INSTALLATION INSTRUCTIONS

Original Issue Date: 10/16

Model: Generator Sets Market: Industrial 15-500 kW Subject: 6 Amp, 12/24 Volt Battery Charger Kits

1 Introduction

The battery charger is designed to both recharge your batteries and extend your battery's life in applications where it is stored for long periods of time. The charger is a multi-stage, completely automatic, lightweight, silent battery charger. The charger produces an output of 12 Volts DC at a full 6 Amps, while using much less AC current than other charger types. When the charger is attached to your battery and plugged into a 115 Volt / 60 Hz AC outlet, the red and green LEDs let you know the unit is recharging and maintaining your batteries. Use this battery charger to charge lead acid flooded, gel, or AGM type 12-volt batteries only. 24-volt battery charger kits include two 12-volt battery chargers.

Save these Instructions

This manual contains important safety and operating instructions for the chargers. Read the entire manual before using. Also read all instructions and cautions for and on the charger, batteries, and equipment in the vicinity of the batteries.

Battery charger kits covered in this document are listed below. Kits include mounting brackets and hardware for specific generator set models as shown in the parts lists.

NOTE: This instruction sheet may be provided with other kits that contain the 6 amp charger GM96383 but are not listed below.

Kit Number	Description
GM96386-KA1	Battery Charger 12V, 6A
GM96386-KP2	Battery Charger 24V, 6A
GM96386-KA4, KP4	Battery Charger 24V, 6A
GM96386-KA5	Battery Charger 12V, 6A
GM96387-KP1	Battery Charger 12V, 6A
GM96388-KA1, KP1	Battery Charger 12V, 6A
GM96389-KA1, KP1	Battery Charger 12V, 6A
GM96389-KA2, KP2	Battery Charger 24V, 6A
GM96390-KA1, KP1	Battery Charger 24V, 6A
GM96391-KA1, KP1	Battery Charger 12V, 6A

Kit Number	Description
GM96391-KA2, KP2	Battery Charger 24V, 6A
GM96391-KA3, KP3	Battery Charger 24V, 6A
GM96392-KP1	Battery Charger 24V, 6A
GM96392-KP2	Battery Charger 24V, 6A
GM96395-KA1	Battery Charger 12V, 6A
GM96395-KA3	Battery Charger 24V, 6A
GM96404-KP1	Battery Charger 12V, 6A
GM103366-KA1, KP1	Battery Charger 12V, 6A
GM103366-KA2, KP2	Battery Charger 24V, 6A

 Figure 1 Battery Charger Kits

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2 Safety Precautions



Accidental starting.

Can cause severe injury or death.

Disconnect the battery cables before working on the generator set. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows: (1) Press the generator set off/reset button to shut down the generator set. (2) Disconnect the power to the battery charger, if equipped. (3) Remove the battery cables, negative (–) lead first. Reconnect the negative (–) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

WARNING	Explosion.
Mr.	Use this battery charger to charge lead acid flooded, gel, or AGM type batteries only.
	Sulfuric acid in batteries.
	Can cause severe injury or death.
	Wear protective goggles and clothing. Battery acid may cause blindness and burn skin.

Battery electrolyte is a diluted sulfuric acid. Battery acid can cause severe injury or death. Battery acid can cause blindness and burn skin. Always wear splashproof safety goggles, rubber gloves, and boots when servicing the battery. Do not open a sealed battery or mutilate the battery case. If battery acid splashes in the eyes or on the skin, immediately flush the affected area for 15 minutes with large quantities of clean water. Seek immediate medical aid in the case of eye contact. Never add acid to a battery after placing the battery in service, as this may result in hazardous spattering of battery acid.

Battery acid cleanup. Battery acid can cause severe injury or death. Battery acid is electrically conductive and corrosive. Add 500 g (1 lb.) of bicarbonate of soda (baking soda) to a container with 4 L (1 gal.) of water and mix the neutralizing solution. Pour the neutralizing solution on the spilled battery acid and continue to add the neutralizing solution to the spilled battery acid until all evidence of a chemical reaction (foaming) has ceased. Flush the resulting liquid with water and dry the area.

WARNING	Explosion. Can cause severe injury or death. Relays in the battery charger cause arcs or sparks. Locate the battery in a well-ventilated area. Isolate the battery charger from explosive fumes.
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Battery gases. Explosion can cause severe injury or death. Battery gases can cause an explosion. Do not smoke or permit flames or sparks to occur near a battery at any time, particularly when it is charging. Do not dispose of a battery in a fire. To prevent burns and sparks that could cause an explosion, avoid touching the battery terminals with tools or other metal objects. Remove all jewelry before servicing the equipment. Discharge static electricity from your body before touching batteries by first touching a grounded metal surface away from the battery. To avoid sparks, do not disturb the battery charger connections while the battery is charging. Always turn the battery charger off before disconnecting the battery connections. Ventilate the compartments containing batteries to prevent accumulation of explosive gases.



Battery short circuits. Explosion can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage. Disconnect the battery before generator set installation or maintenance. Remove all jewelry before servicing the equipment. Use tools with insulated handles. Remove the negative (–) lead first when disconnecting the battery. Reconnect the negative (–) lead last when reconnecting the battery. Never connect the negative (–) battery cable to the positive (+) connection terminal of the starter solenoid. Do not test the battery condition by shorting the terminals together.

2.1 Important Safety Instructions

- Use of an attachment or spare part not recommended or provided by Kohler Co. may result in a risk of fire, electric shock, or personal injury.
- 1. To reduce the risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting the chargers.
- 2. Do not use an extension cord 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:
 - That pins on the plug of the extension cord are the same number, size and shape as those of the plug on the charger;
 - That the extension cord is properly wired and in good electrical condition; and
 - That the cord's wire size is large enough for AC ampere rating of the charger as specified below:

Cord Length	7.6 m (25 ft.)	15.2 m (50 ft.)	30.5 m (100 ft.)
Cable Size	18 AWG	16 AWG	14 AWG

- 3. Do not operate the charger with a damaged cord or plug replace the cord or plug immediately.
- 4. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- 5. Do not attempt to disassemble the charger.
- 6. To reduce the risk of injury, unplug the charger from the outlet before attempting any maintenance or cleaning. Turning off controls alone will not reduce the risk.
- 7. Do not expose the charger to rain or snow.

2.2 Personal Safety

Adhere to the following personal safety precautions when installing or working with the battery chargers:

- Someone should be within voice range or close enough 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 your eyes while working near a battery.
- If battery acid contacts your skin or clothing, wash immediately with soap and water. If acid enters the eye, flood the eye with cold, running water for at least ten minutes and get medical attention.
- Never smoke or allow an open flame in the vicinity of the battery.
- Do not drop a metal tool onto the battery. It may spark, short circuit the battery, and may cause an explosion.
- Remove all metal personal items such as rings, bracelets, necklaces, and watches when working near a lead-acid battery. A battery can produce short circuit currents high enough to weld a ring or other metal object to metal, causing a severe burn.
- Excessive battery discharge and/or high charging voltages can cause serious damage to batteries. Do not exceed the recommended limits of discharge level of your batteries.
- Ensure work area is properly ventilated to avoid gas buildup.

2.3 Preparing to Charge

Before charging a battery with the battery charger, read the following precautions:

- 1. Do **NOT** operate the battery charger if the input or output cables, connectors, indicator, or case is damaged or defective.
- 2. Make sure all accessories connected to the batteries you are charging are OFF.
- 3. If the battery or batteries must be removed from the equipment, always remove the ground terminal from the battery first.
- 4. Be sure the area around the battery is well ventilated while the battery is being charged.
- 5. Clean the battery terminals. Be careful to keep corrosion from coming in contact with your eyes.
- 6. For all batteries, carefully follow the manufacturer's recharging instructions.
- 7. **Never** allow the ring terminals to touch each other.
- 8. Never charge a frozen battery.
- 9. Never charge a damaged battery.
- 10. Check for physical damage to battery case and terminals before putting it into service.
- 11. Connect the charger output leads to the battery terminal before applying AC power to the charger.

3 Installation Instructions

3.1 Location

- 1. The case of this charger will become warm during operation. Because the charger is convection cooled (airflow over the back of the charger), the optimum mounting position for the charger is vertical. Mounting on its back on a horizontal surface may cause the charger to slightly reduce amperage output due to the thermal protection built in. Do not install the charger on carpeted, upholstered, or varnished surfaces.
- 2. Locate the charger as far away from battery as DC cables permit.
- 3. Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.
- 4. Never allow battery acid to drip on the charger when reading electrolyte specific gravity or filling battery.
- 5. Do not operate the charger in a closed-in area or restrict ventilation in any way.
- 6. Do not set a battery on top of the charger.

3.2 Mounting

- 1. Refer to the installation drawings for recommended mounting locations.
- 2. Use the hardware provided with the kit, or use corrosion-resistant 3/16 in. dia. or #10 bolts, backed by a flat washer and secured to the mounting surface with a split-ring lock washer.
- 3. Hold the charger to the mounting surface and mark the holes.
- 4. Remove the charger and drill the mounting holes.
- 5. Align the charger and assemble the mounting hardware. Secure the charger.

3.3 DC Connection

Connect one battery to one battery charger as shown in the connection diagrams. For 24 volt systems with two batteries, two battery chargers are required.

Observe the following precautions when connecting and disconnecting the battery charger :

- 1. Connect and disconnect DC output clips only after removing AC cord from electric outlet. Never allow the ring terminals to touch each other.
- 2. Check polarity of the battery posts. The POSITIVE (POS., P, +) battery post usually has a larger diameter than the NEGATIVE (NEG., N, –) post.
- 3. Connect the red charger output lead to the POSITIVE post. Connect the black charger lead to NEGATIVE. See the connection diagrams for more details.
- 4. Do not face the battery when making the final connection.
- 5. When disconnecting the charger, disconnect the AC cord and then remove the clips from the battery terminals.

3.4 Installation Drawings



Figure 3 Battery Charger Installation, GM96386-KP2 and GM96386-KP4



Figure 4 Battery Charger Installation, GM96387-KP1



Figure 5 Battery Charger Installation, GM96388-KP1



Figure 6 Battery Charger Installation, GM96389-KP1 and GM96389-KP2



Figure 7 Battery Charger Installation, GM96390-KP1, 24 Volt Kit



Figure 8 Battery Charger Installation, GM96391-KP1, KP2, and KP3



Figure 9 Battery Charger Installation, GM103366-KP1 and GM103366-KP2

3.5 Connection Diagram



Figure 10 Connection Diagrams, 12 Volt (one battery) and 24 Volt (two batteries) Systems

4 Operation

4.1 Charge Cycle

- 1. Soft Start : The charger verifies connections are good and the battery is capable of accepting a charge. Batteries with very low voltage will be charged slowly to not harm the battery. When the battery voltage reaches 10V for 30 seconds the charger switches to the next stage.
- 2. Bulk Stage : The charger uses constant current and charges the battery to 14.3 volts. When the battery holds the voltage of 14.3 volts for 30 seconds the charger switches to the next stage.
- 3. Absorption Stage : The charger uses constant voltage to charge the battery until the charge current drops. At this point the charger will switch to the next stage.
- 4. Float Stage : The charger finishes the charge cycle by keeping the battery at 13.3 volts for a period of time and then moves to the next stage.
- 5. Maintenance : The charger monitors the battery. If the battery voltage drops below 12.8 volts or if 14 days have passed since the last charge, the charge cycle will start automatically.

RED	GREEN	Condition
ON	OFF	Charger is in the "Soft Start" or "Bulk Stage" and the battery is being charged. If the red LED stays on for more than 24 hours refer to the troubleshooting section.
ON	ON	Charger is in the "Absorption Stage" and delivering constant voltage to the battery. If the red and green light stay on for more than 24 hours refer to the troubleshooting section.
OFF	ON	The charger has moved to the "Float Stage" and is topping off the charge to the battery and keeping the battery ready to use. The green light indicates your battery is ready to use. If the green light stays on when your battery is known to be low, refer to the troubleshooting section.
OFF	OFF	No AC power to the charger, or component failure.
BLINKING	BLINKING	Blinking LEDs indicate a fault.

Figure 11 LED Indicator Operation

5 Maintenance

Periodically clean both battery terminals with baking soda and tighten all connections. No other maintenance on the charger is required.

6 FCC Class B EMC Notice

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 commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

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 different circuit than the receiver.

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

7 Specifications

Model:	GM96383
Input Voltage:	115 VAC, 50/60 Hz
Input Voltage Range:	100-240 VAC, 50/60Hz
Input Amps (Max):	2.0 amps
Banks:	1
Output Volts:	12 VDC
Absorption Charge Voltage:	14.3 +/- 0.20 V per bank
Float Charge Voltage:	13.3 +/- 0.20 V per bank
Charging current:	6 amps
Rechargeable battery type:	Any 12V lead-acid battery(Flooded, GEL and AGM)
Battery charger capacity (based on 50% drained battery):	Group 24 through 31 (up to 120 Amp-Hours)
AC Cable Length:	1.8 m (6 ft.)
DC Cable Length:	1.8 m (6 ft.)
Fuse Size:	10 amps
Protection Type:	IP68 (casing)
Dimensions:(LxWxD)	89 x 198 x 58 mm (3.5 x 6.4 x 2.3 in.)
Weight	1.8 kg (4.0 pounds)

8 Troubleshooting

Display	Operating Condition	Solution	
Red LED stays on for more than 24 hours.	 One or more faulty or damaged cells. 	 Load test the battery and replace if necessary. 	
	 Charger has reduced its output voltage below the normal level due to a DC overload or a DC short 	 Remove the source of theoverload or short. Disconnect the charger's black (NEGATIVE) terminal from the battery 	
	 On-board DC systems are drawing more current than the charger can 	Reapply AC power and the green LED only should now light.	
	replace.	3. Turn off all DC equipment while charging.	
The red and green LEDs stay on for	1. On-board DC systems are drawing more than 2 amps.	 Turn off all excess DC equipment while charging. 	
more than 24 hours.	 One or more faulty or damaged cells. 	 Load test the battery and replace if necessary. 	
	3. Extremely low AC voltage at the battery charger	 Apply a higher AC voltage source or reduce the length of the extension cord 	
		 Check battery manufacturer's specs on battery charging. 	
Green LED stays on	1. Open DC output fuse.	1. Replace DC output fuse with a 10 amp	
known to be low.	connections.	2. Clean and tighten or repair all terminal	
	3. One or more faulty ordamaged	connections.	
	cens.	necessary.	
Neither of the LEDs	1. No AC power available at the charger	 Clean and tighten or repair allterminal connections 	
power isapplied.	2. Component failure.	 Load test the battery and replace if necessary. 	
Red and green LEDs are flashing	1. Charger is not charging the battery.	 Charger cannot get the battery to charge. Check to see if the battery is too large for the charger or if there is a problem with the battery. Unplug the charger from the AC power to start the charger again. 	

9 Parts List

Parts lists for field-installed loose battery charger kits are shown below. Factory-installed kits are not listed here. Assembly drawing numbers are shown for reference only. See the installation drawings in Section 3.4. **NOTE :** This document may be provided with other kits that include battery charger GM96383 but are not listed below.

Qty.	Description	Part Number	
Kit: GM96386-KP2			
2	Battery Charger 12V, 6A	GM96383	
1	TT Battery Charger, 6 Amp, Industrial	TT-1702	
Kit: GI	M96386-KP4	·	
2	Battery Charger 12V, 6A	GM96383	
1	TT Battery Charger, 6 Amp, Industrial	TT-1702	
Kit: G	M96387-KP1		
1	Bracket, Battery Charger Mtg.	GM32862	
1	Battery Charger 12V, 6A	GM96383	
4	Washer, Plain	M125A-06-80	
2	Washer, Plain 8.4 ID x 16.0 OD	M125A-08-80	
4	Nut, Hex 6mm	M6923-06-80	
4	Screw, hex cap	M933-06020-60	
2	Screw, hex cap	M933-08020-60	
1	TT Battery Charger, 6 Amp, Industrial	TT-1702	
Kit: G	M96388-KP1		
1	Bracket, Battery Charger	GM93706	
1	Battery Charger 12V, 6A	GM96383	
4	Washer, Plain	M125A-06-80	
2	Washer, Plain 10.5 ID x 20.0 OD	M125A-10-80	
4	Screw, hex cap	M933-06020-60	
2	Screw, hex cap.fully thrd M10 x 25mm	M933-10025-60	
4	Nut. Hex 6mm	M934-06-60	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
Kit: G	M96389-KP1		
1	Battery Charger 12V. 6A	GM96383	
4	Washer, Plain	M125A-06-80	
4	Screw, hex cap, M6x16mm, js500 full thrd	M933-06016-60	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
Kit: G	M96389-KP2		
2	Battery Charger 12V. 6A	GM96383	
8	Washer, Plain	M125A-06-80	
8	Screw, hex cap	M933-06020-60	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
Kit: G	M96390-KP1		
1	Bracket, Battery Charger	GM78810	
2	Battery Charger 12V. 6A	GM96383	
12	Washer, Plain	M125A-06-80	
8	Nut. Hex 6mm	M6923-06-80	
12	Screw, Hex Cap	M933-06025-60	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
Kit: G	M96391-KP1		
1	Battery Charger 12V, 6A	GM96383	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
Kit: G	W96391-KP2		
1	Terminal, battery	345039	
1	Terminal, battery	345056	
2	Battery Charger 12V, 6A	GM96383	
4	Nut, Hex 6mm	M6923-06-80	
4	Screw, hex cap	M933-06020-60	
1	TT Battery Charger, 6 Amp. Industrial	TT-1702	
1	Cable, battery (No.0 x 12") black	X-545-65	

Qty.	Description	Part Number		
Kit: Gl	Kit: GM96391-KP3			
2	Battery Charger 12V, 6A	GM96383		
1	TT Battery Charger, 6 Amp, Industrial	TT-1702		
Kit: Gl	M96392-KP1	•		
1	Bracket, Battery Charger	GM28613		
2	Battery Charger 12V. 6A	GM96383		
8	Nut. Hex 6mm	M6923-06-80		
2	Nut. Hex 8mm	M6923-08-80		
8	Screw, hex cap	M933-06020-60		
2	Screw, hex cap	M933-08030-60		
1	TT Battery Charger, 6 Amp. Industrial	TT-1702		
1	Cable Tie	X-468-1		
1	Cable, battery (No.0 x 12") black	X-545-65		
1	Bushing 1.312 x 1.50 in NPT	X-634-16		
Kit: GI	M96392-KP2	100110		
1	Bracket Battery Charger	GM28557		
1	Bracket, Battery Charger	GM28613		
2	Battery Charger 12V 6A	GM96383		
- 12	Nut Hex 6mm	M6923-06-80		
2	Nut Hex 8mm	M6923-08-80		
8	Screw hex cap	M933-06020-60		
12	Screw hex cap	M933-08030-60		
1	TT Battery Charger 6 Amp Industrial	TT-1702		
1	Cable Tie	X-468-1		
1	Cable, battery (No.0 x 12") black	X-545-65		
1	Bushing, 1.312 x 1.50 in. NPT	X-634-16		
2	Screw, hex wshr hd, drill 1/4-14 x 5/8	X-794-1		
Kit: GI	M96404-KP1			
1	Battery Charger 12V, 6A	GM96383		
4	Nut. Hex 6mm	M6923-06-80		
4	Screw, hex cap	M933-06020-60		
Kit: GI	M103366-KP1			
1	Bracket, Battery Charger	GM103339		
1	Battery Charger 12V, 6A	GM96383		
4	Washer, Plain	M125A-06-80		
2	Nut, Hex 6mm	M6923-06-80		
2	Screw, Pan Head Machine	M7985A-06020-20		
4	Screw, hex cap, M6x16mm, js500 full thrd	M933-06016-60		
1	TT Battery Charger, 6 Amp, Industrial	TT-1702		
Kit: Gl	M103366-KP2	L		
1	Terminal, battery	345039		
1	Terminal, battery	345056		
2	Battery Charger 12V, 6A	GM96383		
4	Nut, Hex 6mm	M6923-06-80		
4	Screw, Pan Head Machine	M7985A-06020-20		
1	TT Battery Charger, 6 Amp, Industrial	TT-1702		
1	Cable, battery (No.0 x 12") black	X-545-65		

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler[®] generator set distributor for availability.

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