



# INSTALLATION & OPERATION MANUAL

RACE ENERGY

## TDC30-12 Total discharge Controller







# IMPORTANT SAFETY INSTRUCTIONS

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■ **SAVE THESE INSTRUCTIONS** — This manual contains important safety and operating instructions for the battery charger.

■ **ALL BATTERY CHARGERS**

- 1) CAUTION — To reduce risk of injury, charge only lead acid or sealed gel cell type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
- 2) Do not expose battery charger to rain or snow.
- 3) Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
- 4) Do not disassemble battery charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
- 5) To reduce risk of electric shock, disconnect battery charger from batteries and AC supply before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

■ **AC BATTERY CHARGERS**

1) WARNING — RISK OF EXPLOSIVE GASES.

i) WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE SERVICING EQUIPMENT IN THE VICINITY OF THE BATTERY, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.

ii) To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.

2) PERSONAL PRECAUTIONS

i) Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.

ii) Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

iii) Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.

iv) 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.

v) NEVER smoke or allow a spark or flame in vicinity of battery or engine.

vi) Work carefully around batteries to reduce the risk of dropping any metal tool onto the battery. If the battery is shorted, it could cause a spark or short-circuit battery or other electrical parts that could cause an explosion.

vii) 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.

viii) NEVER charge a frozen battery.

ix) If it is necessary to remove a battery from service, always disconnect the ground terminal from the battery first. Make sure all accessories are off, so as not to cause an arc.

x) Be sure area around battery is well ventilated.

xi) Clean battery terminals with a proper terminal cleaning tool. Be careful to keep corrosion from coming in contact with eyes.

xii) Study all battery manufacturers' specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.

xiii) Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.

### 3) BATTERY CHARGER LOCATION

i) Never place battery charger directly above battery; gases from battery will corrode and damage charger.

ii) Never allow battery acid to drip on battery charger when reading gravity or filling battery.

### 4) CONNECTION PRECAUTIONS

i) Connect and disconnect DC output connections only after setting battery charger switch to off position.

■ **GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS** — 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 the outlet, have the proper cord installed by a qualified electrician. Improper connection can result in a risk of an electric shock.



# INTRODUCTION

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Step up a 12 VDC battery to between 13.5 and 17.0 VDC in 0.5 VDC increments (via 3 position DIP switch), or stabilize a 12 power system. Safety features include reverse input protection, low input voltage alarm, low output voltage alarm, over temperature shutdown and alarm, and output overvoltage crowbar. If the input voltage exceeds the regulated output voltage, the unit simply passes the voltage through with full LC filtering and a single schottky diode drop (0.5 VDC or less).

Without an alternator, a race car battery fully charged starts at 12 volts and discharges down to about 10.5 volts before it is completely exhausted. The TDC30 will draw up to 30 amps from the battery, boost and regulate it to any desired voltage between 14 to 17 volts (in 1/2 volt increments).

The TDC30-12 is perfect for short races (one hour or less) where there is enough charge in the battery to meet the energy needs of the car but not necessarily at a high enough voltage for modern ECU's.

## TDC30-12 Specifications

<b>Input Voltage</b>	10.5 - 18 VDC
<b>Output Voltage</b>	(Input – 1V) or (13.5 to 17.0 VDC) Whichever is greater
<b>Current Limit</b>	30 Amps In
<b>Output Crowbar</b>	Programmed Output Volts x (1.3 ± 1%)
<b>Input Fuse</b>	AGC 20 x 2 Amp
<b>Low Input Voltage Alarm</b>	10.5 VDC
<b>Low Output Voltage Alarm</b>	Programmed Output Voltage minus 2.5 VDC
<b>Noise on Input</b>	< 25 milli-volts
<b>Noise on Output</b>	< 25 milli-volts
<b>Transient Resp.</b>	< 1V for 15A Surge
<b>Efficiency</b>	> 90 % @ maximum output
<b>Temp. Range</b>	-25 to +40 deg° C @ maximum output
<b>Isolation</b>	Any Input or Output to Case 500VDC Input to Output Common Negative
<b>Length</b>	9.1 in / 23.1 cm
<b>Width</b>	7.8 in / 19.8 cm
<b>Height</b>	2.5 in / 6.4 cm
<b>Clearance</b>	1 Inch (2.5 cm) all around
<b>Material</b>	Marine Grade Aluminum
<b>Finish</b>	Black Powder Epoxy
<b>Fastenings</b>	18-8 Stainless
<b>Weight</b>	4.0 lb / 1.8 kg.

Designed and manufactured by:

**RACE ENERGY** 

8128 River Way, Delta, B.C., V4G 1K5, Canada

**Toll free 800. 668. 3884**

[www.raceenergy.net](http://www.raceenergy.net)

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Specifications subject to change without notice.



# INSTALLATION

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## **■ MOUNTING**

Mount the unit in a DRY location. Allow at least 1 inch of clearance for adequate cooling.

## **■ POWER CONNECTION**

The unit is supplied with input power leads 1 meter long. This should normally be adequate to connect to a source of power. If you must extend the cable:

- Use the smallest extension length possible.
- Use no less than 10 gauge conductors.
- Splice and solder the joints.
- Protect the joints with heat shrink tubing.

Connect the wires as follows:

- Red to Positive
- Black to Negative

## **■ OUTPUT CONNECTIONS**

Two positive output terminals and two negative output terminals are provided. Connect only one wire to each terminal. Ensure that the total average load connected does not exceed the continuous current rating of the unit.

Note that the current specifications are for input current. To obtain the maximum output current capability at any given input voltage, use the following formula:

$$\text{Output Current} = \text{Input Volts} / \text{Output Volts} \times 27$$

For example:

10 VDC in and 27 VDC out, the max output current =  $10/27 \times 27 = 10.0$  Amps.

20 VDC in and 27 VDC out, the max output current =  $20/27 \times 27 = 20.0$  Amps

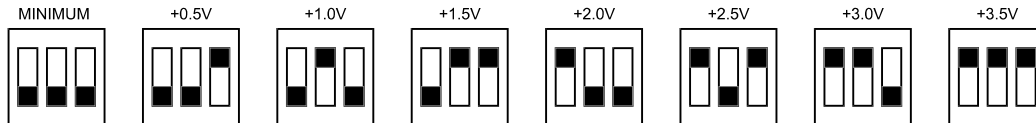


## OPERATION

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Turn the power switch on the front of the unit on to energize the outputs.

To adjust the output voltage, turn off the power switch. Remove the plate from the top of the box. Reach in with a non-conductive device such as a pencil and open or close the dip switches as shown below to select the desired output voltage. Replace the plate. Turn the power switch on.



BLACK PORTION INDICATES SWITCH IS PUSHED DOWN



## TROUBLESHOOTING

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- If the load exceeds the continuous rating for too long a period, the internal temperature sensor will cause the unit to stop boosting the input voltage until the unit has cooled down. After the unit has cooled down, normal operation will resume.
- If the input voltage drops below the specified minimum input, the unit will sound the alarm.
- If the output voltage drops below the specified minimum, the unit will sound the alarm.
- If the current demanded by the devices connected to the unit exceed the maximum current rating, the fuse will blow.
- If the fuse blows with no load connected, check that the power leads are connected to the battery with the correct polarity; if they are then the unit is damaged and must be returned for repair.



## LIMITED WARRANTY

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1. The equipment manufactured by Race Energy, (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service.
2. This warranty is in effect for:
  - a. 3 Years from **date of purchase** by the end user for standard products offered in our catalog.
  - b. 2 Years from **date of manufacture** for non-standard or OEM products
  - c. 1 Year from **date of manufacture** for encapsulated products.
3. Race Energy will determine eligibility for warranty from the date of purchase shown on the warranty card when returned within 30 days, or
  - a. The date of shipment by Race Energy, or
  - b. The date of manufacture coded in the serial number, or
  - c. From a copy of the original purchase receipt showing the date of purchase by the user.
4. In case any part of the equipment proves to be defective, the Purchaser should do the following:
  - a. Prepare a written statement of the nature of the defect to the best of the Purchasers knowledge, and include the date of purchase, the place of purchase, and the Purchasers name, address and telephone number.
  - b. Call Race Energy at 800-668-3884 and request a return material authorization number (RMA).
  - c. Return the defective part or unit along with the statement at the Purchasers expense to the Warrantor; Race Energy, 8128 River Way, Delta, B.C., V4G 1K5, Canada.
5. If upon the Warrantor's examination the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense by the most economical means. Requests for a different method of return or special handling will incur additional charges and are the responsibility of the Purchaser.
6. Race Energy reserves the right to void the warranty if:
  - a. Labels, identification marks or serial numbers are removed or altered in any way.
  - b. Our invoice is unpaid.
  - c. The defect is the result of misuse, neglect, improper installation, environmental conditions, non-authorized repair, alteration or accident.
7. No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.
8. Only the Warrantor shall perform warranty service. Any attempt to remedy the defect by anyone else shall render this warranty void.
9. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically stated to be waterproof.
10. No other express warranty is hereby given and there are no warranties that extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.
11. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.
12. The Warrantor assumes no liability for incidental or consequential damages of any kind.



8128 River Way, Delta, B.C., V4G 1K5, Canada

**Toll free: 1-800-668-3884**

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