

FEATURES

- ❖ Extends the trolling motor run time by charging the trolling motor batteries each time the boat's main engine is used.
- ❖ Automatically senses engine's alternator charge voltage, connects trolling motor batteries in parallel with the main battery to charge.
- ❖ Automatically disconnects from main battery when not charging returning trolling batteries to series 24V for trolling motor operation.
- ❖ Compatible with 120V AC multiple bank trolling battery chargers.
- ❖ An optional single battery charger on the starter battery can also charge the trolling batteries.
- ❖ AUTO (Charge)-OFF-12V DC (All) Power Switch.
- ❖ Meets U.S. Coast Guard Title 33, Section 183.410 electrical requirements for recreational boats.

APPLICATIONS

- ❖ Fishing boats using 24V trolling motors

DESCRIPTION & OPERATION

The MBCM-24 monitors the engine battery and when it sees the alternator putting out charge current it switches the trolling motor batteries from a series configuration (24V DC) to a parallel configuration (12V DC) and connects them in parallel with the main battery to be charged by the alternator. When the engine is shut-off, both trolling motor batteries return to series configuration and disconnect from the main battery. In a two battery configuration (where the main battery is also used to power the trolling motor) the main battery is always connected to the alternator to absorb the charge current and the MBCM-24 re-connects the second battery from series to parallel configuration for charging.

The MBCM-24 is powered by the Red/Red & Black/Red main battery wires (drawing less than 15 mA continuous current). When the boat's engine is started and the alternator output voltage exceeds 13.7 volts ($\pm .1V$), the MBCM-24 energizes the change-over relay, checks to make sure the second battery's negative is connected to ground, then energizes the charge relays connecting main battery in parallel with the two trolling motor batteries so that they all can be charged by the alternator. The MBCM-24 doesn't de-energize the change-over and charge relays until the main battery voltage drops below 12.8V or the alternator charge current to the trolling batteries drops below 6 Amps. It also senses the alternator dropping out and switches the trolling batteries back to 24V operation within 5 seconds. If the main battery is almost fully discharged, the MBCM-24 waits until the main battery's charging voltage exceeds 13.7 volts before connecting the trolling batteries.

The MBCM-24's charge outputs (Red/Blue & Red/Org wires) use a 50 Amp auto-reset circuit breaker to protect the main battery and alternator from short circuit conditions that could occur.



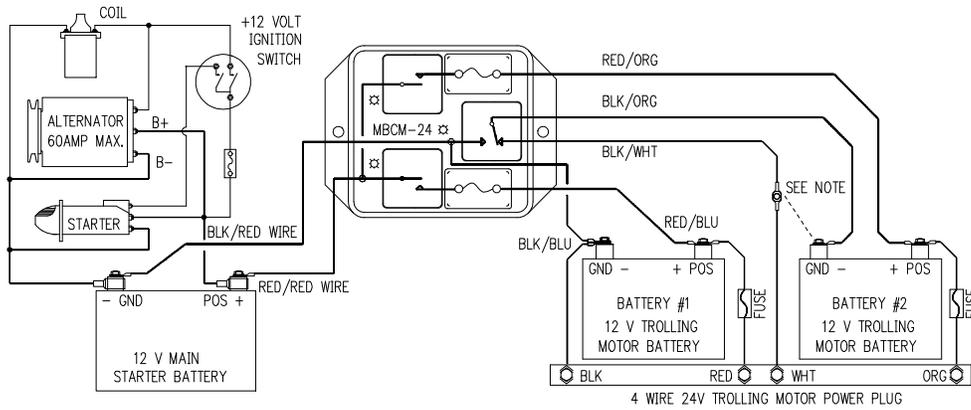
SPECIFICATIONS

SIZE:	3.25"W x 5.5"L x 1.5"H
WEIGHT:	48 ounces, housing, main and trolling motor battery cables
ENCLOSURE:	Epoxy potted in PVC plastic to prevent ignition sparks
MOUNTING:	Two #8 screws
POWER:	10 to 15V DC from battery
CONNECTIONS:	6 ft. set #6 AWG Main-Bat cables 3 ft. set #8 AWG Trolling-Bat cables 18 ft. set #6 main - FB option
CURRENT CONSUMPTION:	Idle mode \leq 15mA Charge mode \leq 330mA
THRESHOLD:	On @ 13.7V DC \pm 0.1V DC Off @ 12.8V DC \pm 0.1V DC
INDICATION:	Three LEDs Green Change-over relay energized Red Charge Relays energized Yellow Power indication (On)
RELAYS:	Change-over relay - CAR1C80DC12 Charge relays - CAR1A80DC12
RATING:	Current: 80A continuous, 160A inrush
CAPACITY:	Up to 75 Amp Alternator systems
PROTECTION:	BUSS 50 Amp Circuit Breakers
TEMPERATURE:	-30 to 75°C

ORDERING INFORMATION

- MBCM-24(2P)** - Multiple Dual Battery Charging Module Handles up to 75 Amp Sys. 2 Wire Trolling Plug
- MBCM-24(4P)** - Multiple Dual Battery Charging Module Handles up to 75 Amp Sys. 4 Wire Trolling Plug
- MBCM-24FB** - Same as MBCM-24(2P) but with 18 foot main battery cables for front mounted trolling batteries

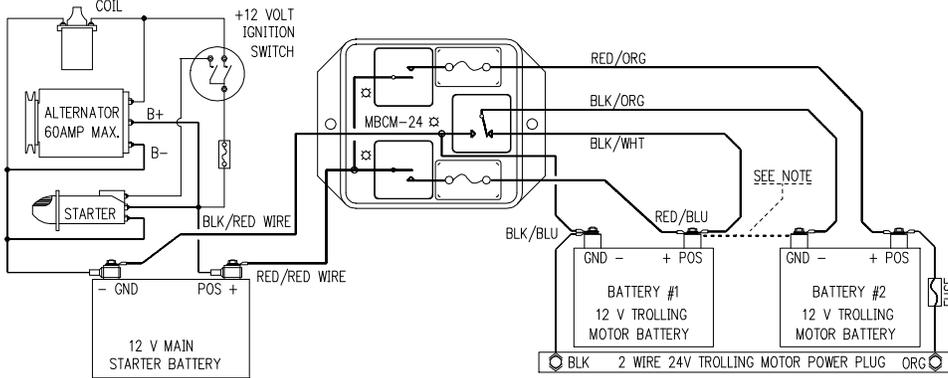
APPLICATION 1 - FOUR WIRE 12/24V CONNECTION



NOTE: The white wire connected to the GND of battery #2 **must be reconnected** to MBCM-24's Black/White wire to avoid permanent damage to the unit and trolling batteries. All other MBCM-24 connections are added to the battery terminals.

The MBCM-24 connects between the starter battery and the trolling motor batteries. It reconnects the two trolling motor batteries from series 24V mode to parallel 12V mode only when a charge voltage is detected (when the main motor is running), and then connects them to the main starter battery to be charged by the alternator.

APPLICATION 2 - TWO WIRE 24V CONNECTION

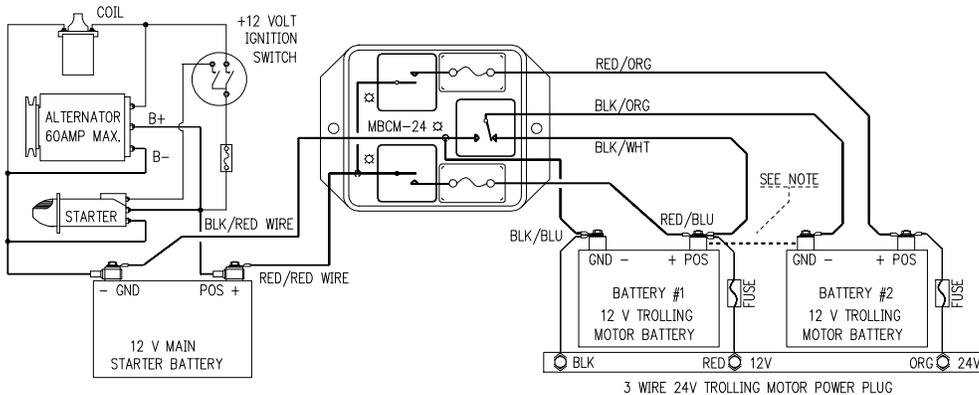


NOTE 1: The wire connected between the two trolling batteries **must be removed** and the MBCM-24's Black/White wire is connected to battery #1 positive terminal. Failure to do so will permanently damage the unit and void all warranties.

NOTE 2: The "2P" Model does not include the Black/White wire. It is jumpered internally. Only the Red/Blue wire needs to be connected to Battery #1 positive terminal.

The MBCM-24 connects between the starter battery and the trolling motor batteries as in Application 1. All other MBCM-24 connections are added to the battery terminals. If the trolling circuit fuse is in the battery jumper, add the jumper with the fuse in series with the 24V positive leg.

APPLICATION 2A - THREE WIRE 12/24V CONNECTION

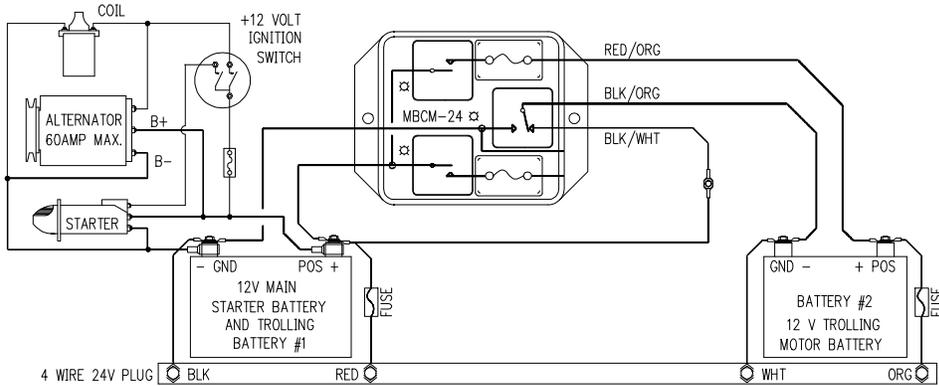


NOTE 1: The wire connected between the two trolling batteries **must be removed** and the MBCM-24's Black/White wire is connected to battery #1 positive terminal. Failure to do so will permanently damage the unit and void all warranties.

NOTE 2: The "2P" Model does not include the Black/White wire. It is jumpered internally. Only the Red/Blue wire needs to be connected to Battery #1 positive terminal.

The MBCM-24 connects between the starter battery and the trolling motor batteries as in Application 1. All other MBCM-24 connections are added to the battery terminals. If the trolling circuit fuse is in the battery jumper, add the jumper with the fuse in series with the 24V positive leg. The MBCM-24 wiring is identical to that of the two wire plug.

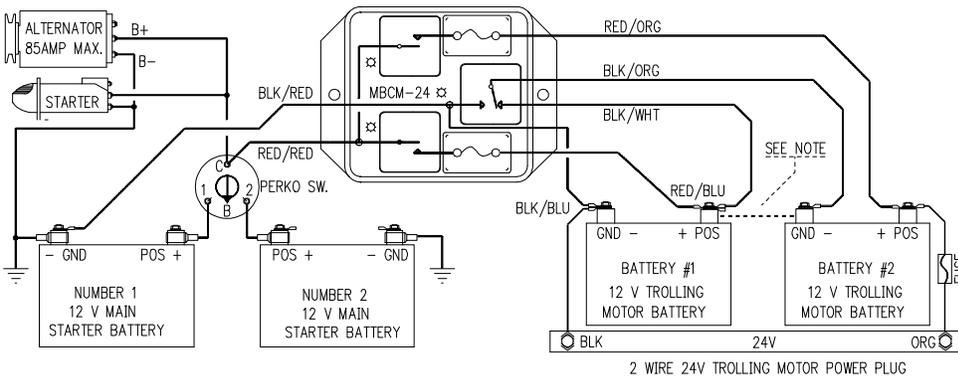
APPLICATION 3 - FOUR WIRE 12/24V CONNECTION (Two Battery Configuration)



NOTE: The blue set of wires are not used and should be properly insulated to avoid shorting.

The MBCM-24 connects between the starter battery and the trolling motor battery. It reconnects the trolling motor battery and starter battery from series 24V mode to parallel 12V mode (only when a charge voltage is detected, when the main motor is running), so that both batteries are charged by the alternator.

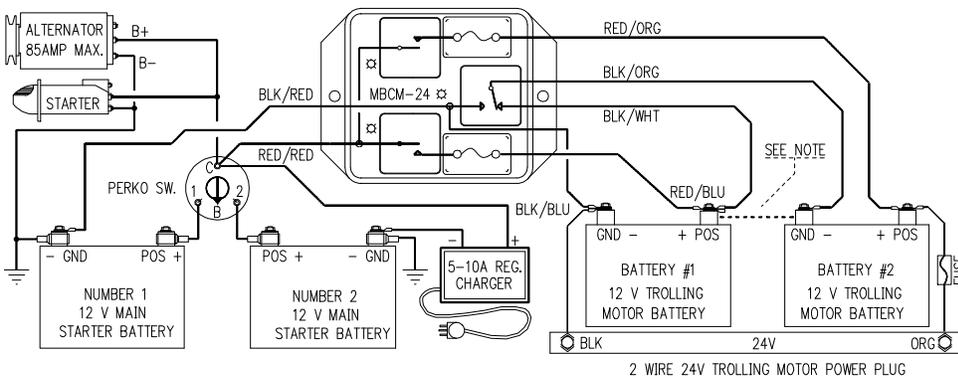
APPLICATION 4 - TWO CRANK BATTERIES W/ PERKO SWITCH



NOTE: The existing jumper between battery #1 and battery #2 **must be removed** when installing the MBCM-24 to avoid damaging the unit and voiding the warranty (as noted in Application 2 & 2A).

The MBCM-24 is connected to the starter/alternator common wire on the Perko switch. This way the crank batteries can be shut off, selected to start the engine and charge one at a time or they can both charge together if the Perko switch is selected to the "Both" position. Since the MBCM-24 is wired to the alternator output, it will switch charge to the trolling batteries whenever the alternator voltage rises above 13.7 volts, independent of the Perko switch position.

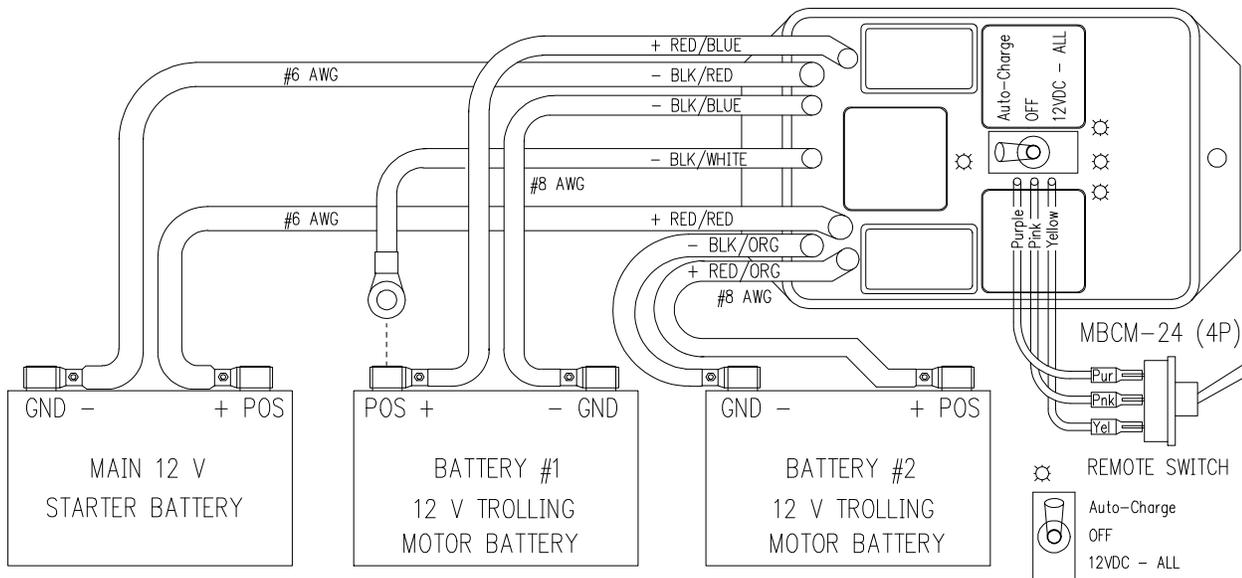
APPLICATION 5 - TWO CRANK BATTERIES W/ PERKO SWITCH AND 120VAC CHARGER



NOTE: The existing jumper between battery #1 and battery #2 **must be removed** when installing the MBCM-24 to avoid damaging the unit and voiding the warranty (as noted in Application 2 & 2A).

The MBCM-24 is connected to the starter/alternator positive wire. A single output 120V AC powered regulated battery charger is then connected to the positive starter wire. With the Perko Switch in the "Off" position, plug in charger. The MBCM-24 should begin charging within 30 seconds, if not, the charger requires a battery load before charging. Set Perko Switch to 1, 2 or Both. The MBCM-24 allows the selected batteries to charge to 13.7 volts before switching and charging trolling batteries.

EXTEND-A-TROLL CUSTOMER INFORMATION



About Your Charger Controller

Your MBCM-24 charger senses when your main engine alternator is charging, measures the starting battery voltage and when it is charged up to 13.7V, switches your 24V trolling batteries from series to 12V to charge from the alternator along with the starting battery. It will switch the trolling batteries back to 24V when the alternator is no longer charging. Some things to be aware of are:

- C Did the charger switch back to 24V each time you stopped to fish?
- C When you checked the charger, what lights were on? (Green LED is 12V, Red LEDs mean charge)
- C What was the charge time when you got home: shorter, longer or same for your trolling batteries?
- C If you start your day with your starting battery only partially charged, it could discharge completely from extended use of your live-well pump and not charge back fully from your alternator if your trolling batteries are also very low.
- C If your fishing doesn't include any longer runs between spots, you may wish to leave your MBCM-24 charger switched off. Your main battery probably needs all your alternator charge current to replenish the current drawn by live well pump operation.

In Case Your Charger Does Not Switch Back To 24V After Charging

If your charger remains on 12V (charge mode) after you have turned off the main motor it should switch back after a few seconds. You can force it to switch back by turning either the module or remote power switch to "Off" and the trolling battery voltage will instantly revert to 24V DC.

Long-term Boat Storage

Your MBCM-24 charger draws less than 0.015 Amps from your starting battery when in "Auto" mode. This is less than 10 Amp hours per month. If this is unacceptable, disconnect your charger by shutting off the switch for winter storage. The trolling batteries will remain at 24V DC.

If Your Main Battery is Discharged

If running your live well pump or other electronic devices has discharged your main battery so that you can't start your engine, you can use your trolling batteries in parallel at 12V DC with your main battery to "jump" start your engine. Turn off all main battery loads. Flip the MBCM-24 power switch over to "12VDC-ALL" mode for 2 seconds then flip it all the way back to "Auto-Charge." You have about 15 seconds to start your engine before the MBCM-24 disconnects the main battery from the trolling batteries which revert back to 24V mode. Your main battery must have at least 10V DC for the MBCM-24 to switch into the "12VDC" mode.

INSTALLATION INSTRUCTIONS

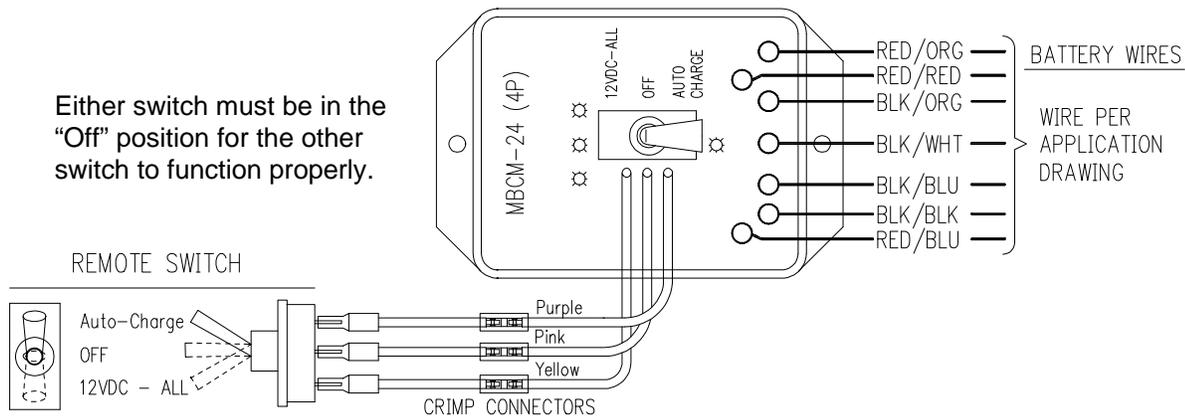
1. Using your volt-meter, identify and label the main starter battery and two trolling motor batteries. To determine which trolling battery is #1 or #2, measure between the positive terminal of one battery and the negative terminal of the other battery. When you measure +24V DC, trolling battery #1 will be the battery connected to the negative lead of your meter (label this battery #1). Trolling battery #2 will be the battery connected to the positive lead of your meter (label this battery #2).
- 2a. Two wire 24V connection (see Application 2), disconnect the jumper wire between the two batteries (not any on-board charger wires). Failure to do so will permanently damage the unit and void all warranties. Place the black/white wire, if present, on trolling battery #1 positive terminal. If the jumper contains the trolling circuit fuse, locate the fuse in the +24V DC trolling motor wire. Three wire 24V plug wires the same (see Application 2A).
- 2b. Four wire 24V connection (see Application 1) you need an MBCM-24 with 7 battery wires. Disconnect the trolling motor wire (not any on-board charger wires) from the negative terminal of trolling battery #2 only and connect it to the black/white wire of the MBCM-24 using a 3/8" bolt. Tighten the bolt and wrap electrical tape around the connection.
3. Add the red/blue and black/blue wires to the respective positive and negative terminals of trolling battery #1. Add the red/orange and black/orange wires to trolling battery #2. Do not remove any charger or trolling wires and tighten the connections with a wrench.
4. Verify the installation to this point by measuring 24V DC as in Step 1. Also verify that your 24V DC trolling motor operates properly as before. (Mount and wire the optional remote switch described in Option-1.)
5. Now connect the longer wire pair of red/red and black/red wires to the respective positive and negative terminals of the main starter battery. Tighten connections as above.
6. Now mount the MBCM-24 to suitable location with stainless steel screws. Route the wires and use tie wraps or electrical tape to secure the cables appropriately.
7. Test your MBCM-24 by switching the power switch to the "12VDC-ALL" position for 2 seconds then over to the "Auto- Charge" position. The unit will switch to the 12V charge cycle for 20 seconds (see par. 8 below) then switch back to 24V.
8. You may also test the MBCM-24 by running your outboard motor while attached to a garden hose. After the alternator charging voltage measured on the main starting battery exceeds +13.7V DC, (you may have to rev over 1000 RPM to get the alternator to kick-in), the MBCM-24 will first switch the trolling batteries from a series to parallel configuration (change-over charge mode), green LED lights verify that the batteries have switched properly and then starts charging (red LED lights). Allow 15 seconds for the charging cycle to start. If the trolling batteries are fully discharged the MBCM-24 may go through several 5-10 second cycles until the trolling battery's voltage has risen sufficiently for the charging to stay on. The MBCM-24 will stop charging when it senses that the alternator is no longer operating, ie: the motor is turned off.
9. The MBCM-24 will charge automatically every time the motor is started and the main battery doesn't need all the charge current. During charging only 12V DC is available at the trolling motor plug.

TESTING YOUR CHARGER

1. Connect one volt-meter (or use your dash battery meter) to the starting battery and another meter to your trolling batteries.
2. Verify wiring per the installation instructions, measure 24V DC on the trolling batteries and 12V DC on your starting battery.
3. Flip the power switch to the "Auto-Charge" position. Then on the lake, test tank or with a hose connection, start your motor. Advance the RPM to the point where your alternator kicks-in, verified by a voltage jump above 13V on the starting battery.
4. Now rev up your motor to where the starting battery voltage exceeds 13.7V. Within 12-15 seconds the MBCM-24 will switch the trolling batteries to 12V (green LED) then 2 seconds later to charging (red LEDs).
5. If the trolling batteries are fully charged and won't accept at least 6 Amps, the MBCM-24 will switch from charging back to 24V in several seconds. The charge mode will cycle again in about 15 seconds.
6. After verifying the charge operation for at least several minutes throttle back the motor, then shut it off. The MBCM-24 will switch back to 24V mode when the alternator is off or isn't delivering at least 6 Amps to the trolling batteries.
7. If your starting battery is very low prior to starting the test, it may take a number of minutes on the alternator to charge to 13.7V before the trolling batteries start to charge. If your trolling batteries are very low prior to charging, the charger may cycle in 15 second periods until the trolling batteries are charged enough to "stay on-line."

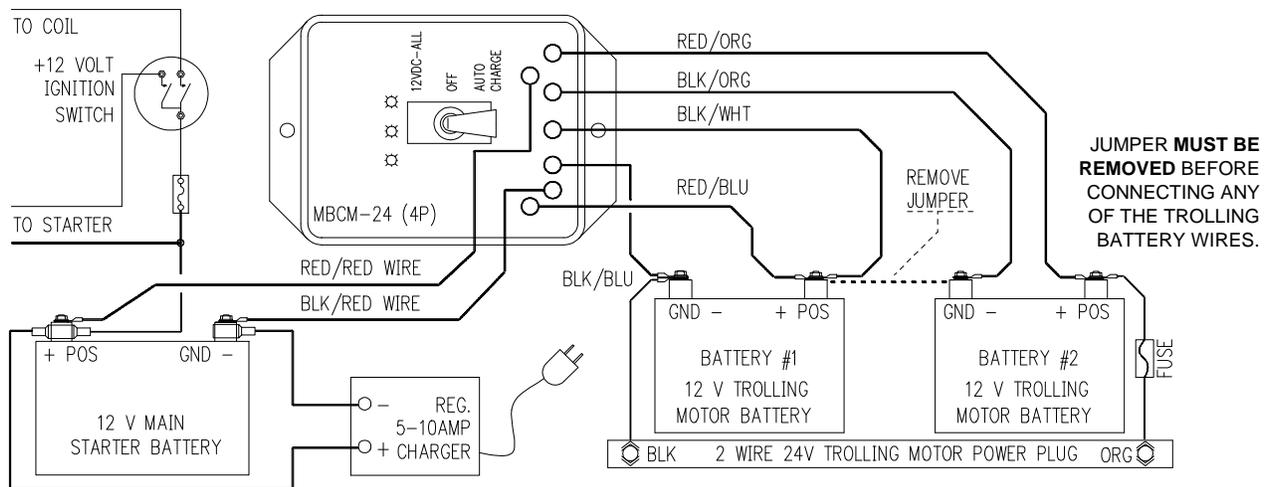
NOTE : The MBCM-24's long term battery discharge rate is about 10 amp-hr per month. If this is a problem for long term storage, turn off the switch. DO NOT shorten battery charge wires as this will VOID warranty and reduce current limiting capability!

OPTION - 1 CONSOLE (REMOTE) MOUNTED POWER SWITCH



The boat operator may wish to have the “Extend-A-Troll” power switch remote mounted at the operators console or helm. This is accomplished by mounting a (3) position-center off switch and connecting the (3) switch terminals to the (3) 18 gauge wire crimp connectors as shown. The module switch must be left in the “OFF” position (center) for the remote switch to function properly. Test the remote switch by flipping it from the center to both positions and observe that the same module LED’s light as if the module switch were flipped. If the console switch operation is backwards, rotate the switch or switch the wires to the two outside terminals of the switch.

OPTION - 2 SINGLE OUTPUT BATTERY CHARGER



If over-night charging with an expensive 3 output charger during fishing tournaments is not a priority, the MBCM-24 allows the use of a much less expensive regulated single output charger to charge all three of the boat’s batteries. Unregulated chargers may be used, but the batteries must be watched to not overcharge.

By flipping the Auto/Off/12VDC switch to the “12VDC-ALL” position, the MBCM-24 switches the trolling batteries from series to a parallel configuration and connects them in parallel with the crank battery for charging. When the charger is plugged in it then charges all three batteries at the same time. When you disconnect the charger remember to flip the switch back to the “AUTO” position for 24V trolling motor operation.