TROLLBRIDGE36® COMBINER

CHARGE 36 or 24 VOLT TROLLING BATTERIES FROM 12 VOLTS

SUMMARY

The Trollbridge36® Combiner allows you to charge your 36 (or 24) volt trolling motor battery from the 12 volt alternator on your main engine, from your trailer hookup or from any single output 12 volt charger. It works automatically by putting the 12 volt batteries in series when you need to run the trolling motor and putting them in parallel for charging.

IMPORTANT - FIRST SETUP INITIALIZATION

The Trollbridge36® adapts some of its operating parameters to match the batteries and trolling motor you are using. This learning process is automatic. If ***all*** batteries have been disconnected for about 30 seconds, the memory will be reset and the learning process may have to start again. For this reason the Trollbridge36® should be left on at all times to retain the settings. It draws no current after shutting down automatically after use.

The initialization procedure s tarts when the first battery is connected and continues for about 2 minutes. The trolling motor should be connected but not running while installing the batteries. For correct results, all batteries should be connected within 2 minutes of connecting the first one so they are established during the testing period. If you don't complete it in time, disconnect all batteries and then reconnect after waiting **at least 30 seconds**. All 6 LEDs will be flashing dim/bright together to indicate setup.

While all the LEDs are flashing and after you have connected all the batteries (two or three) you should start your trolling motor momentarily at max. speed setting. The test is being done at 12 volts so the trolling motor may or may not run but this is not important for the purpose of measuring the current draw.

To minimize power when not in use for extended periods the Trollbridge36® will go into a "sleep" mode. It will wake up if put on charge so a short run of the outboard on the way to the fishing spot will enable it. Without a charge it will also wake up when the trolling motor is turned on however some models of trolling motors may not re-start the computer. If you have this problem you will need to run the outboard for a minute or install the optional Remote Control push button. This will rarely be necessary.

FEATURES

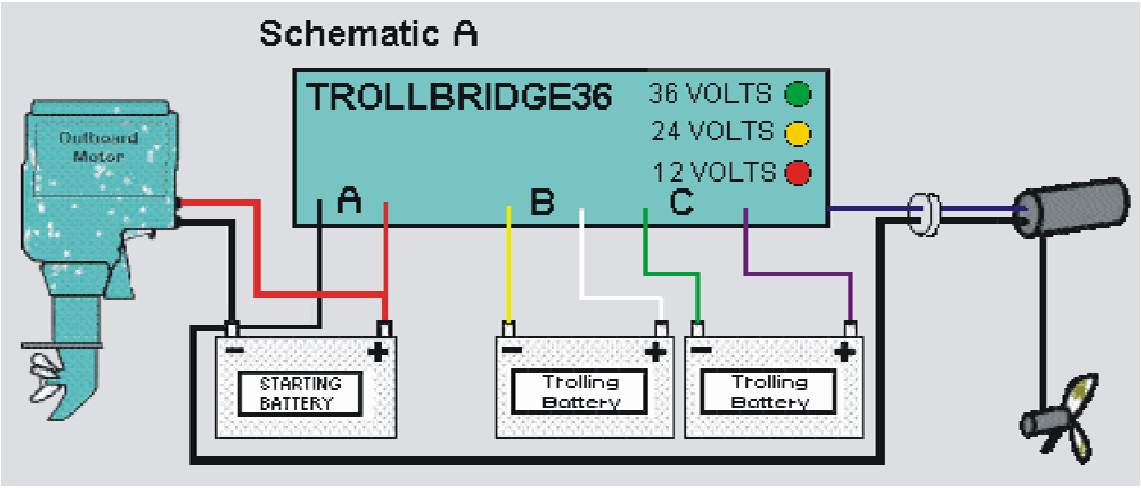
- Fully automatic changeover from charging to running
- Can share the starting battery with trolling if desired to save weight with a 3 battery 36V dual purpose system
- Eliminates the need for multiple output chargers
- Compact, can be conveniently located with the batteries
- Built in combiner on batteries 2 and 3.
- Rated for 12 volt charging sources up to **100 amps**
- Rated for 36, 24or 12 volt trolling motors up to **85 amps**
- 6 LEDs allow reading charging progress in 5% steps
- LEDs show remaining charge in batteries while trolling
- Remote indicator/controller in optional kit
- LEDs dim automatically at night
- Low voltage shutdown (with override) to protect batteries
- Manual controls available with optional remote kit
- Charging is done at 12 volts so motor is protected from high charging voltages
- Nearly UNLIMITED warranty **§**
- Waterproof - will operate submerged in salt water
- Ignition rated for explosive atmospheres
- No voltage drop so batteries reach full charge
- No voltage drop so motor gets full power
- Over 99% efficient, no heat sink or cooling fan required
- No modification to alternator or 12 volt wiring
- Simple 7 wire basic installation
- Comes with all cables for basic hookup
- Draws only 150 microamps when off - no switch needed
- No diodes to burn out if accidentally shorted
- Withstands ambient temperature to over 175°F (80°C) for engine compartment mounting

SAFETY CONSIDERATIONS

DANGER: **ISOLATE ALL LEADS WHILE INSTALLING. Applying power to one will make all the others alive. Avoid shorts to each other or battery.** If you are only doing a 24 volt or 12 volt installation, it is essential that the unused wires have their ends insulated and protected - they will be hot.

WARNING: Use 6 gauge wire for the motor cables and for extending the supplied battery cables. The 10 gauge wire supplied is used for current limiting protection - see explanation under WARRANTY at end of these instructions.

Schematic A



Since the connections made in the battery circuits can carry hundreds of amps, it is imperative that you have low resistance connections. This means having clean metal to metal contact, the right size ring terminals, properly crimped terminals, with secure mechanical fastenings.

BASIC INSTALLATION

The Trollbridge36® uses three 12 volt batteries to make 36 volts.

If you are only using 24 volts omit battery B and isolate, insulate and protect the unused yellow and white cables.

One of these batteries can be the normal starting battery (Schematic A), or dedicate 3 batteries to trolling (Schematic B). To separate the starting battery, it should be connected to the Trollbridge36® with a battery combiner so the trolling motor is isolated from the starting battery when running.

These instructions refer to circuit breakers or fuses. 50 amp breakers are typical since this is a normal maximum Trolling Motor current. You can use a lower value if you have a smaller motor and you can use up to 100 amps if necessary for a larger one or twin motors.

Since they charge in parallel, it is no longer necessary that the batteries be matched for size so if you share the starting battery with the trolling in a 3 battery setup, you can make the starting battery larger to serve both functions. Deep cycle batteries are recommended for all.

1. Connect the **BLACK** ground wire to the common negative of your main 12 volt battery **A** ground terminal. It is OK to Shorten if necessary. Lengthen with 8 or 6 gauge wire if needed.
2. The **RED** cable is connected to the positive terminal of the main 12 volt battery **A**. For safety circuit breaker should be installed on this cable. ***MAKING THIS CABLE SHORTER WILL VOID THE WARRANTY.*** Extending with 6 gauge wire is OK.

The connections do not have to be made right on the battery terminals but any wire or cables between the battery and the Trollbridge36® must be heavy enough to carry the trolling motor current in addition to any existing loads on those cables.

3. For a 24 volt installation, insulate the ends of the YELLOW and WHITE cables and skip to #6.
4. Connect the **YELLOW** cable to the trolling battery **B** negative terminal. ***No other connections should be made to this battery terminal. MAKING THIS CABLE SHORTER WILL VOID THE WARRANTY.*** Extending with 6 gauge wire is OK.
5. Connect the **WHITE** cable to the trolling battery **B** positive terminal . ***No other connections should be made to this battery terminal. MAKING THIS CABLE SHORTER WILL VOID THE WARRANTY.*** Extending with 6 gauge wire is OK..For safety a 50 amp breaker or fuse should be installed on this cable.
6. Connect the **GREEN** cable to the trolling battery **C** negative terminal. ***No other connections should be made to this battery terminal. MAKING THIS CABLE SHORTER WILL VOID THE WARRANTY.***
7. Connect the **PURPLE** cable to the trolling battery **C** positive terminal. ***No other connections should be made to this battery terminal. MAKING THIS CABLE SHORTER WILL VOID THE WARRANTY.*** For safety a fuse or circuit breaker should be installed on this cable.
8. The **BLUE** cable connects to the trolling motor positive input. This cable can be shortened if desired and wired through a disconnect plug. ***No other connections should be made to this cable.*** Extend with 6 gauge wire where necessary. If you installed the fuses/circuit breakers on the batteries, **no fuse or circuit breaker** is needed on this cable.
9. The negative side of the trolling motor connects to the main negative terminal of the (starting) battery **A**. 6 gauge wire is recommended.
10. After the wiring, all batteries may need to be turned off or disconnected so you can do the initialization. See **IMPORTANT FIRST SETUP INITIALIZATION** on page 1.

OPERATING INSTRUCTIONS.

1. **Off**

The Trollbridge36® does not need an on/off switch and should be left connected to the batteries at all times. The computer adapts the operation of the Trollbridge36® to match the characteristics of your trolling motor and batteries. These settings are lost from memory if all power is removed and it will have to re-adapt.

When the trolling motor is off and the battery voltage has not changed for 4 minutes, the display will shut down and draw virtually no current from the battery. About once every 70 seconds one or more of the LEDs will flash briefly when it is OFF. The LEDs that flash will indicate the voltage of the batteries. The remote LED, if installed, will also flash. This short flash uses a minute amount of battery power. (The current drawn in the off mode is about 150 microamps or 1% of battery capacity in two years.) The Trollbridge36® will turn back on if there is a change in battery voltage or the trolling motor is turned on. You can also force it back on with the optional Remote button.

Depending on your model of trolling motor and the way the Trollbridge36® has adapted, it may draw 500 milliamps for about 5 hours after you stop trolling. On some installations this can use 2 to 3 amp hours however most trolling motors do not require this mode and no current is drawn if left on charge.

2. **Charging**

If the battery voltage is increasing and while it stays above about 13 volts the Trollbridge36® is in the charging mode. The LEDs will indicate the level of charge. Batteries are combined in steps as the power from the alternator becomes available. To control the load on the alternator, the added batteries may be cycled on and off. This may cause the voltage display to jump up or down periodically however this is normal.

3. **Trolling**

Unless you have set MANUAL operation with the remote control, turning the trolling motor on will switch the Trollbridge36® to the 36 volt output with the batteries in series. The voltage readout when the trolling motor is running will show a percentage of full charge referenced 36 volts. If you are running a 24 volt motor and omit battery B, it will switch to 24 volt mode and show voltage as a percentage of 24 volts fully charged. If both the second and third batteries are omitted, it will supply 12 volts to the motor and indicate operating voltage on a 12 volt full charge scale.

4. **Manual operation**

See *REMOTE BUTTON FUNCTIONS* in the appendix. Some trolling motors with built-in depth sounders may have to be locked in trolling mode to keep the sounder running when the motor will be idle for more than four minutes and some models may require the remote button to wake up the Trollbridge36® after entering sleep mode when unused for an extended period and the outboard is not started. "No gas motor" destinations may need the remote control.

READING THE LED DISPLAY.

- One LED on, OR one on and an adjacent one flashing is Voltage Display, see detail below
- Occasional lights rising = increasing voltage
- Occasional lights falling = decreasing voltage
- Continuous lights falling = batteries too low to register or batteries missing.
- Two red LEDs flicker = 12 volt idle or charge
- Two amber LEDs flicker = 24 volt trolling
- Two green LEDs flicker = 36 volt trolling
- Two red LEDs 4 times= manual 12 volt
- Two amber LEDs 4 times = 24 volt manual
- Two green LEDs 4 times = 36 volt manual
- Odd/even up/down flash = battery problem
- All 6 flashing bright dim is reboot setup

Reading the Voltage Display

The LED voltage display is always adjusted to show a percentage for the particular voltage being monitored. 100% when charging would correspond to fully charged = 14.2 volts. 100% when running on 36 volts would be 38.4 (i.e. 12.8 volts per battery). Equivalent displays are automatically scaled for 12 or 24 volt trolling motor operation. When idle, 100% is 12.8 volts, fully charged.

The 6 LEDs show battery percentage in 18 stages. Each LED represents about 15%. A flashing LED above or below the one that is on continuously indicates 5% above, or below the steady one. For example, if just the second LED from the bottom is on steady that represents 30%. If it is 35% then the 3rd LED will be flashing with the 2nd on steady. If it is 40% then the 3rd will be steady with the 2nd now flashing. (45% less 5%) if the 3rd is on steady you have reached 45%.

If the top LED is flashing the voltage is above 100% for that range. If the voltage is too low to display the LEDs will run rapidly from top to bottom continuously. Below about 10.4 volts the Trollbridge36® will shut down to protect the batteries until sufficient operating voltage is available. It will restart automatically when the batteries are charged.

When trolling, a voltage in the **green** area shows plenty of charge. The **orange** area shows you are getting down to the 12.0 volt range. The **red** area is a warning that the batteries are getting below 12 volts. You should stop using the motor when the lowest **LED** is on steady and if it starts to flash you are getting below 10.5 volts which can damage the batteries permanently. Below 10.5 volts per battery the Trollbridge36® will put the batteries in parallel to protect them from reverse polarity damage. If you absolutely have to have the motor running and have installed the optional remote control button, you can switch to manual and restore 36 volts at your own risk. If the audio alarm is installed, it will give a warning when approaching the low voltage cut-off.

The voltage range from 0 to 100% on the LEDs changes scale automatically. When starting to charge you will see the increased voltage and upward flashes. When it reaches 12.9 volts the display will now change scale to show the percentage of charge so the voltage will start at a very low % and increase all the way up to 14.2 volts with the top **green** LED on. When charging ceases the display will remain in the "charging" range until the voltage again gets down to 12.8 when it will switch to showing fully charged with the top LED on again.

When you turn on the trolling motor (or enter trolling modes manually) theTrollbridge36® will put the batteries in series to give you 36 volts. If only two batteries are installed it will switch to 24 volt mode. The mode it is in will be indicated by two **green** LEDs on for 36, two **orange** LEDs for 24 volts or two **red** if there is only one main battery and operating in 12 volts. In all three cases, the voltage displayed is proportional to 100% for that range.

TROUBLE SHOOTING

The amount of charging available is limited by the alternator output and how long it runs. Some outboard alternator, particularly older models, have minimal output so running time for the trolling motor will be governed by the running time and capacity of the main engine and the battery capacity.

The computer will detect various battery problems, mainly related to missing or mis-wired batteries. If it indicates 12 or 24 volts when it should be 36, of if the LEDs flash Odd/Even Up/Down, check the battery cables and circuit breakers.

APPENDIX

A **shore power charger** can be connected to battery **A** to charge all batteries. A single output charger is all that is

needed however if a multi-output charger with individual charging leads for each battery is already installed it can be left installed as-is.

A **truck charging line** can be connected to battery **A**. Running an additional cable from this battery to the trolling motor plug will allow making a matching plug from the charging vehicle that can be connected conveniently.

The connector on top is for computer access and future expansion.

OPTIONAL REMOTE CONTROL/INDICATOR KIT

A remote kit is not necessary. For most installations, the Trollbridge36® will function without it. It may be used where it is not convenient to view the built in voltage indicators. When installed, the remote control allows remote indication of battery voltage. This substitutes for (but is not as accurate as) the built-in voltage display LEDs that may not be visible if mounted in the battery compartment. Manual mode may be needed for motors with a built in 36 volt fish-finder and require 36 volts be maintained when the trolling motor is off.

You can purchase the remote kit or Individual items can be installed on their own. See sample schematics for DIY.

The **remote LED** shows the percentage of voltage by how fast it flashes. At 100% it is flashing so fast it looks like it is on all the time, 50% is on ½ second, off ½ second and discharged is about 5 seconds on, and about 5 seconds off with other flash speeds between those to indicate approximate voltage.

The audio alarm provides warnings when the battery voltage is getting so low that the motor should be shut down to prevent permanent damage. It also alerts to mode changes, both manual and automatic.

REMOTE BUTTON FUNCTIONS:

Button presses are either short (a quick press) or long (hold down for at least 1 second).

Any button press will restore and activate the Trollbridge36® from a shut down or fault lockout

A long press will toggle between MANUAL and AUTOMATIC. In Automatic, the Trollbridge36® switches from charging mode to trolling mode automatically. In Manual, it locks in either charging or running mode. **MANUALmode should not be left on for extended periods, it prevents sleep mode to save battery use.**

A short press when in Manual changes between Charging (12V) and Running (36V or 24V).

A short press in Automatic silences or restores the beeper, if it is installed. If it beeps after pressing, it is ON

There are two models of optional remote kits. A splash proof plastic illuminated button that mounts in a 15/16 dia hole. The second is all stainless, waterproof and mounts in a 3/4" hole. Both come with a telephone style cable, 20 feet long..

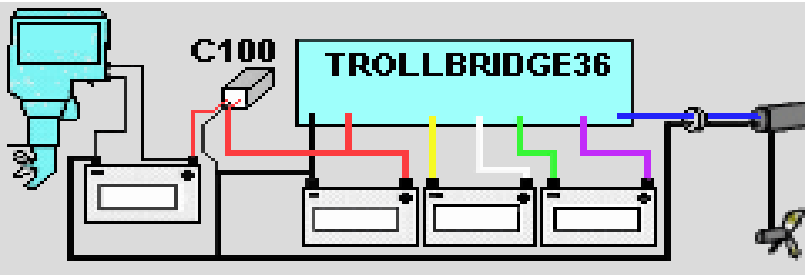
WARRANTY

§ ***WARRANTY VOID IF INDICATED POWER LEADS ARE MADE SHORTER*** otherwise we offer an unlimited warranty. These power leads cannot be shortened because they provide a few milliohms of resistance that protects the Trollbridge36® from excessive current when batteries at different voltages are switched in parallel. They have no detrimental effect at normal operating currents.

Check at http://www.yandina.com/AboutUs.htm to get service information and the warranty return address.

TECHNICAL EMAIL QUERY tech@yandina.com or call 877 355 2184 toll free (843 524 2282 direct).

SCHEMATIC B



REMOTE SCHEMATIC

Remote push button, Beeper and LED shown. The push button must be normally closed and open when pushed. A form C switch can be used, ignoring the normally open connection. A 12 volt electronic beeper should be used. Maximum current 10 mA. The capacitor across the beeper should be 33uF at 25 volt.

The switch can be omitted if desired - just connect the LED and/or Beeper to the + Power. The beeper can be omitted if not desired. The LED can be omitted if not desired but if you have the push button, the LED terminal should connect to the switch, bypassing the LED shown.