	Switch unit off then on again. If fan is not running call for service.
10	Internal temperature too high	Switch unit off then on again. If fan is not running call for service.
11	Cable temperature sensor open	Replace charge cable: SO, (Tsensor = open)
12	Cable temperature sensor short	Replace charge cable: SS, (Tsensor = short)
13	Charge cable (Vab)	Replace clamp or charge cable
14	Sensing cable (Vcd)	Replace clamp or charge cable
15	Battery temperature exceeds thermal limit	Battery replacement recommended, unsafe to charge
16	Battery temperature below thermal limit	Frozen battery, may not recover
20	Unit internal error	Call for service