

SOLAR® Owner's Manual

Model Nos. HT1224/FMB1224

Commercial Jump Starter/Chargers



⚠ WARNING



**READ ENTIRE MANUAL
CAREFULLY BEFORE
OPERATING UNIT!**

⚠ WARNING - 12/24 VOLT MODELS



Never hook up a 12 Volt DC power source to a 24 Volt DC vehicle. This will grossly overcharge the 12 Volt power source and generate flammable gasses that may explode and cause property damage and/or bodily harm.

Congratulations! You have just purchased the most versatile and dependable unit on the market today.

Keep the unit plugged in when not in use and it will provide long, continuous service and satisfaction.

The **SOLAR** Jump Starter/Charger is specifically designed to jump start and/or charge 12 Volt lead-acid batteries. Follow all battery/vehicle manufacturer's jump starting or charging instructions.

DO NOT JUMP START WITH AC POWER CORD CONNECTED TO 120 VOLT AC POWER SOURCE.

The unit's charger will maintain its internal battery and recharge most lead-acid batteries within 6-12 hours. It will automatically shut off. When the AMPS gauge reaches zero, the onboard batteries are fully charged. The charger constantly monitors its storage battery or the battery it's charging. It may be used to charge maintenance-free, conventional, deep cycle, gelled electrolyte, and recombination batteries.

All flooded acid batteries emit gases when charging. It is critical that fluid levels in the onboard batteries be checked every 30-45 days.

⚠ WARNING	
	DO NOT TIP UNIT OR LAY UNIT FLAT WITH BATTERY INSTALLED!

⚠ WARNING	
	Read these instructions completely before using the SOLAR Jump Starter/Charger and save them for future reference. Before using the SOLAR Jump Starter/Charger to jump start a car, truck, boat or to power any equipment, read these instructions and the instruction manual/safety information provided by the car, truck, boat or equipment manufacturer. Following all manufacturers' instructions and safety procedures will reduce the risk of accident.
	Working around lead-acid batteries may be dangerous. Lead-acid batteries release explosive gases during normal operation, charging and jump starting. Carefully read and follow these instructions for safe use. Always follow the specific instructions in this manual and on the SOLAR Jump Starter/Charger each time you jump start using the SOLAR Jump Starter/Charger. All lead-acid batteries (car, truck and boat) produce hydrogen gas which may violently explode in the presence of fire or sparks. Do not smoke, use matches or a cigarette lighter while near batteries. Do not handle the battery while wearing vinyl clothing because static electricity sparks are generated when vinyl clothing is rubbed. Review all cautionary material on the SOLAR Jump Starter/Charger and in the engine compartment.
	Always wear eye protection, appropriate protective clothing and other safety equipment when working near lead-acid batteries. Do not touch eyes while working on or around lead-acid batteries.
	Always return clamps to their proper storage positions, away from each other or common conductors. Improper storage of clamps may cause the clamps to come in contact with each other, or a common conductor, causing the battery to short circuit and generate high enough heat to ignite most materials.
	Use extreme care while working within the engine compartment, because moving parts may cause severe injury. Read and follow all safety instructions published in the vehicle's Owner's Manual.
	The battery in the SOLAR Jump Starter/Charger contains liquid acids which are hazardous if spilled. In addition, batteries being charged with the SOLAR Jump Starter/Charger unit likely contain liquid acids which are hazardous if spilled.

SAFETY INSTRUCTIONS

1. Use of an attachment not recommended or sold by manufacturer may result in a risk of fire, electric shock, or injury to persons.
2. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting unit.
3. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
4. 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 pins on plug of extension cord are the same number, size, and shape as those of plug on unit; extension cord is properly wired and in good condition; wire size is large enough for the length of cord as specified in the following chart:

Length in feet:	25	50	100	150
Cord AWG size:	16	12	10	8

5. Do not operate unit with damaged cord or plug - replace them immediately.
6. Do not disassemble unit – take it to/or call a qualified technician when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
7. To reduce risk of electric shock, unplug unit from outlet before attempting any maintenance or cleaning.

PERSONAL SAFETY PRECAUTIONS

1. Someone should be within range of your voice 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.
2. 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.
3. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
4. 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.
5. 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 a ring or the like to metal, causing a severe burn.
6. When using unit as charger, charge LEAD-ACID batteries only. It is not intended to supply low-voltage power for applications other than battery charging. Do not use with batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage property.
7. NEVER JUMP START OR CHARGE a frozen battery. Any battery that is suspected of being frozen must be thawed before jump starting or charging.

GROUNDING AND AC POWER CONNECTION INSTRUCTIONS

Unit should be grounded to reduce risk of electric shock. Unit is equipped with an AC 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

Never alter the AC cord or plug provided – if it will not fit outlet, have proper outlet installed by a qualified electrician. This unit is for use on a 120 Volt, 60 Hz cycle circuit. A temporary adapter may be used to connect this plug to a two-pole receptacle if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician. Before using adapter, be certain that center screw of outlet plate is grounded. The green rigid ear or lug extending from adapter must be connected to a properly grounded outlet – make certain it is grounded. If necessary, replace original outlet cover plate screw with a longer screw that will secure adapter ear or lug to outlet cover plate and make ground connection to grounded outlet.

UNIT ASSEMBLY AND SETUP

CHARGING INSTRUCTIONS

Batteries have already been installed in units and are ready for immediate use. We recommend charging the unit upon receiving, so you will have maximum power for your jumping needs.

1. Unwrap AC power cord from unit and plug into 120VAC outlet.
2. Charger will read internal battery status and apply the proper charge needed within 3-5 seconds.
3. When batteries are fully charged the AMPS gauge (left gauge) will read 2 Amps.
4. Unplug and rewrap AC power cord.
5. Unit is ready for use.

VEHICLE HARNESS (FMB1224 MODEL ONLY)

Two 25 ft. #4 gauge cables are provided with FMB1224 for optional charging of unit from vehicle in which the box unit is mounted.

CONNECTING VEHICLE HARNESS

1. Cables must run from box unit into engine compartment area.
2. Do not allow cable to touch any moving parts of engine.
3. Positive cable (red band) connects to alternator 12 Volt output.
4. Negative cable (black band) connects to engine ground (any non-moving part of the engine block or heavy gauge metal part of frame).
5. Excess cable can be tied off or pulled into box unit.

USING VEHICLE HARNESS

When vehicle engine is running, alternator will charge box unit. Running vehicle while FMB1224 is connected in 24 Volt mode will not harm vehicle, but it will only allow alternator to charge the #1 battery in the box unit. **For full charging of all batteries ensure FMB1224 is in 12 Volt mode.**

OPERATING INSTRUCTIONS

⚠ WARNING - 12/24 VOLT MODELS



Never hook up a 12 Volt DC power source to a 24 Volt DC vehicle. This will grossly overcharge the 12 Volt power source and generate flammable gasses that may explode and cause property damage and/or bodily harm.

JUMP STARTING

For box units equipped with installed vehicle harness, leave vehicle running for best performance.

WARNING: DO NOT JUMP START WITH AC POWER CORD CONNECTED TO 120VAC POWER SOURCE. NEVER JUMP START A FROZEN BATTERY. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

1. Set selector cable to proper voltage of vehicle being jump-started. Either 12 or 24 Volts.
2. If vehicle has 12 Volt system with dual batteries, place cable on battery closest to starter.
3. Position DC jumper cables to reduce risk of damage by hood, door, or moving engine part.
4. Stay clear of fan belts, pulleys, and other parts that can cause injury to persons.
5. Connect POSITIVE (RED) clamp from unit to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery last.
Note: Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
6. Start the vehicle (turn on the vehicle ignition).
Note: If the vehicle doesn't start within 6 seconds, let the unit cool for 3 minutes before attempting to start the vehicle again or you may damage the unit.
7. When disconnecting unit, **ALWAYS** disconnect the negative clamp from vehicle chassis first. Remove positive clamp from battery terminal second.

CHARGING

WARNING: UNIT CANNOT CHARGE VEHICLE WITH 24 VOLT SYSTEM! UNIT CAN ONLY CHARGE IN 12 VOLT SETTING. DO NOT JUMP START WITH AC POWER CORD CONNECTED TO 120VAC POWER SOURCE. NEVER JUMP START A FROZEN BATTERY. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

1. Position DC jumper cables to reduce risk of damage by hood, door, or moving engine part.
2. Stay clear of fan belts, pulleys, and other parts that can cause injury to persons.
3. Connect POSITIVE (RED) clamp from unit to POSITIVE (POS, P, +) post of battery. Connect NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery.
Note: Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
4. Connect AC power cord to 120VAC power source. When battery being charged is fully charged, the AMPS gauge (on front panel) will read 0 Amps.
5. When disconnecting unit, **ALWAYS** disconnect AC power cord first. Disconnect clamp from vehicle chassis second. Remove clamp from battery terminal last.

SERVICE/REPAIR

RECOMMENDED BATTERY SPECIFICATIONS

1. Size: Group 31, 900-1200 CCA
2. Use battery with sealed top or with screw type flush fill caps. This will help prevent acid leakage should unit be inadvertently laid flat or turned over.
3. Use battery with 3/8" threaded studs.
4. A high quality battery emits fewer gases as it recharges. Using a high quality battery will extend charger and wiring life. Battery acid and petroleum resistant wiring is used in this unit. Battery fluid level must be checked every 30 to 45 days.

BATTERY REPLACEMENT (HEAVY TRUCK HT1224)

See Figure 1

REMOVING OLD BATTERIES

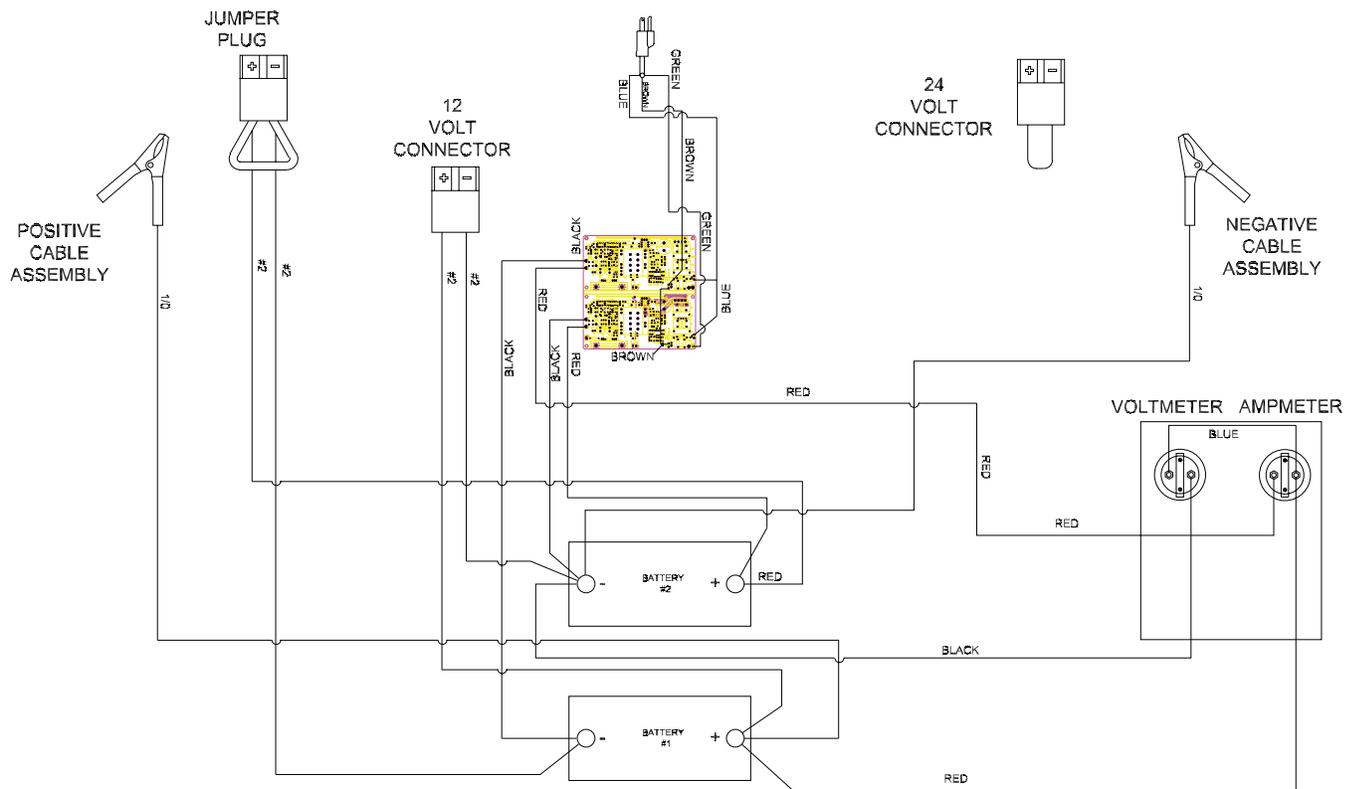
1. Remove front top panel by removing (8) #8 Phillips screws securing panel. Remove bottom front panel by removing (3) top and (3) bottom #8 Phillips screws (2 middle side screws are false screws –DO NOT try to remove).
2. Disconnect cables and wires from batteries. Label for easier reconnection. Move cables out of way.
3. Remove the nut from the left side of the AMPS gauge and disconnect red wire.
4. Disconnect the two fast on connectors of the power cord wires from charger. Remove green power cord wire from charger by removing 6-32 nut.
5. Remove charger from unit by removing top (5) #8 Phillips screws from back panel (3 bottom screws are false screws – DO NOT try to remove). Lift out panel and charger. Set aside.
6. Remove front and rear hold-down bars by removing (4) 1/4-20 bolts with 7/16" sockets or wrenches. Set aside for later use. DO NOT touch hold-down across battery terminals, as arcing will occur.
7. Remove upper rear battery by lifting battery up, turning and sliding it out rear opening of unit.
8. Remove lower front battery by lifting battery up, turning and sliding it out rear opening of unit.

INSTALLING NEW BATTERIES

1. Slide first battery in through rear opening, turning battery so that its vent faces the front of unit. Then set battery on lower platform of battery stand.
2. Slide second battery in through rear opening, turning battery so that its vent faces the front of unit. Then set battery on upper platform of battery stand.
3. Install rear hold-downs, then front hold-downs, using (4) 1/4-20 bolts. DO NOT touch hold-downs across battery terminals, as arcing will occur.
4. Insert back plate with charger onto the unit and re-fasten the (5) #8 x 1/2" screws securing it into place.
5. Connect red wire from Charger #1 (upper charger) to the AMPS gauge, replace the nut and tighten.
6. To left side of rear battery (Battery #2, NEG Terminal) connect the black wire from Charger #2 (lower charger), Cable from Negative side of 12 Volt quick connect, and Negative jumper cable with attached black wire from the right side of VOLTS gauge. Apply nut and tighten.
7. To right side of rear battery (Battery #2, POS Terminal) connect the red wire from Charger #2 (lower charger) and cable from Positive side of Common Quick Connect with handle. Apply nut and tighten.
8. To left side of front battery (Battery #1, NEG Terminal) connect the black wire from Charger #1 (upper charger) and cable from Negative side of Common Quick Connect with handle. Apply nut and tighten.

9. To right side front battery (Battery #1, POS Terminal) connect the cable from the Positive side of the 12 Volt quick connect and Positive Jumper Cable with attached red wire from the right side of AMPS gauge. Apply nut and tighten.
10. Connect green ground wire of Power Cord to bottom right bolt of charger mount and apply second 6-32 nut and tighten.
11. Connect the two fast on connectors of the Power Cord to the open terminals of the double male / single female connectors on Charger #1 (Upper charger).
12. Make sure the battery type switch that is mounted by fan on dual charger is set to the type of battery installed in unit. (STD for standard flooded cell batteries, AGM for AGM batteries.)
13. Plug in Power Cord to charge the batteries. The AMPS gauge will register the proper charge rate being applied to the batteries. (Internally, both chargers will have a red LED lit showing the start of the charge cycle.)
14. When the AMPS gauge reaches "0", the batteries are fully charged and the unit is ready for use. (Internally, both chargers will have a green LED lit showing charge cycle complete and both chargers in maintain mode.)
15. Replace bottom front panel and secure with the (6) #8 x 1/2" Screws.
16. Replace the faceplate and secure with the (8) #8 x 1/2" Screws.

FIGURE 1 – HT1224 WIRING DIAGRAM



BATTERY REPLACEMENT (FIX MOUNT FMB1224)

See Figure 2

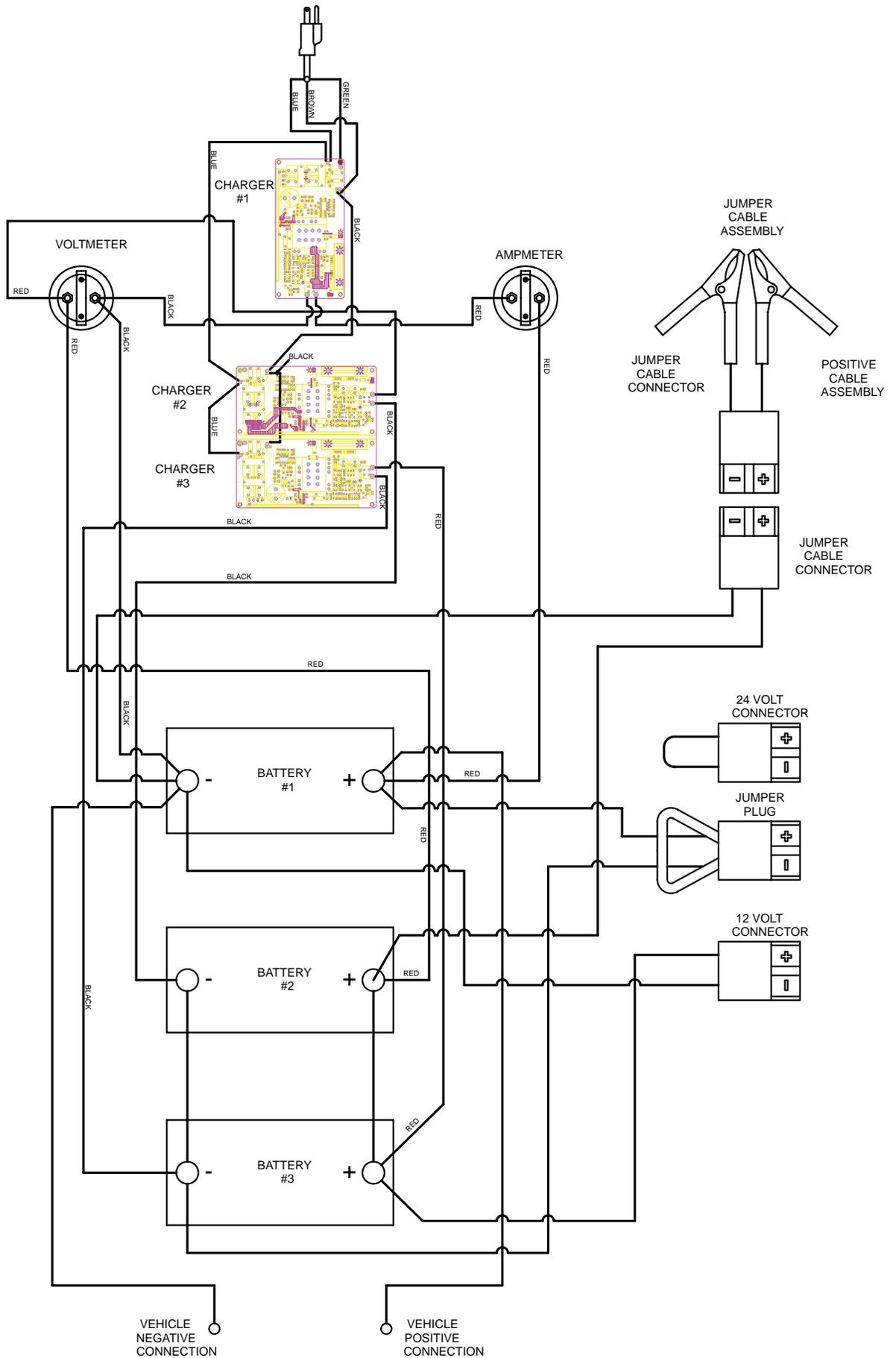
REMOVING OLD BATTERIES:

1. Open box lid.
2. Disconnect cables and wiring from batteries.
3. Loosen hold-down by removing 1/4–20 bolt on end of box, by vehicle harness. This will allow hold-down to pivot up.
4. Lift and remove old batteries.

INSTALLING NEW BATTERIES

1. With hold-down pivoted up, place 3 new batteries with negative terminals against back of case.
2. Pivot hold-down onto batteries and secure with 1/4–20 bolt.
3. Order of Connection for cables and wiring.
 - a) To #3 Battery (battery furthest from chargers) NEG Terminal connect:
One end of the 12" 4/0 Cable jumper (other end goes to battery #2 NEG).
#2 AWG negative cable from the common quick connect (red housing with handle).
Black wire from Channel #1 of dual charger (lower channel).
 - b) To #3 Battery POS Terminal connect:
One end of second 12" 4/0 Cable jumper (other end goes to battery #2 POS).
#2 AWG positive cable from 12 Volt quick connect.
Red wire from Channel #1 of dual charger (lower channel).
 - c) To #2 Battery (middle battery) NEG Terminal connect:
Other end of 12" 4/0 cable jumper from NEG terminal of battery #3.
Black wire from Channel #2 of dual charger (upper channel).
 - d) To #2 Battery POS Terminal connect:
Other end of 12" 4/0 cable jumper from POS terminal of battery #3.
4/0 positive cable from jumper cable quick connect (gray housing).
 - e) To #1 Battery (closest to chargers) – NEG Terminal connect:
4/0 negative cable from jumper cable quick connect (gray housing).
#2 AWG negative cable from 12 Volt quick connect.
#4 AWG negative cable of vehicle harness.
 - f) To #1 Battery POS Terminal connect:
#2 AWG positive cable from the common quick connect (red housing with handle).
#4 AWG positive cable of vehicle harness.
Red wire from AMPS gauge right side (stud closest to front of unit).
4. Tighten all battery nuts.
5. Compare all connections against the attached schematic to ensure that all elements of the FMB1224 system are properly connected.
6. Make sure both battery type switches (mounted by fans on chargers) are set to the type of batteries installed in unit. (STD for standard flooded cell battery, AGM for AGM battery).
7. Plug in unit power cord to charge the batteries. The AMPS gauge will register the proper charge rate being applied to the batteries. Internally, all chargers will have a red LED lit showing the start of the charge cycle.
8. When the AMPS gauge reaches "0", the batteries are fully charged and the unit is ready for use. Internally, all chargers will have a green LED lit, indicating charge cycle is complete and maintenance mode engaged.
9. Close lid of FMB1224 unit.

FIGURE 2 – FMB1224 WIRING DIAGRAM



TROUBLESHOOTING

Problem	Possible Cause	Solution
Unit won't jump	Quick connects not locked together	Check quick connects
	Poor grip connections	Check grip connections
	Low/defective battery	Load test/replace battery
	Loose jumper cable connection to battery	Clean/tighten battery connections
Unit won't charge	Poor grip connection	Check grip connection
	Faulty 120VAC outlet	Check or change outlet
	Bad plug on unit	Check continuity of plug pins/replace plug
	Loose/defective connections	See figure of unit to check wiring connections
	Defective amp gauge	Short across studs on gauge to see if charger comes on - replace gauge
	Faulty charger	Replace charger