Yandina LLC.

TROLLBRIDGE2400® COMBINER

CHARGE 24 VOLT EQUIPMENT BATTERIES FROM 12V DC

SUMMARY

Rev June 2017

The Trollbridge2400® Combiner allows you to charge your 24 volt battery for you trolling motor, bow thruster, winch, hydraulics etc., from the 12 volt alternator on your main engine, your trailer hookup or any single or multi-output 12 volt charger. It works automatically by putting two 12 volt batteries in series when you need to run the 24 volt load and putting them in parallel for charging.

FEATURES

Use with 24 volt loads up to 12KW or 16 horse power, **500 amps** continuous

Automatic charging starts when the alternator is running and starting battery is above 13 volts

Rated for 12 volt alternators up to **200 amps** for rapid charging

Efficiency over **99%** at maximum load or charge

No load (350 microamps) on any batteries when idle

Both batteries are in parallel when idle

Eliminates the need for multiple output chargers

Green LED indicates 24 volt output active

Yellow LED indicates charging in progress

Red LED indicates fuse blown

Remote indicator outputs provided, see **§**

Waterproof. UNLIMITED warranty

No wasted power, no heat sink or cooling required

Simple 6 wire basic installation

12 volt house loads can also be placed on **BATTERY 1**.

HOW HOW IT WORKS

The Trollbridge2400® uses two 12 volt batteries to make 24 volts. They remain in parallel at 12 volts when not in use so only 12 volts is supplied to the load. If the load draws 1 amp or more from this it switches the batteries in series to give 24 volts. If no current is drawn it reverts to parallel mode after a time delay.

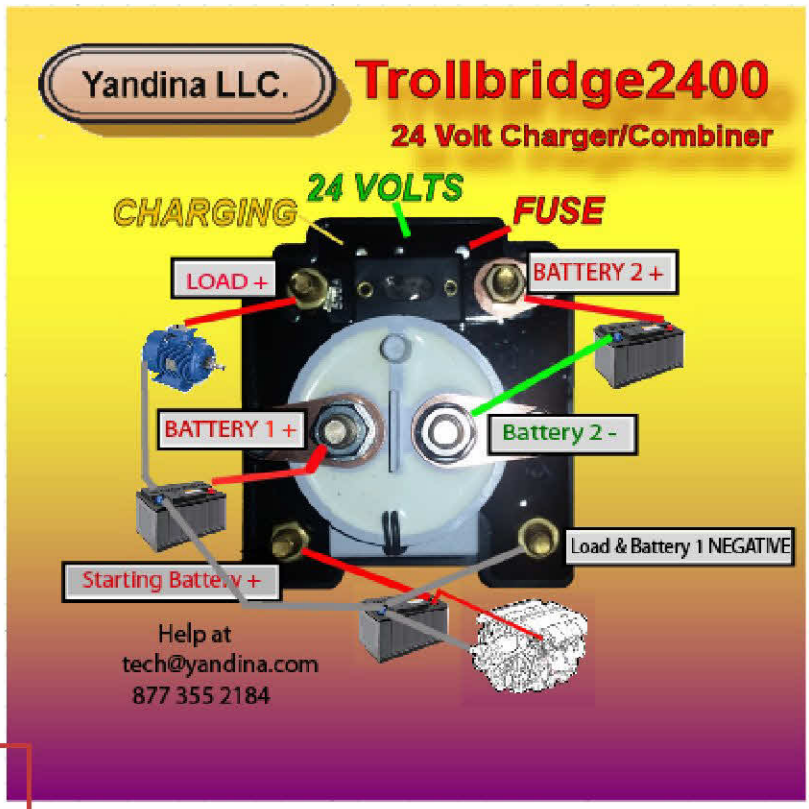
BATTERY 2 is switched in series for a 24 volt load. ***NOTHING ELSE CAN CONNECT TO BATTERY 2.***

A hard wired series jumper that typically exists between battery 1 and battery 2 for 24 volts must be removed, it is replaced by the 500 amp relay on the TB2400. A 250A fuse comes installed between the battery 2 positive and the load output. The TB2400 has a charging terminal that connects to the starting battery.

CAUTION The negative side of your 24 volt load has to be connected to **BATTERY 1** negative and the starting battery negative. Make sure this negative ground is compatible with current and the load polarity.

INSTALLATION

Required fuse (250A) included. If the stalled current of the motor is greater than 250 amps and your cable sizes are adequate, a 500 amps maximum fuse is available..



ASSUME NOTHING - Read every word of this manual. NEVER short the two main relay terminals together, self destruct can result.

DANGER: During installation voltages will be present on unconnected terminals. Make sure cables on these do not short out to ground, battery circuits, or to each other. EXPLOSIVE level currents could result.

DOUBLE CHECK instructions prior to making each connection. Tap the connections first to check for sparks which would indicate a wiring error.

If modifying an existing installation REMOVE ALL CABLES FROM BATTERIES and start from scratch. In particular REMOVE any jumper between the batteries.

For maximum efficiency, mount the Trollbridge2400 adjacent to the batteries.

Use a gauge of cable on the 24 volt circuit appropriate for your maximum load. Charging circuits 6 gauge or lighter.

Label the batteries with their number so you don't get confused. Double check each connection. Be very careful observing polarity. Mistakes can cause fire, explosion and injury. **Tap the connections first to check for sparks which would indicate a wiring error.**

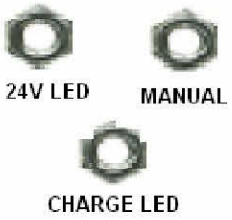
Since the connections can carry hundreds of amps you need low resistance connections with clean metal to metal contact, the right size terminals, properly crimped terminals, with tight mechanical fastenings but don't over

tighten, they are only brass. Put high current terminals on the bottom of the studs for maximum contact, and lighter gauge terminals go above them.

1. ***VERY IMPORTANT*** Remove any existing jumper from **BATTERY 1 positive** to **BATTERY 2 negative**. (If your 24 volt equipment has dual 12/24 volt inputs connect the 12 volt input to battery 1 positive with a fuse or circuit breaker if needed.)
2. Any existing battery charger cables can be left as-is or preferably connect all to the starting battery in parallel.
3. Connect the Trollbridge2400® negative terminal to **BAT 1 NEG** using **6 gauge cable or lighter**. This battery terminal also connects to the starting battery negative with **6 gauge or lighter cable** or 4 gauge for a run over 15 feet.
4. The relay terminal marked **BAT 1POS** is connected to the positive terminal of **BATTERY 1** with high current, owner supplied, **RED** cable. Cable goes OVER the copper link. Relay closures can often occur during initial connection.
5. The relay terminal marked **BAT 2 NEG** is connected to **BATTERY 2** negative using owner supplied heavy current cable, **GREEN** if available otherwise use **BLACK**. ***No other connections should be made to this negative battery terminal.*** Cable goes OVER the copper link.
6. Connect the positive terminal of **BATTERY 2** to **BAT 2 POS** terminal with heavy gauge **RED** cable. ***No other connections should be made to this positive battery or BATTERY 2 POS terminal.*** Place cable OVER copper link, fuse goes **UNDER** the copper link. *****SEE FUSE REPLACEMENT INSTRUCTIONS .***
7. The **24 VOLT** **(Load +)** terminal connects to your 24 volt equipment positive through an on/off safety switch or circuit breaker.
8. The **12V CHRG** terminal connects to the +12 volt charging source, normally the vehicle starting battery. It can be fused up to 200 amps if desired. Use **6 gauge or lighter** cable or 4 gauge for charging runs over 15 feet.
9. The negative side of the 24 volt load connects to the negative terminal of **BATTERY 1** with heavy **BLACK** cable.

§ An optional remote **green LED** indicator that shows when you are in 24 volt mode can be connected between the **"24V LED" terminal** and +12. An internal resistor already limits current to 10mA.

An optional remote **yellow LED** indicator that shows when the batteries are being charged can be connected between the **"CHARGE LED"** terminal and +12. Current is internally limited to 10mA.



Connecting **"MANUAL"** to +12 will force 24 volt mode.

OPERATING INSTRUCTIONS.

The Trollbridge2400® automatically puts the batteries in series whenever you turn on the 24 volt load. When not in use, there is 12 volts going to the load to detect when a load is connected When a load of 1 amp or more is applied the voltage switches to 24 volts and the **GREEN LED** turns on.

When the load is off the batteries are put back in parallel after a time delay.

Charging is disabled when running with a 24 volt load to protect the charging circuit from overload if battery 1 is disconnected however both motors can run simultaniously.

TROUBLE SHOOTING

The **RED LED** indicates a blown fuse.

Normally only 12 volts will be going out to your 24 volt equipment until it is turned on and draws current.

Charging will be delayed until the starting battery first gets a significant charge and is above about 13 volts. Charging may cycle on and off with low batteries to match the charging load to the alternator capacity.

A repetitive clicking or buzzing sound indicates that one of the batteries is not connected or has failed.

Green LED stays on. Check that the fuse is installed correctly, see ** below. The terminals must be tight.

The control circuits in the 24 volt load may be drawing current even when the high current load is OFF. Test by disconnecting the **24 VOLT** terminal. If this is the case you will need a switch or circuit breaker in the cable going to the load. Turning this off will prevent it discharging batteries into this residual load and allow the Trollbridge2400® to switch back to 12 volt charging mode.

Green LED stays off. (LOCKOUT). If it fails to switch to 24 volts when you apply a load, it may be due to the wiring safety lockout. ***Double check your wiring***. **Nothing** other than the 2 cables to the TB2400 should be on battery 2. No other power source can be connected to the load. The load cannot be another 24 volt battery. There is no visual or audio indication of the lockout. The on-board fuse MUST be used.

Some 24 volt applications may fail to turn on because their electronics won't operate while only getting 12 volts. In this case, to use the Trollbridge2400® you will need to install a **MANUAL CONTROL** switch that connects the **"MANUAL"** terminal to **+**12 volt (eg. battery 1 positive). When turned ON you will have 24 volts. When turned off it will switch back to 12 volts for charging mode **after** the load is removed and after a time delay. Light gauge wire is OK for the switch. Manual operation will be prevented if there is a wiring error, see LOCKOUT above.

Amber may Stay on if **any** battery is over 13 volts.

** FUSE REPLACEMENT INSTRUCTIONS .

The fuse integrates with the electronic controls and cannot be omitted. **BATTERY 2+** and **24 VOLT** terminals are not interchangeable.

When changing the fuse ***TURN THE LOAD OFF***, loosen both terminal nuts a couple of turns, swing the LOAD + terminal end of the fuse away and then slide out of the BATTERY 2 + terminal. ***IMPORTANT***, when replacing, the fuse slides **UNDER** the copper link on the BATTERY 2 + terminal tab and UNDER the BATTERY 2 cable.

SHORE POWER CHARGING

A **single output shore power charger** can be connected to the starting battery to charge all batteries. If you have a multi-output charger already installed there is usually no need to change the connections.

WARRANTY

We offer an unlimited warranty replacement.
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 overseas direct).